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THE MICROSCOPE IN PHARMACY.

BY HENRY POCKLINGTON.

(*Continued from* Vol. II. *p.* 1025.)

Pyrethri Radix.—Sections of this root can only be examined to advantage in fluid, and should be put up in glycerine or glycerine jelly for preservation. Owing to the thinness of the cell walls and the loose texture of the root generally, it suffers much distortion (structurally) in drying; so that it is almost impossible to make a proper examination of the dried root.

The *medulla* is present, and somewhat largely developed, and is irregularly septate, the cavities between the septa being somewhat large. The cells of the medulla are very thin-walled modified globose cells, adhering somewhat intimately to each other, and varying much in cross-sectional outline. Many of these cells display *pseudo*-reticulations, due to unequal shrinking during exsiccation, which may easily mislead a beginner.

The *medullary rays* are very large, exceeding sometimes by three times the breadth of the wood wedge; they are complete and incomplete in nearly equal proportion. Their cells resemble those of the medulla, becoming more cubical as they approach the cortex.

The *wood wedges* are hardly worth their name, as they are merely composed of cubical parenchyma cells and vascular (pitted) vessels. These vessels are almost scalariform, but do not otherwise possess any features of interest, and are out of all proportion, as to size and number, to the *pseudo*-wood cells. The only cells in which secondary deposits are traceable are the liber cells of the cortical layers, which are not otherwise interesting, except in being very numerous. The cortical layers consist of cubical parenchyma; colouring matter receptacula, which are cubical cells also; liber cells; and the compressed cells of the external layer. Starch is present in very small proportion. The granules are roundish, and of small medium size.

Pareiræ Radix.—As is tolerably well known, the so-called root of Pareira of British pharmacy is really the stem, generally of *Cissampelos Pareira*, but often of some other species. The structure of the B. P. so-called root is exceedingly interesting and characteristic. I describe the true *Pareira Brava* from a portion of a stem about half an inch in diameter.

Medulla.—The medulla is very visible to the naked eye, is often very eccentric, and throws out radiating processes (medullary rays) to the bark. These are also visible without a lens. The cells of the medulla are of medium size, are somewhat irregular, and variable in size and shape; some contain a darkish yellow colouring matter, nearly all contain starch. The starch granules are very variable, both in size and shape. The large ones may be best described as flatly compressed lenticular granules, with a strongly marked longitudinal hilum. By polarized light these granules give a decided single black cross. The smaller granules are much too variable to be grouped under any one characteristic, unless it were rounded-off polyhedrons. Acicular raphides, or more correctly perhaps, as they have not pointed ends, elongated prismatic raphides, are contained in specialized cells near the exterior of the medulla, and very occasionally, but they are then much smaller, in the cells of the medulla itself. The true medulla cells are distinctly pitted with oval pits, the cell walls are slightly coloured yellowish brown, and are evidently considerably thickened by secondary deposits. They are generally egg-shaped, often globose; towards the circumference they become more angular, and when the medullary rays strike off, become much longer in proportion to their other dimensions.

Medullary Rays.—These are, as has before been stated, very well marked. Their cells are somewhat loosely attached to each other, and are somewhat less angular than usual. Raphide-receptacula abound in the rays.

Vascular Bundles.—Owing to the great size of the medullary rays, the wood masses are well isolated on two sides. They are composed of porous wood fibres and pitted vessels; these latter being of the large size common to all climbing plants. The wood fibres are themselves of the nature of vessels, from the largeness of their central cavity and the small extent to which their walls have been thickened. They are fragile, adhere closely to each other, and are of considerable length, slightly tapering towards each end; oval in cross section, and closely pitted. The pits are usually in the centre of a relatively large ring, and are oval; they do not contain either starch or raphides. The vessels vary much in size, and are exceedingly interesting. The largest are reticulated in an intricate manner; the pits oval, and in a central bordering follow the pattern of the reticulation somewhat closely, the axis of the pore lying often parallel with the course of a supposed spiral wound within the cell. The ends of these ducts are, as Quekett remarked long since, somewhat flattened; are often closed with a double septum, or more correctly with septa, being the unabsorbed membrane of the respective cells. The reticulations on these septa are often very remarkable, and resemble very closely those of *Sanseviera guineensis*, being much more elaborate and less regular than those of the spiral cells of orchids with which most microscopists are familiar. In the older ducts the membranes between the reticulations often have been absorbed, and we have a true reticulated fibrous vessel. In the smaller ducts these reticulations are not easily discernible, sometimes they are absent. The polariscopic reactions are very marked; few slides would be more beautiful than a good longitudinal section mounted in balsam, and viewed with the aid of a blue selenite whose optic axis is inclined 13° to 27° from the plane of primitive polarization; the long axis of the ducts must be at right angles to that plane. Under these conditions the play and succession of colour as the polariser is revolved are astonishing, and, I need hardly say, exquisitely beautiful. It unfortunately happens that good sections are very difficult to make. The larger vessels are usually stained deep yellow; alongside lie, in special cells, bundles of raphides.

Cortical Layers.—An adequate discussion of these would occupy more space than I can afford, as they happen to be somewhat complex.

The points of interest are the liber cells, which are usually full of yellowish-brown colouring matter, the somewhat unusually shaped cells of the epiphlœum, the bundles of raphides in their receptacula, and, specially, certain stellate cells. These latter are unusually interesting. Their centre is porous, as may be seen if the colouring matter with which they are usually filled be removed, the pores passing through the very thick layers of sclerogenous deposits and communicating with the contiguous cells. The details of structure in these cells can be best made out, if they be isolated by means of sulpho-chromic acid from the surrounding tissue. The action of the acid is very energetic, and care must be exercised or the section will be spoiled. The beginner had better commence by using nitric acid; and when he has succeeded with that, pass to the use of the sulpho-chromic.

HYPODERMIC INJECTIONS.

BY M. ADRIAN.

In the preparation of a solution for hypodermic injection, the choice between the normal alkaloid and its salts is not an indifferent one. When medicaments so powerfully active are injected under the skin, it appears necessary to define clearly the relation that exists between the alkaloid itself and its combinations with acids. In medical practice sufficient importance is not always attached to this distinction; and instances are sometimes met with where the same doses of hydrochlorate, sulphate and acetate of morphia, or of hydrochlorate and sulphate of strychnia, are prescribed, although the constitution of these various salts assigns to them a sensibly different proportion of the active principle that is employed. This will be seen by an examination of the following numbers:—

One gram of	Crystallized Alkaloid.	Water necessary for Solution.
Hydrochlorate of Morphia contains	0·80	20
Sulphate of Morphia . .	0·76	10
Acetate of Morphia . . .	0·86	5
Sulphate of Strychnia . .	0·75	10
Hydrochlorate of Strychnia	0·83	8

According to this table, one gram of acetate of morphia contains ten centigrams more of morphia than the same weight of the sulphate, and a similar difference exists between the hydrochlorate and sulphate of strychnia.

Of course it is because of their greater solubility in water that the preference is given to the saline combinations over the alkaloids. But the preparation of these solutions is not so easy as at first sight might appear, and certain difficulties are met with in the operation which might possibly lead to a notable error in the final result, and so modify consequently the composition of the medicament. Thus in operating with the salts of morphia, it is found that their solubility is variable, and it is necessary sometimes to have recourse to elevation of temperature, or the addition of a fresh quantity of acid, to obtain a solution. This difference may arise from an impurity in the salt, or more frequently from the greater or less amount of dehydration it has undergone in its preparation. On the other hand, it is rarely that the solution is sufficiently clear, and it becomes necessary to filter it through paper. But what then happens? The filter absorbs a portion of the liquid; and although the precaution may be taken of well washing the filter, there is no proof that the whole of the active principle is carried off in the washing, so that in pouring 10 grams of distilled water containing 30 centigrams of hydrochlorate of morphia upon a filter weighing 50 centigrams, only 8·20 grams of the solution is recovered, being a loss of 1·80 gram, or nearly one-fifth.*

Solutions intended for hypodermic injection, prepared as they usually are, present another defect, namely, the alteration which they undergo after a time. Small fungi are seen to form upon their surface; then the liquid becomes turbid and gives rise to a copious deposit. The experiments which the author has made with the object of avoiding this alteration, have led to the following results.

The solutions of atropia and codeia are decomposed more readily than the others. Also, when they are prepared in the cold they change more rapidly than when they are obtained with boiling distilled water. Liquids containing the alkaloids dissolved with the help of sulphuric acid are preserved better than those in which hydrochloric acid is used. Finally, solutions containing glycerine to the extent of one-fifth of the total volume may be kept for a long time without undergoing the least alteration.

Based upon these observations, the author has been led to consider the following conditions to be desirable in the preparation of solutions for hypodermic injections.

(1.) To use exclusively alkaloids of vegetable origin in a state of purity. These are always well defined, stable and uniform in composition, whilst their salts vary according to the equivalent of the acid which is used in their formation, and according also as they contain more or less water of crystallization.

(2.) To use as a vehicle boiled distilled water, containing twenty per cent. of glycerine.

(3.) To give the preference to sulphuric acid, diluted in the proportion of one of acid to ten of water, above all other acids.

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* In a memoir upon which the author is engaged, he proposes to indicate the change of composition to such a liquid through the absorption in the filter.

(4.) To substitute measurement by volume for measurement by weight.

Mode of Operation.—After having verified the purity of the alkaloid, reduce it to powder, and weigh a quantity corresponding to a determined volume. Place the powder carefully in a graduated flask holding 10, 20, 50, or 100 cubic centimetres. After having added some drops of glycerined water to suspend the powder, the acid is poured in of the strength indicated above. The solution may be made in the cold, but more often it is necessary to raise the temperature a little in order to accomplish it. When the solution has cooled, it must be made up to the necessary volume with the glycerined water. Solutions may be prepared by these simple means that will be clear and of uniform composition, and have the advantage of keeping a long time without alteration. This result having been recognized, it remains only to indicate a formula which will enable the medical man to know the quantity of alkaloid contained in the solution, so that he may vary the dose at his will. The following proportions appear to the author to be the most suitable:—

Morphia	1 gram.
Sulphuric Acid (10 per cent.)	2·50 grams.
Distilled Water containing twenty per cent of glycerine	q. s. to make 100 c. c.

If the syringe be gauged to one centimetre, and it require twenty half turns to empty it, then each half turn will equal one half of a milligram. By augmenting the proportion of the morphia and that of the acid, without changing the total volume, solutions containing one to two milligrams to the half turn may easily be obtained. If necessary, the quantity may be increased to ten grams to the hundred cubic centimetres, but when the solutions are too concentrated they crystallize, and the composition of the liquid is thus modified.

The formula for Codeia is as follows:—

Crystallized Codeia	1 gram.
Sulphuric Acid (10 per cent.)	1·50 ,,
Distilled Water containing 20 per cent. of glycerine	q. s. to make 100 c. c.

Each half turn of a syringe gauged to one cubic centimetre will correspond to half a milligram.

The other alkaloids may be treated in a similar manner.

The following are the approximative quantities of sulphuric acid required to dissolve one gram of the substances named:—

Alkaloids.	Acids.
Aconitine (Duquesnel)	1 gram.
Atropia	2·50 ,,
Narceia	7·50 ,,
Strychnia	2·50 ,,
Veratria	2·50 ,,

The author gives the following formula for the preparation of hypodermic injections of the crystallized digitaline of M. Nativelle, although he does not think that digitaline should be used in this manner, since it causes intense irritation.

Crystallized Digitaline	1 centigram.
Alcohol (95 per cent.)	5 cubic centim.
Dissolve and add	
Distilled water	5 cubic centim.

One cubic centimetre will contain one milligram of crystallized digitaline; by dissolving two centigrams of digitaline, each cubic centimetre will contain two millimetres.—*Bulletin Thérapeutique.*

DUGONG OIL

Among the many attractive portions of the International Exhibition, none is perhaps more worthy of attention than the Queensland Annexe, which has, we believe, been erected at the cost of that young but vigorous colony. The evidence of great material wealth in gold, copper, coal, wool, cotton, sugar and tobacco, to say nothing of arrowroot, tea, coffee, etc., are enough to show us that much may yet be expected of this portion of Australia. On one table are exhibited a large number of tins of preserved meat, and a case containing specimens of the bones, flesh, skin, meat and oil of the dugong.

As we have received several letters recently, containing inquiries respecting this animal and the economical products obtained from it, we take this opportunity of laying before our readers such information as we have been able to obtain.

Near the case in question is a specimen of a "Dugong sucking calf;" lent, as a card attached to it informs us, by Professor Flower, of the Royal College of Surgeons, Lincoln's Inn Fields. This "calf," which is between four and five feet long, has a very curious head, and flippers instead of fins.

In the case are the skull and some of the rib bones of a full-grown dugong cow, a piece of the dried skin, nearly an inch in thickness, several teeth and tusks, a piece of dried meat, stated to be a piece of a calf, and which looks and, we were assured, tastes precisely like bacon, and a few bottles of a white substance not unlike lard or dripping, labelled "Dugong Oil," which is announced as "the great Queensland remedy for consumption." It appears to have been first prescribed for that disease by Dr. Hobbs, of Brisbane, who was led to use it in his practice through observing the wonderful effects the mere eating of the flesh of the animal had on the aboriginals when suffering from lung diseases. It is claimed for this oil that it is not only quite equal to cod-liver oil in the treatment of affections of the lungs, but that it is also a remedy for diseases of the stomach and bowels and general debility, indigestion and biliousness, as well as chronic coughs and wasting in children. But its chief peculiarity is reported to be that, far from partaking of the nauseousness of cod-liver oil, it is actually pleasant to eat as an article of food, and can thus be taken by people of a delicate appetite when the stomach entirely revolts from cod-liver oil.

At a dinner given by Mr. Danetree, the Agent-General of Queensland, in the Annexe, on the 10th inst., dugong oil bore a very prominent part in the *menu.* Both pastry and biscuits were introduced, in which the oil took the place of butter or lard, and we are informed that the general opinion was that it was in every way a success. The London correspondent of the 'Newcastle Daily Express,' in writing to that journal, says, "Lighter or more delicious pastry than that in which this oil had taken the place of lard, I never tasted. The same thing may be said of the biscuits, which were everything that biscuits ought to be."

The fish, or, more properly speaking, the animal, from which this oil is procured, is a herbivorous cetacean, and would probably be ranked by naturalists midway between the whale and the seal. It is found in very large numbers in the waters of Northern Queensland, and more infrequently in the southern portions as far as Moreton Bay, beyond which it does not appear to go. It is also said by various authorities to be found in the Indian Archipelago and Indian seas as well as at Mauritius. It grazes on the thick grass which in those warm latitudes grows on the shallows between the islands and along the coasts, where it usually feeds in from one to four fathoms of water, coming up to breathe at short intervals. It is not amphibious, but comes in and goes out with the tide, feeding only during high water. Like most other animals of this order, it is gregarious, and vast mobs of many hundreds and even thousands are frequently seen.

The dugong varies in length from seven to twelve feet, and its weight may be averaged at from six to seven hundred weight. The head is not unlike that of an ox lacking the horns, while the skin more nearly resembles that of the pig. The dam or cow brings forth its young alive and suckles it at the breast, holding it there with her arm-like flipper. All authorities join in attesting the wonderful attachment the female dugong has for her young, so much so that if the calf be killed, the mother makes no attempt to escape, but falls an easy prey. The skin averages from one to two inches in thickness, and the bones are perfectly solid and very similar to ivory, being very heavy, probably to assist the animal in sinking easily to its pasture. The fat meat from which the oil is procured lies next the skin, and is not unfrequently mixed with layers of lean, giving it a perfect resemblance to bacon, like which it also tastes. Some eaten at the dinner before alluded to in the exhibition was pronounced to be very fair ham. The lean meat is said to be very similar to tender lean beef, and is readily sold in its salt state as a breakfast relish in Queensland.

It will be apparent that an article having the advantage claimed for dugong oil, that it is capable of being taken as an article of food, will command a large sale if only its medicinal properties are such as is asserted. As yet there has been no opportunity for testing the oil to any extent in England, but several very strong testimonials as to its value as a medicine, given by colonial medical men, are published by the firm interested in its sale. In the pamphlet are narrated cases of dyspepsia, debility, consumption, liver complaint, indigestion, biliousness, etc., which are stated to have been cured by its use. The oil certainly deserves a trial by the profession with a view to arriving at its actual value.

We believe we are correct in saying that at present there is not any attempt being made to introduce dugong oil to the English market. The gentleman who exhibits it at the International Exhibition has only imported a small quantity in order to bring it under the notice of the medical profession. At present the demand in the colony is quite equal to the supply, and before that can be greatly increased a much larger capital will have to be invested in the fishery. With a view to fostering this enterprise (which in Queensland is looked upon as likely to become of very great value), the Government proposes granting special rights for a few years if a certain amount of capital is invested, so that those who go to the expense attendant on creating a new industry and introducing this novel medicine to the world, may have a fair opportunity to repay themselves for their outlay. Arrangements are now in progress to take advantage of this concession.

THE CHEMISTRY OF THE HYDROCARBONS.*

BY C. SCHORLEMMER, F.R.S.

It is now nearly 200 years since Lemery, in his celebrated 'Cours de Chymie,' separated mineral bodies from vegetable and animal substances, and since that time chemistry has been divided into organic and inorganic chemistry. Such a division appeared quite natural at a time when chemistry formed only a part of descriptive natural science; yet even at that period the founders of the phlogiston theory considered it unscientific to divide chemical substances according to their origin, and they endeavoured to justify such a classification from a chemical point of view. Thus Becher says, "The elements occurring in the three natural kingdoms are the same, but they are combined in mineral bodies in a manner more simple than they are in vegetable and animal substances." Stahl thought that in minerals the earthy principle preponderated, whilst organic bodies contained more phlogiston and more of the aqueous principle. If we translate these definitions into our present chemical language, we find that they are identical with views which were held not long ago.

When, with the discovery of oxygen, the era of quantitative chemistry commenced, the distinction between organic and inorganic bodies was still kept up, because it was observed that compounds formed by the vital process possess certain peculiarities by which they can be easily distinguished from mineral substances.

"Whilst formerly," as Kekulé says, "chemistry was divided because a boundary was seen, afterwards such a boundary was looked for because it was found convenient to have one (Kekulé's 'Lehrbuch,' i. 8). This appeared easy enough at first; chemists then understood both how to decompose mineral compounds into their constituent elements, and also how to build them up again.

But such was not the case with organic bodies; their composition could be easily ascertained, but all efforts made to effect the synthesis of such compounds failed; and hence Berzelius assumed that "the elements present in living bodies obeyed laws totally different from those which rule inanimate nature." It was said that organic bodies might be changed by chemical processes into other organic compounds, but it was thought to be impossible to obtain any such body by synthesis.

The further development of chemistry soon showed that these views were erroneous. As soon as a clear insight into the chemical constitution of organic bodies was gained, methods were found by means of which bodies hitherto formed only by the vital process could be built up from their elements.

Now, when the fact was established that the same chemical laws rule alike animate and inanimate nature, the difficulty presented itself of fixing a boundary line by which inorganic bodies might be separated from organic compounds. I need not dwell here upon all the views brought forward to explain the difference between these two divisions. You all know how the definitions of organic chemistry were changed from year to year, until in 1848 Gmelin first called attention to the fact that carbon was the only element essential to organic compounds. He said, "If we regard as organic those carbon compounds which have hitherto been classed among inorganic substances, viz. carbonic oxide, carbonic acid, sulphide of carbon, phosgene, cast iron, etc., we might define organic compounds simply as the compounds of carbon. But the organic compounds are still further distinguished by containing more than one atom of carbon. Hence the term *organic compounds includes all primary compounds containing more than one atom of carbon*" (Gmelin's 'Handbook,' vii. 5).

At that time the true atomic weight of carbon was not known, and thus the above compounds were separated

* A lecture delivered before the Chemical Society, April 4th, 1872. Reprinted from the 'Journal of the Chemical Society' for June, 1872.

from organic substances, whilst methyl and formyl compounds were included amongst them. As soon as the true atomic weight of carbon was established, Gmelin's definition fell to the ground. It was then said that organic chemistry was simply the chemistry of the carbon compounds. Kekulé, who first distinctly advocated this view, says ('Lehrbuch,' 1), "There is no natural boundary line between organic and inorganic chemistry, and if we still retain this division, it is only as a matter of convenience. We treat the carbon compounds separately on account of their large number and their importance."

Erlenmeyer expresses similar views. He thinks (Lehrb. d. Org. Chem. 5) "that a division of labour is requisite in the interest of teaching." "Besides," he adds, "it cannot be denied that by reason of certain properties possessed by carbon, the carbon compounds exhibit several peculiarities in their chemical behaviour, so that their study requires in many respects other methods of investigation than those employed in the study of the compounds of the other elements, and thus the necessity for a division of labour has also made itself apparent in the interests of scientific research."

Butlerow also says (Lehrb. d. Org. Chem. 5), "Organic chemistry must now be defined as the chemistry of the carbon compounds. If such a definition is somewhat unnatural and not exactly correct, it is still very convenient." I think, however, that such a division is more than a mere matter of convenience. The compounds of carbon do really differ from those of the other elements, because carbon itself exhibits certain properties which no other element possesses.

Kekulé, who first showed that carbon is a tetrad element, pointed out at the same time that the existence of such an immense number of carbon compounds can be easily explained by assuming that the atoms of this element have the property of combining with each other. The same view was expressed by Couper.

This property is also possessed by other polygenic elements, as sulphur and oxygen; but whilst, in the case of the latter elements, the number of atoms uniting together in this way is very limited, we have not yet found such a limit to exist in the case of carbon.

It is, therefore, most characteristic for tetrad carbon that a large number of its atoms can be linked together to form a group, which in a great many reactions remain together, and act like a single atom.

But carbon possesses yet another property in common with no other element. *All the combining units in such a group, which are not saturated with carbon, can be saturated with hydrogen.*

Thus, whilst most of the metals do not combine with hydrogen at all, and the other elements form only one or two, or at the most three compounds with hydrogen, we find not only that very many hydrocarbons exist, but that their number is daily increased by the discovery of new ones.

The hydrocarbons are not only the most simple of the carbon compounds, but, from a theoretical point of view, also the most important, because all other carbon compounds can be regarded as derivatives of them, or as being formed by substitution of other elements for hydrogen. This is shown by the fact that a considerable number of vegetable and animal substances can be prepared artificially from hydrocarbons. On the other hand, as soon as the constitution of a carbon compound is understood, we are in a position to convert it into the hydrocarbon from which it has been theoretically derived.

In the majority of carbon compounds occurring in nature, a portion of the hydrogen of the original hydrocarbon is replaced by oxygen, and in others by nitrogen; all the other elements can, however, be introduced artificially into carbon compounds. But there are only a few cases in which all the hydrogen can be replaced.

Thus, the number of carbon chlorides is much smaller than that of the hydrocarbons. With oxygen, carbon forms only two compounds, and with nitrogen it unites in only one proportion. From this it follows that the great majority of carbon compounds contain hydrogen,—that there is present in them a residue of the original hydrocarbon.

We may, therefore, define that part of our science which is commonly called organic chemistry as the *chemistry of the hydrocarbons and their derivatives.*

I now propose to lay before you, in a short sketch, how far our knowledge of the hydrocarbons has advanced.

(*To be continued.*)

SULPHOZONE, A SUBSTITUTE FOR SULPHUR.*

BY CHARLES ROBERTS, F.R.C.S., ETC.

Sulphur in the sublimed, precipitated, or powdered form, is extensively employed by medical men, veterinary surgeons, and horticulturists, for destroying the animal and vegetable parasites infesting man, animals, and plants. The substance to which I have given the name of sulphozone (from its strong smell and powerful chemical action), in order to distinguish it from the sulphur of commerce, is a preparation containing free sulphurous acid as its active and essential principle.

For many years past large quantities of sublimed and powdered sulphur have been used in this country and on the Continent, for the destruction of the mildew and blight attacking vines, hops, roses, fruit and other trees; and it is now, I believe, almost the sole remedy employed for that purpose, as no other has been found so generally effectual or so convenient of application.

From careful and often repeated series of experiments, I have arrived at the conclusion that the beneficial action is to be attributed to the presence of a small but variable quantity of free sulphurous acid (occasionally hyposulphurous acid), which exists as a constant impurity in the sulphur of commerce. Sublimed sulphur contains more acid than powdered crude sulphur, and is more certain in its action, while precipitated sulphur, being almost, or altogether, free from acid, is quite useless. I find that when substances are carefully purified from all traces of sulphurous acid by repeated washing with spirit and water, they are equally ineffectual in destroying mildew and other vegetable and animal organisms, and that seeds germinate as quickly and vigorously when sown in pure sulphur as in fine sand, and that moulds grow on the surface when a little organic matter, as flour, has been mixed with the sulphur. I find also that cheese mites are not destroyed by pure sulphur, but live and multiply indefinitely in cheese covered with sulphur; though they are immediately destroyed by commercial sublimed sulphur. On the other hand, when pure sulphur is impregnated with sulphurous acid, it destroys mildew, and other minute organisms with an energy proportioned to the quantity of acid it contains, and it does not appear that one form of sulphur possesses any advantages over the others, provided the quantity of acid is uniform. Many other substances which contain no sulphur, when impregnated with sulphurous acid in a similar manner, and to the same extent, are equally effectual in destroying mildew.

It has been observed that when a piece of silver-leaf is suspended over a roll of sulphur, it is slowly converted into the sulphide of silver, and it has been inferred therefrom that sulphur vapourizes at ordinary temperatures; and the theory has been advanced by a well-known vegetable physiologist, that the oxygen given off by the leaves of plants to which sulphur has been applied, oxidizes it and produces sulphurous acid, and thus the action of sulphur in destroying vegetable organisms

* Paper read at the Meeting of the Royal Horticultural Society at Birmingham.

may be accounted for. But this theory is not borne out by my experiments. When silver-leaf is suspended over pure sulphur it does not tarnish more rapidly than when suspended in the air, and its conversion into the sulphide by the roll sulphur may be explained by the fact that that substance contains free sulphurous and hydrosulphurous acids, and sulphuretted hydrogen, which are constantly escaping from it. When pure sulphur is applied to the leaves of plants, no evidence of oxidation can be detected by either litmus, or starch and iodine paper. If oxidation were to take place under such circumstances, the product, if sulphurous acid in the first instance, would be immediately converted into sulphuric acid by further oxidation, and it could not escape detection. Further precipitated sulphur, being in a much finer state of division than sublimed sulphur, would be more easily oxidized, and ought to prove the more potent agent; but practically it is found to be the least so.

Sulphur in various forms is used by medical men and veterinary surgeons for the destruction of the itch and other insects, and in the treatment of various diseases (as ringworms), caused, or accompanied by fungus growths, infesting the skin and hair of men and animals; but sulphurous acid, in solution, is in many instances substituted for them on account of its more certain action. Many surgeons, indeed, believe that the beneficial action of sulphur ointment in the treatment of itch, is to be attributed to the grease of which it is made, rather than to the sulphur it contains, and this is probably true, as the quantity of sulphurous acid is exceedingly small, and I find the action of the ointment is remarkably increased when the sulphur has been strongly impregnated with acid previous to being made into ointment, and this is equally true of its other applications in medicine.

In addition to its destructive action on organized bodies, sulphurous acid possesses a powerful chemical action on the organic and inorganic products of decomposing animal and vegetable substances, and the emanations from persons and animals suffering from infectious diseases; hence it is one of the most potent and valuable disinfectants we possess, and it appears to prevent the spread of smallpox, diphtheria, cattle plague, etc. Its qualities as a deodorizer are also very considerable. It attacks and destroys sulphuretted hydrogen, and neutralizes the strong smell of ammonia and other alkaline bases, but without losing its antiseptic properties, or destroying their manurial value. (Crookes.)

From my experiments and observations, and from the well-known properties of sulphurous acid, I conclude, therefore, that it is the acid, accidentally present in the sulphur, which is the active agent in the destruction of mildews and blights, and that the sulphur is only the medium for its application. This is a fact, not only of scientific interest, but of great practical and commercial importance, for under the mistaken impression that the sulphur itself is the active agent, great care and expense have been incurred to secure its freedom from acidity, which is by no means necessary.

Sulphur, like charcoal and many other substances, possesses the power of absorbing a large quantity of sulphurous acid, and by a modification in the refining process the acidity may be considerably increased, and the quantity of sulphur correspondingly diminished, and a more certain and uniform agent produced. For horticultural purposes, however, it is necessary to limit the quantity of sulphurous acid, or it will prove destructive to the plant as well as the parasite. This limit I have established practically by experiments made on rose trees infested with mildew, and as the rose mildew is with difficulty destroyed by common sulphur, except by repeated applications, this preparation (to which I have given the name of sulphozone, for reasons given above), may be considered to be of the maximum strength, and four or five times stronger and more potent than sublimed sulphur. In substituting it, therefore, for sulphur' a great saving will be effected in the cost of sulphur, its carriage, and the time and labour of applying it. There will, moreover, be the additional advantage of not loading the foliage with a large quantity of sulphur powder, which must in some measure impair its health by its mere mechanical presence, and in the case of hops, the brewers will have less ground for objecting to the quality of the produce. Sulphozone, being a fine dry powder like sulphur, may be applied in a similar manner, and with the same apparatus, care being taken to use a much smaller quantity (*i. e.* about a quarter of that of sulphur).

For medical, veterinary and sanitary purposes, a very strong sulphozone has been prepared to take the place of sulphur in the officinal preparation, and for use as a disinfecting powder. This substance is exceedingly destructive to organic life, and is not adapted for horticultural purposes except for dressing the stems and branches of deciduous trees in the winter, and for destroying insects where it can exert no deleterious influence on surrounding vegetation, or for disinfecting and deodorizing manure heaps, etc., for which purpose it is better adapted than any other disinfecting powder, as the sulphurous acid fixes the ammonia—the most valuable constituent of manure—and makes it available for gardening and farming purposes, while chlorine and other disinfectants destroy it, and reduce the value of the manure in proportion to the extent of their action in deodorizing it.—*Gardeners' Chronicle.*

DETECTION AND ESTIMATION OF PARAFFIN IN STEARIN CANDLES.

BY M. HOCK.*

Makers of stearin candles mix paraffin with the fatty mass in quantities up to 20 per cent. Paraffin candle makers also mix stearic acid with their paraffin and attribute valuable properties to such a mixture, as far as candle-making is concerned. The attempt to determine if paraffin be present, and if so, to get some approximate idea of the quantity, in a sample of stearin and *vice versâ* by means of the comparison of the melting-point and specific gravity of such a mixture is shown to be useless, as these vary according to the source from which the paraffin is obtained, as also in the case of the stearic acid, since the pure commercial article is by no means a chemically pure article.

A good method for detecting the presence of stearic acid in paraffin has been devised by R. Wagner, viz. by treating a boiling solution of the paraffin in alcohol with an alcoholic solution of neutral lead acetate, when, if stearic acid be present, a dense floccular precipitate appears, but none if it be absent. The best method, and one which can be used quantitatively as well as qualitatively, is described as follows:—Not less than five grams of the candle are taken and treated with warm solution of potassium hydrate, which must not be too concentrated. A soap is formed with the stearic acid, whilst the paraffin is left unaltered. Sodium chloride is thrown into the solution, whereby the soap is separated out as a soda soap, and in precipitating takes down the paraffin with it. The soap obtained is thrown on the filter and washed with cold water or very dilute spirits of wine. Thus, firstly, the sodium chloride is washed out, and finally, the soap is brought into solution and likewise washed through the filter, leaving the paraffin, which is then dried at a temperature below 35° C. so as not to fuse it. The paraffin is then treated on the filter with ether, and after repeated washing with this solvent, the ethereal solution is carefully evaporated in a weighed porcelain crucible, in the water-bath, at a low temperature. The residue consisting of the paraffin is then weighed, and the stearic acid is estimated by difference. —*Journal of the Chemical Society.*

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* Dingl. Polyt. J., cciii, 313—315.

The Pharmaceutical Journal.

SATURDAY JULY 6, 1872.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE PRESENT POSITION OF PHARMACY AND PHARMACISTS.

THE privilege of grumbling exercised by Englishmen has long been proverbial; but there can be little doubt that to the disinclination for sitting down contented with things as they are, thus called by an ugly name, is due much of the greatness of which as a nation we are so proud. Therefore, it is not, perhaps, so much matter for regret that, amongst those who are for ever deprecating their particular calling as the most unprofitable and unsatisfactory under the sun, some should be found who so speak of pharmacy. It is no part of our intention to dispute the assertion of such persons; on the contrary, we feel sure that there are many who will agree with us in saying that if it be an exaggerated one, it is, on the whole, much nearer the truth than it ought to be. Nevertheless, nothing will be gained by silence respecting what has been done towards improving the trade, or by ignoring the machinery that exists for carrying on so desirable a work.

That pharmacists stand in a better position now than they did thirty years since is a proposition that would be as difficult to controvert as that the improvement is due primarily to the noble and ungrudged labours of the men who about that time founded the Pharmaceutical Society of Great Britain. And we believe that the present measure of success is only an earnest of what will be attained, should the body continue to produce men worthy of sitting in their vacated chairs.

The state recognition of the fact that the pharmacist requires a special education—a recognition obtained through the efforts of the Society that has done and is doing much to make such education possible—was a great step in advance. Although it was necessary, in order to do justice to the very proper claims of existing rights, to open the doors very wide, the effects of that necessity can last but for a time, and will ultimately cease. Meanwhile, it appears to be to the interest of all pharmacists, by assisting to keep the Society in a vigorous and healthy condition, to ensure the carrying on the work it has so well begun. To persons, who, like a recent correspondent, are able to borrow the Society's Journal weekly without paying for it, and require information as to what other return they would have for their subscription, it would be useless perhaps to offer such an argument. But, fortunately, there are those who believe that in this country, as in France and Germany, a future may be secured for pharmacy in which it will be more properly termed a profession than it is at present.

Much, however, remains to be done; and continually we are receiving letters from assistants, urging arguments and asking questions that are difficult to answer satisfactorily. We cull two or three from a communication just received. "Are our hours as "short as they might be, were our employers to work "in combination?"—"Considering the qualifications "we are supposed to possess, are we sufficiently re-"munerated for our labour?"—"Has there been, "during the last ten or fifteen years, an increase in "our remuneration proportionate to the increase of "expenditure caused by the higher price paid for "labour and material in other departments of trade?" And lastly, "What can we do to place ourselves upon "a pecuniary level with other *employés*."

To the first of these questions the employers in some districts are trying to give a satisfactory answer, and we wish them all success. To the last, the reply depends principally upon the assistants themselves. Considering what is now taking place in many parts of the country, our readers will not be surprised to learn that more than one correspondent has attempted it by suggesting a "strike."

But such a movement, doubtfully beneficial on the part of men content to base their claims upon an assumed equality of labour value, would be positively injudicious where individual acquirements and talent should exercise so much influence upon the terms of an engagement as in pharmacy. Rather let each assistant assert his proper position by exerting himself to attain that scientific knowledge of his business which is now acknowledged to be essential, and by demanding a fair remuneration for the qualifications he may possess, and he will find, if he takes care that those qualifications equal the estimate he may place upon them, that in pharmacy,—certainly not more than in any other calling,—it is not the most skilful that is left unemployed or unrewarded.

PHARMACEUTICAL EDUCATION.

THE first attempt to give a definite form to the opinions that have been current in the minds of many concerning the best method of providing pharmaceutical education in the provinces, will be found at p. 10. We hope that it will receive the attention to which it is entitled, and that in the shape of opinions, criticisms and suggestions respecting this scheme, the columns of this Journal will bear testimony to the interest with which the important subject of education is regarded by the trade generally.

A VICTIM TO SCIENCE.

We take from our contemporary, the *British Medical Journal* the following short account of a very deplorable accident by which science has sustained the loss of a young but active and promising worker:—

"Many sad reflections of much more than personal import attach themselves to the sad announcement of the death of that distinguished young chemist, Mr. E. T. Chapman, whose name is well known as one of the authors of the ammonia-process of water-analysis. He was killed by an explosion in his laboratory at Rübeland, in the Hartz, on the 25th June. Four years ago, Mr. Chapman was the most industrious contributor to the Chemical Society. He will be especially remembered by chemists for his very beautiful researches on "Limited Oxidation," and for his remarkable faculty of performing unpromising chemical operations with quantitative accuracy. Last autumn, he left England to take charge of a large wood distillery in the Hartz, and a short time ago had commenced the manufacture of nitrate of methyl on a gigantic scale. Under certain conditions, nitrate of methyl is terribly explosive; and it is supposed (for no one survives to tell what took place) that the terrible explosion which shivered a bomb-proof building, killing Mr. Chapman and two workmen who were with him, was an explosion of nitrate of methyl. Mr. Chapman was only 26 years old at the time of his death. A few years ago, it would have been deemed a strange thing for England to send out a chemist to take charge of a German factory; but that the most promising of the young chemists of England should have found no room for himself here, and should have taken service in a foreign land and perished there, is melancholy in the extreme."

Mr. Chapman is not the only young chemist of high promise who has been compelled to seek mere livelihood in uncongenial pursuits, and waste a life which might have been devoted under a more propitious fortune to the advancement of science and of civilization.

A few weeks ago we drew attention to the condition in which scientific chemistry finds itself here in England, destitute as it is of encouragement and support from Government, and, what is worse, without pioneers among the men who occupy professional chairs, though in many instances they might be expected to derive some stimulus from the historical associations by which they are surrounded.

Mr. Chapman was among those—and there are not a few such—to whom we referred, who want only means and opportunity to perform their part in restoring to English chemists the reputation which their predecessors so justly enjoyed. It would, perhaps, be an exaggeration to say in his case that

"Chill poverty repressed his noble rage,"

but it would not be difficult to find instances in which this would represent the actual and unpoetical truth. Surely there should be opportunities of extending to such men encouragment and sympathy; and we do trust that in the future some efforts will be made in that direction.

According to a return recently ordered by the House of Commons to be printed, the quantity of methylated spirit sent out by persons licensed to sell the same under the Act 18 and 19 Vict. c. 38, during the year ending 31st December, 1871, was in England, 451,530 gallons; Scotland, 232,174 gallons; Ireland, 12,331 gallons; total in the United Kingdom, 696,035 gallons. The amount of drawback or allowance paid thereon was £200,174. 11s.

A commission has been formed in Victoria, Australia, "to consider and report," in the words of the proclamation, "how far it may be practicable to introduce branches of industry which are known to be common and profitable among the farming population of continental Europe; to specify which of such industries are most suitable to the soil, climate and circumstances, and to report on the best means of promoting their introduction into Victoria, and how far the labour of persons at the disposal of the State may be advantageously used for that purpose; and to further consider and report on the best means of promoting the culture, extension and preservation of State forests in Victoria, and the introduction of such foreign trees as may be suitable to the climate and useful for industrial purposes." From the Progress Report of this commission we find that a large number of medicinal plants are proposed for cultivation, the following amongst others being recommended as quite suitable for, and hardy in the climate of Victoria: — Cinchona, Rhubarb, Aloes, Camphor, Squill, Aconite, Hemlock, Henbane, Foxglove, Belladonna, Buchu, Poppy, Gentian, Chirata, Erythræa, Jalap, Juniper, Liquorice, Uva Ursi, Veratrum, Arnica, Podophyllum, Taraxacum, Senna, Peppermint, Sarsaparilla, etc.

The commission further deems it "desirable that the Government should obtain and distribute genuine seeds of such medicinal and otherwise useful plants, and recommends the distribution of the seeds by means of advertisement." A large quantity of poppy seed was thus distributed gratuitously by a commercial firm in Melbourne, and over 1000 applications were received. A very considerable proportion of the sowings of these seeds have been attended with success in the production of opium, and we are told that it is a fact pretty certain that the poppy, in a short time, will be one of the most extensively cultivated crops in Victoria if the question of juvenile labour can be satisfactorily settled.

The Botanic Garden has effected also the extensive distribution of useful plants and seeds, at least such as are not easily obtainable in the horticultural trade. The great extension of this practice cannot but tend to create and promote new cultures, and to enlarge the resources and wealth of the country.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

July 3rd, 1872.

MR. A. F. HASELDEN, F.L.S., PRESIDENT, IN THE CHAIR.
MR. W. SCOTT BROWN, VICE-PRESIDENT.

Present—Messrs. Baynes, Betty, Bottle, Frazer, Greenish, Hampson, Hills, Mackay, Owen, Radley, Sandford, Savage, Schacht, Shaw, Stoddart, Sutton, Urwick and Williams.

The minutes of the last meeting were read and confirmed.

The reporter was requested to withdraw whilst the Council considered the Report of the Committee appointed last month with regard to the reporting. After an interval, he was recalled and informed that in future his reports of the proceedings of the Council must be furnished direct to the Editor, who alone would exercise any supervision over them, and that, subject to this editorial control, he must use his own discretion in condensation or otherwise.

The SECRETARY presented a list of nine members and one associate in business who had paid their subscriptions subsequently to the 30th April, and it was

Resolved—That they be restored to their former status on payment of the nominal fine of one shilling.

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

Bouttell, Harold .... Sudbury.
Bradford, Cordley .... Spalding.
Jameson, William Edward .... Bristol.
Jasper, Frederick William .... Penzance.
Rammell, Edward .... Crediton.
Shenstone, Wm. Edward .... Colchester.
Townley, Thomas William .... Ambleside.
Warren, William .... Chertsey.

ELECTIONS.

MEMBERS.

The following Pharmaceutical Chemists were elected Members, and their diplomas were stamped with the seal of the Society:—

Hughes, James .... Sydney.
Wilson, John Henry .... Calcutta.

The SECRETARY drew attention to the fact that the two newly elected Members were resident abroad, and stated that the general practice in such cases was for the gentlemen elected to pay the first year's subscription only. He suggested that foreign members should be required to pay a life membership subscription.

Mr. SANDFORD and other gentlemen were of opinion that the Council had no power to make such a regulation. If Members residing abroad discontinued their subscriptions, they would be treated in the ordinary way, and required, in accordance with the Bye-law, to return their certificate of membership.

The following registered Chemists and Druggists were elected Members of the Society:—

Cocker, Benjamin .... London.
Folkard, George Frederick .... Putney.
Goddard, William Henry .... Barrow-in-Furness.

ASSOCIATES.

The following, having passed their respective examinations and being in business, were elected "Associates in business" of the Society:—

Minor.

Adams, Frederick Joseph .... Dover.
Foottit, Charles M. .... Marlow.
Howse, Henry William ...... London.
Upjohn, Francis William .... London.

Modified.

Hepburn, John .... London.

The following, having passed their respective examinations, were elected Associates of the Society:—

Minor.

Bonnett, Frederick .... Bridgend.
Brookes, Frederick James .... Selby.
Colling, Robert .... Stockton-on-Tees.
Dunston, Alfred .... Spalding.
Goldsmith, John Jackson .... Abingdon.
Greaves, Abraham Walter .... Chesterfield.
Jones, Owen Williams .... Flint.
Leake, Thomas Whaplate ...... London.
Newton, Thornton Albert C.... Devonport.
Tansley, Arthur James ...... Cheadle.
Thirlby, William Arthur ...... Ashby-de-la-Zouch.
Watson, William .... Chatham.

Modified.

Binge, Alfred .... Islington.
Biss, John William .... Southsea.
Gorton, Charles .... Whitechapel.
Hilton, William .... Whitefield.
Kitchen, George Seaton ...... Stamford.
Knight, Geo. Edward Moses .. Southampton.
Pride, Arthur Edwin .... Nottingham.
Prytherch, Rees .... Llandovery.

FINANCE COMMITTEE.

The Report of the Finance Committee was received and adopted, and sundry payments ordered.

BENEVOLENT FUND.

The Report of the Benevolent Fund Committee was received and adopted.

Grants of fifteen pounds were made in each of the following cases:—

A registered Chemist and Druggist at Sheffield (2nd grant).
The widow of a late Member at Tring.
A former Member of the Society at Clapham.

The names of George Bagot Kennett and Sophia Pedley Henson were placed on the list of candidates for election as Annuitants in October next.

LIBRARY, MUSEUM AND LABORATORY.

The Report of the Library, Museum and Laboratory Committee was received and adopted, and the following books were ordered to be purchased for the Library:—

Index to Gmelin's Chemistry.
Thudichum's Chemical Physiology.
Smith's Air and Rain.
Stockhardt's Experimental Chemistry, by Heaton.
Marcet's Natural Philosophy.
Atkinson's Natural Philosophy (from Ganot).
Tyndall's Molecular Physics.
Tyndall on Sound.
Nicholson's Biology.
Masters' Botany for Beginners.
Gladstone's Michael Faraday.
Church's Laboratory Guide, 2nd edition.
Grove's Correlation and Continuity.
Mitchell's Practical Assaying, by Crookes.
Hardwick's Photographic Chemistry, 7th edition, by Dawson and Hadow.
Griffith's Textbook of the Microscope.

HOUSE COMMITTEE.

The Report of the House Committee was received and adopted. It recommended improved arrangements for the better custody of Students' coats, etc.; and that estimates be obtained for certain repairs, repainting, etc.

Provincial Education Committee.

The Report of this Committee was read, recommending that the following document, drawn up by Mr. Schacht, be in principle adopted by the Council:—

Principles.

1st.—It is desirable that scientific pharmaceutical education throughout the country be promoted by the Pharmaceutical Society of Great Britain, and be assisted by its funds.

2nd.—It is desirable that such assistance be given to those efforts only that are directed to the *systematic* and *persistent* teaching of the sciences connected with pharmacy.

3rd.—It is desirable that such assistance be distributed upon a method as far as possible just and universal.

Scheme.

The Council of the Pharmaceutical Society of Great Britain shall announce that they are prepared to propose an annual vote of money for the purpose of assisting scientific pharmaceutical education throughout the country upon conditions to be enumerated below.

The plan upon which this assistance will be given will consist, essentially, in affording a limited and partial aid or stimulus towards founding and maintaining local pharmaceutical educational associations.

The sciences towards instruction in which aid will be given are chemistry, botany and materia medica.

The processes through which this aid will be given are:—

1st.—Examinations to be held at all places whose local pharmaceutical associations have applied for aid, and which have fulfilled the requisite conditions.

2nd.—Payments of money to the local pharmaceutical associations on the result of these examinations and donations of prizes to the competing candidates.

3rd.—Grants towards the fitting up and illustration of the libraries, museums and laboratories of local pharmaceutical associations, or for any portions of their schemes which have a scientific educational object.

*General Details.**

Every local pharmaceutical Association claiming aid from the Pharmaceutical Society of Great Britain must have been enrolled as "an association in connection" with it at least three months before the date of the annual examination.

The conditions of enrolment shall be that it be a *bonâ fide* association of chemists and druggists, acknowledging a fixed set of rules and a money subscription for membership; that it possess a responsible committee of chemists and druggists whose names are on the register, a chairman and a secretary; that it includes in its scheme courses of lectures by competent teachers upon chemistry or botany, for the use of its members and associates, of not less than twenty-five lectures, on different days, of one hour's length; and that it is prepared to carry out in its integrity the educational system of the Pharmaceutical Society.

The Pharmaceutical Society of Great Britain will hold annually, about May, through the agency of the enrolled associations, examinations in chemistry and botany in any place in England, Wales, and Scotland, from which a proper application has been received. On the results of these examinations payments will be made to the enrolled associations, and prizes will be awarded to the students themselves.

There will be two grades of success, the first and the second. All candidates who succeed in passing in the second or lowest class will earn for the association with which they are connected £1 each; all who pass in the first class, £2 each. All who pass in the first class will also earn for themselves a prize.

Persons eligible to earn prizes and payments for results will be chemists and druggists, their apprentices, pupils and assistants, with the exception of such as have passed the Major or Minor examination of the Pharmaceutical Society of Great Britain.

Students presenting themselves for examination in the same subject a second or third year will still be considered as entitled to earn payments for results; but if they have already earned one payment, subsequent payments earned in the same subject will be one-half the original amount, and will not be repeated beyond the third payment; nevertheless students may present themselves for examination in any subject as many times as they please.

Payments for results and prizes will only be awarded where the evidence is sufficient to show, on the one hand, that good systematic teaching has been supplied, and, on the other, that the candidate has been a diligent student. It will be necessary, therefore, in the first case, that the local associations are careful to provide really efficient teachers, and that a proper daily record be kept of the pupils' attendances at each lecture. Forms for these purposes (   ) will be supplied, which must be returned when application is made for examination papers. It will be imperative that at least twenty lectures shall have been attended by each candidate.

Examinations.

When an enrolled association wishes to participate in the aid granted by the Pharmaceutical Society, an application, stating on what subject or subjects examination will be required, and giving the precise number of candidates to be examined in each subject, must be made by the secretary of the enrolled association on a printed form (   ) and sent to the Secretary of the Pharmaceutical Society   days before that fixed for the examination.

The local association will then provide a proper room with the requisite accommodation for carrying out the detailed instructions which will be sent them (   ), and a committee, consisting of the secretary and one other responsible chemist and druggist, not personally interested in the result (but not the teacher), must attend in the room throughout the examination to see that perfect fairness prevails, and that the printed details are absolutely complied with.

On the morning of the day appointed for the examination a packet containing the lists of questions, one for each student, will be received by post by the secretary of the local association, which packet must be opened for the first time when all are assembled in the examination-room and the candidates are in their places. The answers will be collected, enclosed in one wrapper, sealed and forwarded by post to the Secretary of the Pharmaceutical Society.

Instructions for the exact guidance of the committees and candidates during examination will be forwarded at the proper times.

The examination on either subject will be conducted in every locality throughout the country on the same day and at the same hour.

The answers will be examined, and their values estimated, as speedily as possible, and the list of successful candidates will be published in the Pharmaceutical Journal, no mention being made of those who do not succeed in passing.

The claim for payments must be made on a printed form (   ) to be supplied on application. It must be signed by the chairman and secretary of the local association, and forwarded to the Secretary of the Pharmaceutical Society within one month of the time of pub-

* These details are to be understood as incomplete.

lishing the examination-lists; and if found to be correct, the money will be forwarded to the secretary of the local association.

Prizes.

The prizes for those candidates who pass in the first class will consist of books. Candidates will be at liberty to select their own prizes from a list published in the Pharmaceutical Journal.

In addition to these, there will be three medals distributed annually in each subject,—one gold, one silver, and one bronze,—to those whose papers stand respectively first, second and third in order of merit throughout the country, provided the examiners consider them sufficiently excellent to justify such a recognition.

Examiners.

The Council of the Pharmaceutical Society of Great Britain shall appoint a professional chemist and professional botanist to conduct the examinations in their respective sciences. They will be in no way engaged in teaching any class of pharmaceutical students nor be personally interested in the result of the examination.

It will be the duty of the examiner to frame a list of questions, to each of which he will attach a certain numerical value, and he will do his best to keep the questions he has selected a perfect secret.

When the answers are returned to him he will estimate their values also in figures, and those candidates who have earned an aggregate number of marks equal to 80 per cent. of the highest possible number will be placed in the first class, and those whose marks are less than 80 per cent., but equal to 50 per cent., will be placed in the second class. The rest will be considered to have failed.

The examiners will report to the Council the general character of the replies, and will present the names of the successful candidates with the number of marks they have respectively earned.

The fees for the professional services of the examiners will be paid by the Council of the Pharmaceutical Society of Great Britain.

Grants for Museums, etc.

The Council of the Pharmaceutical Society shall have the power to award a grant of money, to the extent of one-half the required expenditure, to any enrolled association in aid of any portion of their scheme which shall have a distinct scientific educational object. For this purpose every application will be judged of on its own merits.

Mr. Schacht having read the above, to the end of the "Scheme," said that the details which he had appended were not to be considered as complete, and it was the opinion of the Committee that if the general principles were adopted by the Council, they should be referred back to the Committee for further consideration and completion. It was also hoped that by the publication of the paper he had prepared, the suggestions of members throughout the country might be available for the Committee. He moved—

"That the Report be received and adopted; that this Council approves generally the principles and scheme presented, and refers the same back to the Provincial Education Committee for further consideration and report."

Mr. Stoddart said he could heartily commend the principle of the scheme, particularly as it did not countenance the idea which was far too prevalent, that young men should be coaxed into study and improvement. The real principle was to afford every facility possible to those who really wished to improve themselves, and therefore, the scheme now brought forward was admirable, if it was considered to go far enough.

Mr. Hills thought the only fault in the scheme was that it was not liberal enough. He did not think they should require from every town a complete account of all the results that had been accomplished, and that if a certain number of men known to the Council would guarantee that the funds should be applied to the object of Pharmaceutical Education, that was all that was required. Referring to his own experience, he had gained more information from a small class to which he belonged than from any other source. If any amount were raised in any locality for the purpose of education, he thought it should be augmented by the Society to a certain extent, either by one-half or one-third of the amount locally raised. He hoped, therefore, that when the Committee reconsidered the details, they would be rather more liberal.

Mr. Baynes heartily endorsed the scheme in its general principle, but suggested that a small capitation fee should be given to associations for students who had attended the classes a certain number of times.

Mr. Brown remarked that the last sentence of the scheme left it open to the Council to make a grant to any association, however small. He thought the system of payment for results would get over the difficulty, which always met them, that the money of the Society might be bestowed on persons who never contributed anything to its funds.

Mr. Mackay also approved of the scheme, though he doubted the propriety of employing lecturers.

The resolution was then carried unanimously.

Parliamentary Committee.

The Report of the Parliamentary Committee was read, stating that they had considered the correspondence with reference to the registration of certain persons as chemists and druggists, and recommended the Council to give the Registrar the necessary authority to remove their names from the Register. The details of several cases were given, in one of which the Solicitor having written to the party concerned, and received no reply, it was recommended that proceedings be at once taken against him for selling poisons, etc., he not being registered as a chemist and druggist. In another case the excuse made was that the party was a homœopathic chemist, and it was recommended that evidence be obtained of his having sold poisons. The Committee also recommended the immediate readjustment of the schedule of poisons with regard to Vermin Killers, and that the first convenient opportunity be taken for obtaining the sanction of the Privy Council thereto.

Mr. Williams regretted that the Committee had not seen their way to recommend proceedings being taken against a surgeon whose false and improper representations had led to the registration of one of the parties now about to be removed.

Mr. Betty thought the nature of the readjustments of schedules should be mentioned.

The President said that was not stated in the Report of the Committee.

Mr. Williams suggested that the last clause of the resolution respecting Vermin Killers should be omitted. This was a very important matter, and the practical result of altering the schedules and putting strychnine in part one, would be to prohibit the sale of Vermin Killers containing such compounds by booksellers, stationers, and other persons not on the Register. This would have the further effect, that Vermin Killers containing those substances would fall into disuse, and only those would be sold containing phosphorus or other poisons. This was a very serious thing effecting the trade and commerce of the whole country, and he hoped it would not be done without consideration.

Mr. Schacht said if the Committee had come to a distinct conclusion, it ought to have been included in the report; and as they had not done so, it must go back to them again.

Mr. Brown said at the last meeting the Council had decided that the Solicitor should be asked to draft a new bye-law which would have the effect of preventing any motion being brought forward at an annual meeting that would affect the legal position of the members without previous notice having been given. The Solicitor had drafted three new bye-laws which he would not now trouble the Council with; but he would move

> "That the proposed additions to the bye-laws, as drafted by Mr. Flux, be referred for consideration to the Parliamentary Committee, who shall also report as to the desirability of an alteration in the bye-law which requires voting-papers to be delivered by post one clear day previous to the annual meeting; also as to any other bye-laws which appeared to require addition or alteration."

Mr. Shaw seconded the resolution, and said he had noticed the inconvenience of the bye-law referred to, which often had the effect of rejecting a considerable number of voting-papers.

The resolution was carried unanimously.

The Report was then received and adopted.

The following names were ordered to be erased from the Register:—

Harriet Buxton ....New Cross.
Thomas Taylor ....Skelton-in-Cleveland.
Shemelds Taylor ....Skelton-in-Cleveland.

REPORT OF THE BOARD OF EXAMINERS FOR ENGLAND AND WALES. JUNE, 1872.

Examinations.	Candidates. Examined.	Passed.	Failed.
Major	13	8	5
Minor	42	26	16
Modified	44	27	17
	99	61	38

Preliminary—Certificates received in lieu of this examination:—

University of Cambridge	2
,, ,, Durham	1
,, ,, Oxford	1
College of Preceptors	2
	6

The President read a letter from a candidate at the recent Major Examination, complaining of the manner in which that examination had been conducted, and asking that he might be allowed to compete for the Pereira medal, notwithstanding that he had not passed with honours.

A considerable amount of discussion ensued, but the general feeling of the Council was, that they could not interfere with the decision of the Board of Examiners.

Appointment of Professors.

Professor Redwood was re-appointed Professor of Chemistry and Pharmacy for the ensuing year.

Professor Bentley was re-appointed Professor of Botany and Materia Medica for the ensuing year.

Professor Attfield was re-appointed Professor of Practical Chemistry and Director of the Laboratory for the ensuing year.

William Augustus Tilden, D.Sc., was re-appointed Demonstrator for the ensuing year.

Mr. John Moss was re-appointed Assistant Demonstrator for the ensuing year.

Mr. Urwick said the expense of the laboratory was a great weight upon the Society, and he believed ten years ago, when the expenses were very much less, better results were shown.

Mr. Williams said he had paid a deal of attention to this subject, and would remind Mr. Urwick that, although the laboratory for the past year had not quite paid its expenses, on taking the average for the last few years, it had been a paying part of the institution; that is to say, it received as much from the students as was expended on the professors and demonstrators.

Mr. Collins was re-elected curator.

North British Branch.

The lease of the new premises at Edinburgh for the use of the North British Branch of the Society was submitted by the Solicitor to receive the seal of the Society, and it was ordered to be appended. Mr. Mackay explained that the Society would not take possession until November, in consequence of the damp weather in the spring having prevented its being in a fit state to receive their specimens and books, which had accordingly been stored in the meantime, and a temporary room was taken when required for examinations. He added that they had power under the lease to leave at the expiration of a year and a half if the rooms were not found suitable.

Benevolent Fund Investment.

Mr. Baynes moved the following resolution, of which he had given notice:—

> "That the sum of £10,000, or thereabouts, part of a large sum now standing to the credit of the Benevolent Fund, in Consols, be invested in real securities, so as to produce a higher rate of interest, and that the Finance and Benevolent Fund Committee be requested to inquire, and if necessary, confer with the Solicitor, as to the best means of carrying out this resolution, and to report to the Council."

He said that the bye-laws restricted the investment of the funds to Government and real securities, or he should have wished that a wider scope could have been given to them, and that Perpetual Preference Railway Stock or India Bonds might have been purchased. Therefore, if any alteration were made in the bye-laws, as was contemplated by the previous resolution, that might be taken into consideration at the same time; but at any rate he thought they should endeavour to get the largest interest possible, compatible with perfect safety, on the moneys invested for the benefit of the Benevolent Fund.

Mr. Shaw seconded the resolution, saying it had often occurred to him that they might get a much larger amount of income than they did from their investments. He had made inquiries in Liverpool with regard to one of the largest insurance companies there, and found that they had invested nearly a million and a quarter of money on mortgage of freehold and leasehold property, yielding 4 per cent.

Mr. Sandford said he objected, as a matter of principle, to dabbling with any other than Government securities, and he was glad to find they were restricted as to investments. He would prefer that the Council veto the matter at once.

Mr. Brown said the better way would be to refer it to the Finance Committee.

After some further conversation the resolution was withdrawn, and the following substituted, which was carried unanimously:—

> "That it be referred to the Finance Committee to consider whether any more eligible investments can be found for the capital of the Benevolent Fund than at present, and to consult the Solicitor thereon and report to the Council.".

The Journal Accounts.

The Secretary read some correspondence which had passed between himself and Mr. Wootton, Editor of the *Chemist and Druggist*, the latter having applied to know whether the accounts of the Pharmaceutical Journal, both during its monthly and weekly publication were open to the inspection of members, and, if so, at what time it would be convenient for him to inspect them; the answer returned to him being that the matter would be submitted to the Finance Committee.

Mr. Shaw said the question was simply whether any member had a right to inspect the account books of the Society, which he presumed was not the case.

Mr. SUTTON said if there was a printed statement of accounts vouched by the auditors, that might be shown to any Member, but he apprehended that nothing further could be seen. They did not wish to keep anything back which ought to be properly open for inspection; they could not, however, have any one looking through their books for all manner of details.

The PRESIDENT said he had examined carefully the Bye-laws and found nothing which gave any Member a right to demand an inspection of the books. As a matter of courtesy he opined that a Member would not be refused an opportunity of looking at the statement of accounts referring to any particular subject, but they could not admit the principle that anybody might come and examine the weekly and monthly Journal accounts.

It was ultimately decided that the printed statement of accounts as passed by the auditors for the last year should be sent to Mr. Wootton.

Mr. BROWN then moved—

"That the best thanks of the Council be given to Mr. Schacht for the scheme for aiding education which he has framed and submitted for consideration; and that a copy be forwarded to every Local Secretary, and published in the Journal."

He said that Mr. Schacht had been at considerable personal expense in this matter; and it was extremely undesirable that any further burden should be thrown upon him. It ought at once to be taken up by the Council and sent out to the Local Secretaries, when he had no doubt that many valuable suggestions would be received by the Committee who would aid them in their future action in the matter.

Mr. BAYNES thought this was a very proper course, and said no doubt the Local Secretaries would communicate with the leading men in the trade, and ascertain what their feeling was, and the Committee would gain valuable information in that way.

The resolution having been seconded, was carried unanimously.

The PRESIDENT stated that he had received from the Société de Prévoyance des Pharmaciens de la Seine a gold medal presented by that Society to the subscribers to the Fund raised for the benefit of the pharmaciens who sustained losses during the Franco-Prussian War. It was resolved—

"That the medal be accepted on behalf of the subscribers to the Fund, and thus become the property of the Society."

BENEVOLENT FUND.

SUBSCRIPTIONS AND DONATIONS RECEIVED DURING JUNE, 1872.

SUBSCRIPTIONS.

LONDON.

	£.	s.	d.
Attfield, John, 17, Bloomsbury Square	1	1	0
Bell, W. H., 96, Albany Street, N.W.	0	10	6
Bellars, John O., 30, Ferdinand Street, N.W.	0	10	6
Berdoe, Edward, 511, Hackney Road, E.	0	5	0
Fallowfield, J., 36, Lower Marsh, Lambeth	1	1	0
Field, William, 83, Brompton Road	1	1	0
Fincham, Robert, 57, Baker Street.	1	1	0
G. B.	0	10	6
Johnson, Joseph, 8, Brondesbury Terrace, Kilburn	0	10	6
Lewis, D. J., 13, Upper Tachbrook Street, S.W.	0	5	0
Marston, J. T., 105, London Wall	0	10	6
May, John, Garden Wharf, Battersea	0	10	6
Muter, Dr. John, 231, Kennington Road, S.E.	3	3	0
Price, John M., 3, Loughborough Place, Brixton Road	0	10	6
Steel, Frank, W., 283, Liverpool Road, N.	0	10	6
Turner, E. A., 116, Balls Pond Road	0	10	6
Warner, C. H., 55, Fore Street	1	1	0
White, George G., 130, Camden Road, N.W.	1	1	0
Williams, Richard, 2, Gresham Place, Brixton	0	10	6

COUNTRY.

	£.	s.	d.
Ampthill, Allen, G.	0	10	6
Bath, Barnitt, F.	0	10	6
,, Williams, C. G. T.	0	2	6
Beyton, near Bury St. Edmund's, Nunn, C. J.	0	9	6
Bideford, Hogg, T.	0	5	0
Birmingham, Foster, A. H.	0	5	0
Brigg, Dixon, James	0	3	0
Brighouse, Pollard, W. H.	0	10	6
Brighton, Schweitzer, Julius	1	1	0
,, Smith, William	0	10	6
Bristol, Long, J. T.	0	10	6
,, Troake, R. J.	0	10	6
Burslem, Blackshaw, T.	0	10	6
Cambridge, Pearse, J.	0	5	0
Cardiff, Coleman, E. J.	0	10	6
,, Drane, Robert	0	5	0
,, Inglis, W. G.	0	2	6
,, Joy, F. W.	0	10	6
,, Stewart, Charles	0	10	6
,, Williams, T.	0	10	6
,, Yorath, T. B.	0	10	6
Carlisle, Hallaway, John	0	5	0
,, Sawyer, James	0	5	0
Chatham, Crofts, H. C.	0	10	6
,, Tribe, John	0	10	6
,, French, Gabriel	0	10	6
Chipping Sodbury, Jones, Richard	0	5	0
Chowbent, Warburton, T.	0	5	0
Cottingham, Lister, George	0	10	6
Crook, near Durham, Wilson, James	0	10	6
Denbigh, Edwards, William	0	5	0
Edinburgh, Robertson, James	0	10	0
Exeter, Bromfield, C.	0	5	0
Fallowfield, Leete, W.	0	10	6
Gloucester, Mumford, F. C.	0	5	0
Goole, Briggs, George	0	10	6
,, Hasselby, T. J	0	5	0
Hastings, Miller, F.	1	1	0
Heaton Norris, Hulley, John	0	10	6
Honley, Thackray, H.	0	10	6
Kaffraria, Daines, Thomas	0	10	6
Kidderminster, Haddock, B.	0	10	6
Landport, Hackman, L. L.	0	10	6
Langholm, Rome, R. Moncrief	0	4	0
Lees near Oldham, Malor, Jabez	0	10	6
Liverpool, Barber, George	0	10	6
,, Buck, R. C.	0	5	0
,, Williams, John A.	0	5	0
Llanegryn Towyn, Pugh, Hugh	0	1	0
Maidstone, Rogers, W.	0	10	6
Malvern Wells, Wakefield, C. H.	1	1	0
Manchester, Wilkinson, William	1	1	0
Margate, Candler, J. T.	0	10	6
Middleton, Teesdale, Marsden, M.	0	5	0
Montreal, Mercer, Nathan	0	10	6
New Radford, Jenkins, J. T.	0	5	0
Norwich, Cooke, William	0	5	0
,, Woodcock, Page D.	0	10	6
Nottingham, Beardsley, John	0	5	0
,, Jenkins, J.	0	10	6
,, Lomas, J.	0	5	0
,, Mayfield, J. T.	0	10	6
,, Parker, W. H.	0	5	0
,, Parr and Atherton	1	1	0
,, White, F.	0	10	0
,, Williams and Fitzhugh	1	1	0
,, Woodward, W.	0	5	0
Perth, Reid, N.	0	5	0
Pontypridd, Bassett, C.	1	1	0
Pwllheli, Pughe, R. O.	0	2	6
Rochdale, Booth, James	1	1	0
,, Lord, E.	0	5	0
,, Taylor, E. B.	0	5	0
,, Taylor, Edward	0	5	0
,, Whitehead, J.	0	5	0
Rochester, Harris, H. W.	0	10	6
Romford, Pertwee, Edward	0	10	6
Rothesay, Duncan, William	0	5	0
Scarborough, Oldfield, F.	0	10	6
Shaw, near Oldham, Whittaker, Mrs. E. H.	0	5	0
Seacombe, Holt, R. W.	0	5	0
Sheffield, Cubley, G. A.	0	10	6
,, Hudson, F.	0	10	6
Slough, Griffith, R.	0	10	6
Spilsby, Rainey, Edward	0	10	6
Staines, Jones, E. G.	0	5	0
Stone (Staffs.), Slater, Thomas	0	10	6
Streatham, Robinson, C. J.	0	10	6
Strood, Picnot, Charles	1	1	0
Tunstall, Keightley, Jos.	0	10	6
Waterloo, Pheysey, Richard	1	1	0
Yaxley near Peterborough, Thomas, S. C.	0	10	0

DONATIONS.

	£.	s.	d.
Aberdare, Thomas, William	5	5	0
Ironville, Greaves, W. S.	1	1	0
London (13, Baker Street), Taylor, John	1	1	0
Stratford-on-Avon, Kendall, Frederic	5	5	0

Proceedings of Scientific Societies.

SOCIETY OF BIBLICAL ARCHÆOLOGY.

At the meeting of this Society, on Tuesday, July 2, a paper "On the Economic Botany of the Bible" was read by Mr. James Collins, Curator of the Museum of the Pharmaceutical Society. The author began with some remarks on the obscurity in which the subject was involved from the lapse of time, philological and other difficulties rendering it in many cases almost impossible to identify the substances mentioned with those known to us at the present time. The literature, from that cause and from the great interest at all times taken in everything pertaining to the Holy Land, is exceedingly voluminous, and the various statements very conflicting. He then treated the subject under the general heads of—1. Food plants. 2. Medicinal plants. 3. Textile, dyeing and other industrial plants. 4. Plants used in perfumery and incense; and 5. Miscellaneous substances, and concluding remarks. Under these heads the history, uses, etc., of the following substances amongst others was given:—Aloes, Almonds, Balm of Gilead, Bedellium, Calamus, Cassia, Cinnamon, Colocynth, Frakincense, Gall, Galbanum, Lign-Aloe, Mannas, Myrrh, Olive Oil, Palm, Pomegranate, Ricinus, and Spikenard. The paper was abundantly illustrated with specimens of many growing plants, supplied by Messrs. Vietch, and also of the various substances mentioned.

Other papers were also read, "On the Mazzoroth of Job xxxviii., 32," by H. Fox Talbot, D.C.L., F.R.S, and "On the use of Papyrus among the Accadians," by the Rev. A. H. Sayce, M.A.

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

Public Health Bill.

Thursday, June 27th.

On the motion for going into Committe on the above Bill,

Mr. Stansfeld proposed to commit the Bill *pro formâ* in order to omit some clauses and to insert some amendments.

The House having resolved itself into Committee,

Mr. Sclater-Booth asked for an explanation of the object of the proposed amendments.

Mr. Stansfeld suggested that it would be more convenient for members to judge of them when the Bill had been reprinted. The amendments where mainly based upon suggestions made by hon. members, or deputations which had waited upon him.

Mr. T. Collins thought an assurance should be given that the amendments did not substantially alter the character of the Bill.

The Bill then passed through Committee *pro formâ* with amendments, and the House resumed.

Friday, June 28th.

Mr. Rylands asked the President of the Local Government Board if it was the intention of the Government to proceed with the Public Health Bill this session, and, in that case, if it was proposed to withdraw any of the provisions contained in the Bill.

Mr. Stansfeld said it was unquestionably the intention of the Government to proceed with the Public Health Bill. The Bill was committed *pro formâ* last evening for the insertion of certain amendments. He had unwillingly come to the conclusion that, considering the advanced period of the session and the pressure of public business, it was necessary, in the interest of the bill itself, to do what was sometimes called throwing part of the cargo overboard. He had examined the Bill in order to see what sacrifices it was necessary to make in order to ensure the passing of the Bill. The House would remember that last year they consolidated certain departments of the measure with the Central Government Bill. The Bill as it stood might be divided into three parts, one consisting of provisions organizing the local sanitary authorities, followed by the body of the Bill giving new powers to and imposing new duties upon those authorities; and then came a number of miscellaneous clauses, giving facilities for the proceedings of the local authorities. It appeared to him that the best course would be to stop this year with the creation and consolidation of the local authorities, and to withdraw from the Bill all the clauses relating to nuisances, hospitals, river pollutions, and other matters.

In reply to Mr. Corrance,

Mr. Stansfeld said it was not possible to fix a day for the Committee till the Mines Bill had been disposed of.

Adulteration of Food, Drugs, etc., Bill.

Wednesday, July 3rd.

The House went into Committee on this Bill, but, on the motion of Mr. Rylands, progress was immediately reported.

Poisoning by Cyanide of Potassium taken in Mistake for Medicine.

On Tuesday, June 25th, an inquest was held at the Queen's Head, Chelsea, respecting the death of Mr. John King. Deceased, who was under medical treatment, had his medicine bottle in the bar, and on taking a dose became suddenly faint and died in two hours. It was then found that some cyanide of potassium had been put into an empty medicine bottle, and the label, "To be taken every four hours," left upon it. Edward Jennings, potman to deceased, said he had been in the habit of obtaining twopennyworth of cyanide of potassium about once a month, from Mr. Pasmore, chemist, for Mr. Edward King, who used it for cleaning the metal work of the refrigerator in the bar. The mixture, up till Tuesday in the previous week, always used to be made and kept in a very old dirty bottle, but the regular bottle was then broken. Mr. Edward King, being asked by the coroner how the cyanide of potassium came into the medicine bottle, said, "I put it into that when the other bottle was broken last week. It was a fresh lot that I made up. I took it out of the locker about a quarter after six in the morning, and put it on the shelf to clean the refrigerator with, when it got cool after breakfast. My father must have come in and put his medicine bottle by the side of that, and then taken up the poison bottle in a mistake, but he always knew that we used the cyanide of potassium three times a week, and always on a Saturday. The Jury returned a verdict of Accidental Death.—*Standard.*

Death from an Overdose of Morphia.

On Thursday evening, July 27th, an inquest was held at Morecambe by the coroner, Mr. Holden, upon the body of Mrs. Elizabeth Townsend, whose death was stated to have been caused by an overdose of morphia.

Mr. Tilly watched the inquiry on behalf of the assistant of Mr. Birkett, chemist and druggist.

Miss Ann Lester deposed: The deceased was my aunt and I lived with her. She has been invalided for some years, and for the last three years and a half has been attended by Mr. Metcalfe Johnson. He has sometimes sent medicine from Lancaster, and occasionally written prescriptions. On Tuesday night, about ten minutes past seven o'clock, he saw deceased, and about eight we received some medicine from Mr. Birkett's. It consisted of a small box of pills and a lotion. A boy brought the medicine, and I took it in. I gave my aunt one of the pills about five minutes afterwards. I did not notice that it had any effect upon her for about half an hour, when she said she felt sleepy, and in about ten minutes after that she fell asleep. At ten o'clock I left her for the night. Some time early in the morning my uncle called me to her again. Mr. Metcalfe Johnson was then with her. I remained with her until she died. She never spoke whilst I was with her that I am aware of, and she died about half past six. I did not give her any other medicine besides the pill. I gave the box to my uncle when I had done with it.

Mr. John Townsend, lodging-house keeper, deposed: The deceased was my wife; she was 62 years of age, and had been invalided for the last 20 years. For about three years and a half she had been attended by Mr. Metcalfe Johnson. I went for him on Tuesday morning, and he came between seven and eight o'clock in the evening. He left no medicine with me, but some was left afterwards by Mr. Birkett's boy. My niece subsequently gave me the box, and I returned it to Mr. Birkett's assistant, who came for it about eleven o'clock on Tuesday night. My niece left us about ten, and I shortly afterwards went to the room where the deceased was. I did not notice anything particular in her breathing, until about a quarter of an hour before Mr. Birkett and Mr. Johnson came. Mr. Johnson used means to rouse her, and a messenger was sent to Lancaster for further aid. Mr. Christopher Johnson came a little before four in the morning. She opened her eyes twice, and exclaimed "Oh, dear," and about six o'clock she died.

By Mr. Tilly: About a quarter of an hour elapsed between the intervals of her exclaiming "Oh, dear!"

Mr. John Birkett deposed: I am a registered chemist residing at Morecambe, and Wm. Edmondson is my assistant. He was an apprentice, and is now an assistant, having been with me upwards of eight years. I have been in the habit of making up prescriptions for Mrs. Townsend, given by Mr. M. Johnson. My assistant informed me on Tuesday evening that Mr. M. Johnson had left a prescription to make up, and I told him to make it up. I went out on business for about a quarter of an hour. The medicine was sent out in the ordinary way. Shortly before ten o'clock I discovered that a mistake had been made. Mr. Townsend came and asked, "Shall I be doing right to repeat those pills at eleven o'clock?" [Box produced, the directions being, "One directly, and repeat every four hours until free from pain or sickness."] I called my assistant, and said, "Let me see that prescription." I read it, and found that the dose was one-sixth of a grain for each pill. I told him that he might repeat it if necessary, according to the directions. He mentioned that she had gone to sleep, and said he supposed there would be no harm in it. I said "None whatever." He asked if they were sleeping pills, and I told him they were. After a conversation about the strength of the dose, Mr. Townsend left. Shortly after he had left, my assistant told me the pills contained one grain of morphia each. I knew that Mrs. Townsend was in a very weakly way, and I thought that the dose might be too large for her. I considered it over, and the conclusion I came to was that it would be best to go for Mr. Metcalfe Johnson. I took a cab and went for him, leaving here about a quarter past eleven. I reached home about twenty-five minutes past twelve, and Mr. Johnson came down about a quarter of an hour afterwards. I accompanied him to Mr. Townsend's. Further medical assistance was sent for, and Mr. Christopher Johnson arrived about a quarter to four. She never spoke while I remained, but opened her eyes once or twice. I keep the morphia in a cupboard where all the more active poisons are kept. I know morphia to be an active poison.—By Mr. Tilly: The prescription reads literally, "Take of the acetate of morphia one grain; let six pills be made; one directly, and repeated every four hours until free from pain or sickness." The prescription does not say literally, "Let six pills be made of it," but "Let six pills be made." It is mostly usual to say that the ingredient is to be divided into so many pills, and it would have been a greater safeguard to have said so in this instance. When I read it I saw at once it meant one-sixth of a grain in each pill, taking the prescription as a whole. I have known doses of a grain given. I considered the prescription was perfectly intelligible, but it would have been better to have said the morphia was to be divided into so many pills.

Wm. Edmondson deposed: I am assistant to Mr. Birkett. I have not gone through my examination to qualify myself as a chemist, but am preparing for it. I served my apprenticeship with Mr. Birkett, and have been with him about eight and a half years altogether. I have made up prescriptions for Mrs. Townsend before, but not recently. On Tuesday evening I received the prescription produced from Mr. Metcalfe Johnson. He asked me if I could make it out. I read it, and replied, "Yes." After some verbal directions about the lotion, which I wished particularly to understand, Mr. Johnson pointed to the first part of the prescription relating to the pills, and I understood him that I had to put one grain of morphia in each of the six pills. Immediately on getting into the shop, I wrote down the directions about the lotion, and I then began to make the pills. The box produced contains the remainder of the pills, and they contain one grain of morphia each. I know morphia to be an active poison, and I understood Mrs. Townsend to be dangerously ill; but not in a weakly state. I do not remember ever having previously made up pills containing a grain of morphia each. I knew Mrs. Townsend was suffering from dropsy. When I had made up the pills, I sent them by our boy. About ten o'clock, I was in the shop when Mr. Birkett and Mr. Townsend had some conversation together. Almost immediately after Mr. Townsend had left, I told Mr. Birkett what the pills contained. He replied that it must be a mistake, as Mrs. Townsend was in a very weakly state. He said, "We had better get the pills back, before another dose is given." I went to Mr. Townsend and got the pills back, just as he had reached home.—By Mr. Tilley: There is another form of prescription when we have to make up pills. It says, "Take the quantity, and divide into so many pills."

At this stage of the examination, the inquest was adjourned until Saturday.

On Saturday William Edmondson was re-called. He produced the authorized British Pharmacopœia, in which from one-eighth to half a grain of morphia was prescribed as a dose. He said he knew the book by heart from end to end, and that the extent of the dose according to the Pharmacopœia was half a grain. It did not occur to him until afterwards—when Mr. Townsend came to ask about repeating the dose—that one grain was too much to give. He supposed the reason why it did not occur to him at the time, was that his mind was absorbed with the lotion part of the prescription more than with the pill portion, inasmuch as there were some special verbal directions to attend to.

Mr. Metcalfe Johnson said: I have attended Mrs. Townsend two or three years, or more. She was suffering from dropsy produced by a combination of diseases. On Tuesday last I saw her at six o'clock in the evening. I prescribed for her; the prescription produced being the one I wrote out. I took it to Mr. Birkett's shop, and saw his assistant, William Edmondson. I gave him verbal directions, and intended to convey to his mind that the grain of morphia was to be divided into six pills. He asked no questions upon it, and I left it in his hands to be made up. One grain of morphia is an unusual dose, and only prescribed in very rare cases. I have occasionally left my prescriptions at Mr. Birkett's to be made up. I have not before left any similar prescription at Mr. Birkett's. The morphia was given to alleviate pain, and it is well known that an overdose produces certain death. Children and aged or infirm persons are particularly susceptible of its influence. A little before twelve o'clock the same night Mr. Birkett came to me at Lancaster, and told me what had occurred. I followed him to Morecambe almost immediately. I applied galvanism externally, ammonia through the nostrils, and hot coffee through the mouth. I sent for Mr. C. Johnson at two o'clock in the morning, and he brought additional galvanic apparatus to my aid, but all the means used were of no avail; we never restored the patient to thorough consciousness. The mere exclamation "Oh, dear," twice, I don't consider as consciousness in my sense of the term. She died, I think, about seven o'clock in the morning. The symptoms throughout the night were very pronounced, leaving no doubt that she was suffering from an overdose of morphia. The eyes were for the most part closed, and the breathing was slow—about six times in one minute, instead of twenty. Yesterday I made a *post-mortem* examination of the body, in conjunction with Mr. C. Johnson. I first opened her head and found the membrane very much congested, not very firmly adherent. The brain substance was softened, owing to *post-mortem* changes. There was an excess of fluid in the ventricles, and a large number of bloody points apparent on the section of the brain, showing that the whole organ was much congested. On examining the abdomen I found an enormous tumour, probably weighing between 20lb. and 30lb., which was adherent to the walls of the stomach, parts of the intestines, and the abdominal walls. The lining membrane of the stomach was congested, owing to *post-mortem* changes, and contained a coloured fluid it was not possible to analyse. The liver also contained cysts, and was much congested. The heart was remarkably thin, very soft in texture, and the valves healthy. The lungs were compressed but not congested. All these symptoms made the system peculiarly susceptible to morphia. The condition of the brain corresponded with the symptoms during the last part of her life as to induce me to consider that the immediate cause of death was the action of morphia. The prescription produced is written in an usual form, and written in such a way that I thought it to be quite incapable of being misunderstood. It is not so common to put the word divide in prescriptions as the form I have used. The deceased was not in the habit of taking morphia, and the first dose, would, therefore, act more powerfully. I produce a copy of the certificate of death. In that certificate I attribute death to dropsy from diseased liver, accelerated by an overdose of morphia.

By Mr. Tilly: Deceased could not have lived very long, but I did not consider her on her death-bed. She might have lived a month, or it might only have been a day. I considered her recovery beyond all hope. In the certificate I gave I ascribed death to have resulted from dropsy from diseased liver, accelerated by an over-dose of morphia. In my evidence I ascribe death to the action of the morphia. I have known Edmondson for six or seven years—in fact, I think almost as long as he has been in Mr. Birkett's employ. I have many times had communication with him in the course of my profession, and have found him of fair ability, and intelligent in his business. It is usual to mention in the prescription the material of which the pills are to be made, but it is not usual to say divide. I gave him verbal directions as to dividing the morphia into six pills. It is quite possible that Edmondson misunderstood my verbal directions. It might have made the prescription more plain to have said divide. The remedies were applied immediately I arrived at the house. A grain of morphia is not an unusual dose, but that quantity is not often administered in a pill. A grain of morphia would not kill a healthy person. In cases of delirium tremens two grains are sometimes given. The verbal directions about the lotion were very special.

By the Coroner: I have been 25 years in actual practice and never recollect prescribing a grain of morphia in one dose.

Mr. Tilly, in addressing the jury, said that he hardly thought that the evidence which Mr. Johnson had given that day was reconcilable with the cause of death as stated on the certificate, and the matter would be fresh in his mind at the time he made out the certificate. Mr. Johnson then stated that deceased had died from dropsy, accelerated by an over-dose of morphia, but in his evidence that day he stated that death had resulted from morphia. Supposing the latter supposition to be the correct one, they must all agree that the drug had been administered by mistake, and therefore, he contended, they would be justified in returning a verdict to the effect that death had occurred through misadventure. He thought every one would absolve Mr. Birkett from all blame whatever in the matter; it was not to be expected that Mr. Birkett could personally superintend, or personally make up, all prescriptions that came to his shop,—it would be an impossibility for him to do so; but he had provided an assistant whom they had heard described as possessing full average ability and intelligence for the situation in which he was placed—a young man whom he had had in his employ for eight years—and it might therefore be assumed that Mr. Birkett had done everything that was necessary for the requirements of his customers, and consequently that not the slightest blame or negligence could be attached to him. He thought it was a misfortune that any special directions were given at all; suppose the prescription had been handed over to some one else to make up, what would have become of the verbal directions? The prescription should have contained all that was necessary, and nothing been left to intentions; for it was the verbal directions that the young man had misunderstood. Lamenting as they all did, the painful occurrence, they must nevertheless, be satisfied with the conduct of Edmondson, which had been consistent and straightforward throughout. Supposing he had said nothing about it directly he had found out his mistake, but had got the pills back again and destroyed them, how would they have been able to prove anything against him? But, on the contrary, he came before them and told them candidly how the mistake had occurred—that he had misunderstood the verbal direction which had been given to him. Mr. Tilly concluded by stating that the form of prescription was to his mind somewhat ambiguous, and contended that under the circumstances the jury would be justified in returning a verdict to the effect that deceased had died from dropsy, accelerated by a dose of morphia administered by misadventure or accident.

The coroner very carefully summed up the evidence. He agreed with Mr. Tilley that the certificate as to the cause of death, and the evidence which Mr. Johnson had given that day, were inconsistent with each other. In the first instance, Mr. Johnson was of opinion that death was simply accelerated by morphia; but that day he stated that the immediate cause of death was from the action of the morphia. It was only fair to remember that he was able to speak with more certainty on the latter point from the *post-mortem* examination which he had made. He thought no one could charge Mr. Birkett with any negligence in the matter; he did all that a just and right-minded man could do under the circumstances. On finding out the mistake which had been made he secured the pills, and at once went to Lancaster for Mr. Johnson, and acquainted him with the occurrence. The latter gentleman followed him down almost immediately; and all had been done that skill and diligence could suggest, but, unfortunately, without effect. The prescription might have been more explicit, but Mr. Johnson said it was written in the usual form, and in a way that he thought could not have been misunderstood. The Pharmacopœia said that the extent of a dose of morphia was from one-eighth to half a grain; but when druggists received prescriptions from a doctor prescribing ingredients in excess of what their Pharmacopœia stated,—recognizing the doctors as better qualified to judge than themselves, they did not hesitate to make them up. Edmondson had told them that he understood the pills were to contain one grain of morphia each, and they were bound to believe him; and if they did believe him, then they must acquit him of any offence against the law. The coroner then gave the legal definition of manslaughter as it applied to the case, quoting Lord Lyndhurst, to the effect that if a party having a competent degree of skill and knowledge makes an accidental mistake through which death ensues he is not thereby guilty of manslaughter. On the other hand, a man would be guilty of manslaughter if, notwithstanding he has a competent knowledge of medicine, he be guilty of gross rashness in the application of a remedy, or negligence in attending to the patient afterwards. If the jury believed in the intelligence and skill of Edmondson, that he had used due precautions, and that he read the prescription to mean that the pills were to contain one grain of morphia each, then they would say by their verdict that death was caused by misadventure; if, on the other hand, they thought he had been guilty of gross negligence, then they must find him guilty of manslaughter; but he (the coroner) felt bound to tell them that he thought the evidence would hardly bear out the latter verdict, and that the proper legal verdict would be to say that death was caused by misadventure.

The jury retired, and in about half an hour brought in a verdict that death resulted from an overdose of morphia admininistered by misadventure.—*Lancaster Observer and Lancaster Guardian.*

Poisoning by Methylated Spirit.

The *Standard* reports that on Wednesday night, a pointsman, named John Nutter, employed at the Preston Goods Station on the London and North-Western Railway, was found dead in a break van. Previous to this a breaksman named Robert Fenton had left Preston with a goods train for the north, but was taken so seriously ill at the Carnforth station, a few miles beyond Lancaster, that he was unable to attend to his duties, and was sent back to Preston by the first return train. From him, however, it was elicited that he and Nutter, seeing what they thought was spirit trickling through the bottom of a luggage van, caught a quantity of the liquor in their cans and drank it. The train to which this van was attached arrived at Preston about nine o'clock on Wednesday morning, and on examining it a cask of methylated spirit was found to be leaking. It was this liquor that the unfortunate men had been drinking. It was stated that Fenton was delirious and was not expected to recover.

Excise Prosecution.

At the Exeter Police Court George Pates, chemist and druggist, was summoned by the Inland Revenue officers for keeping a male servant without a licence. Mr. Friend appeared for the defendant. John Satchell, Inland Revenue officer, stated that on Monday, 22nd April, he was passing the defendant's house on Fore Street Hill, and in a room under the shop he saw a boy brushing a man's shoe. On the following day he took Mr. Pates a declaration paper, telling defendant if he kept a male servant he must pay 15s. per year, and told him to read the paper. On the next day defendant returned the paper with "Nothing liable" written on it. Mr. Leckenby called John Salter, a little boy about ten years of age, in the employ of Mr. Pates, who stated that he frequently cleans his master's boots. Mr. Friend called Ann Leach, servant at Mr. Pates's, who stated that it was her place to do the work of the house, but not to clean the shop. Witness had asked the boy to come down and help her, and he had done so. The Bench fined the defendant £5, and recommended a further reduction.—*Exeter Evening Express.*

Review.

The Pharmacopœia of the Hospital for Diseases of the Throat. Edited by Morell Mackenzie, M.D. Lond., Hon. Med. Superintendent. London: John Churchill and Sons, 1872.

The pharmacopœia of a hospital, like that of a nation, reflects the state of both therapeutics and pharmacy in the institution from which it emanates. The Paris Codex, it has been said, shows that French Pharmacy is founded on sugar. The American dispensatories vaunt the virtues of resinoid active principles and syrups of the phosphates, and the present British Pharmacopœia exhibits our growing partiality for pure, definite chemicals for use as remedial agents. In the work before us are enumerated and described the medical preparations employed in the special treatment of throat diseases.

Like the old London Pharmacopœia, and still more resembling that of the London Hospital of 1868, from which several of the formulæ have been abstracted—the editor being also one of the staff of that hospital,—this pharmacopœia is divided into two parts, "Materia Medica" and "Formulæ." Under the head of "Materia Medica" about 160 drugs and chemicals are mentioned, all of which are official in the British Pharmacopœia except the following: — Acidum Lacticum — the specific gravity is not mentioned, or the strength or purity in any way indicated—the article of commerce varies very much in these respects,—Æther Aceticus, Aluminii Chloridum, Oleum Abietes Pectinatæ, Oleum Calami Aromatici, Oleum Folii Pini Sylvestris, Oleum Cassiæ—from what source is not mentioned—we presume that distilled from the bark of *Cinnamomi cassia* is intended, — Oleum Lupuli, Oleum Myrti, Oleum Salviæ, Oleum Santali—the botanical sources of these also are not stated,—Oleum Origani Pallidi,—we are not acquainted with the species *O. pallidum*, but suppose *pale* oil of marjoram (*Origanum vulgare*) is meant, as distinguished from the commercial Oleum Origanum distilled from *Thymus vulgaris*,—Oleum Juniperi Anglic*i*, B.P., is another similar misnomer. In addition to the above are Sodæ Hypophosphis, Pepsina Porci (Bullock's), Thymolis Hydras (thymic acid) and Ferri Persulphas. The last preparation is a rather mythical one; it is stated that it enters into the preparation of Pilula Aloes et Ferri (Lond. Hosp. Pharm.), in which dried ferrous sulphate is ordered,—into Collyrium Ferri Sulphatis, which contains only ferrous sulphate and water,—and into Aqua and Collyrium Ferri Aluminis, in which the only ingredients are iron alum and water. Calcis Carbonas Præcipitata is official under its vulgar name Creta præcipitata—it supplants Creta præparata in Mistura Cretæ. Of creasote, that prepared from beechwood only is to be used. The oil of the mountain pine—Oleum Pumelii—is also mentioned in one of the formulæ. With this preparation we are unacquainted, and its botanical source is to us very obscure. The utility of the first part of the work—the Materia Medica—is not very obvious, unless it be to define and describe accurately the special non-official medicaments used in the second part. In the first part the list of preparations into which drugs enter is very incomplete and often erroneous. As an additional instance, under the head of Ipecacuanha, among the "preparations" are Pulvis Emeticus; referring to the second part we find Pulvis Emeticus thus:—"Take of Sulphate of Zinc 20 grains. *Dose*, 20 grains freely diluted with warm water."

In the second part we have a clear and explicit description of the Vapores—Inhalations, and their mode of use,—(1) as medicated steam inhalations, (2) cold inhalations, (3) atomized inhalations (which are to be applied by means of a spray apparatus), and (4) fuming inhalations, these are produced from nitrated papers which are to be ignited and the smoke inhaled. The Eclectic Inhaler devised and recommended by the editor is also described. As an example of the style of the formulæ we take the following for Vapor Cajuputi.

"Take of

Oil of Cajuput	20 to 30 minims.
Light Carbonate of Magnesia	15 grains.
Water to	3 fluid ounces."

Mix.

"A teaspoonful in a pint of water at 150° F. for each inhalation."

The magnesia is added to keep the oil mechanically subdivided; but we think its use is chemically objectionable. Most volatile oils have an acid reaction, and, therefore, form compounds with magnesia which are non-volatile.

Acetic Acid Inhalation is directed to be prepared by taking Acetic Acid, B.P., and Glacial Acetic Acid, of each one drachm, and adding to a pint of water at 140° F. As Glacial Acetic Acid is exactly three times the strength of Acetic Acid, B.P., we are unable to perceive the advantage that such a mixture as above has over half a fluid ounce of Acidum Aceticum, B.P.

Under the head of poultices, caustics, plasters, gargles, mixtures, etc., appear the usual formulæ. By the way, we may remark there is no such preparation as "Emplastrum Roborans, B.P." The term "aqua" is applied to solutions intended to be sprayed unto the affected part by means of the atomizer, *e.g.* alum 80 grains, distilled water 10 fluid ounces, form "Aqua aluminis." But the most objectionable nomenclature occurs in usurping the term "collyrium," which is now universally understood to be an eye lotion, and applying it to a solution for topical application to the throat by means of a brush. As "Collyrium Argenti Nitratis" contains "60 grains of salt in the fluid ounce of water"! whereas that for the eye is rarely used above the strength of 4 or 6 grains to the ounce, the danger of mistaking one for the other is apparent. "Pigmentum" would be a better designation for such a preparation, and as it has to be applied by means of a *brush*, this would be a consistent term to use, although it is generally applied to iodine applications only.

Mistura Cathartica is made more vile than Mistura Sennæ Composita by the addition of carbonate of magnesia and oil of peppermint, and the omission of extract of liquorice and the tinctures in the B.P. formula. The following is the formula for "Linctus Scillæ":

"Take of

Compound spirits of ammonia	½ a fluid ounce.
Wine of ipecacuanha . . .	2 fluid drams.
Oxymel of squills to . . .	3 fluid ounces.

Mix. Dose, 1 fluid dram."

To avoid all danger of an explosion it will be necessary to dispense it in two bottles, or let the effervescence cease before bottling it.

Pure chlorate of potash will not dissolve to the extent of 24 grains in the ounce of water at ordinary temperatures, as in Gargarisma Potassæ Chloratis; but equal parts of tannic acid and water form a perfect solution if the tannic acid be pure—see Gargarisma Acidi Tannici Forte. The suspension mentioned will be impurity. Among the various formulæ we cannot conceive the utility of the following for Mistura Ferri et Ammoniæ:—

"Take of

Ammonio-citrate of iron . .	60 grains.
Water	12 fluid ounces.

Dissolve. Dose, 1 fluid ounce."

It merely signifies that citrate of iron and ammonia may be given in five grain doses. The same remarks apply to Mistura Sodæ Hypophosphitis, Mistura Aconiti, and Mistura Acidi Hydrocyanici.

Such misnomers as compound spirit*s* of ammonia, for aromatic spirit of ammonia, rectified spirit*s* of wine, and spirit*s* of chloroform strike us forcibly, especially in a Pharmacopœia. We find "spirit*s* of chloroform, *æ*ther, each ½ fluid ounce," which leaves us in doubt whether ether or spirit of ether is intended. The English word ether we find thrice spelt as above, and once *e*ther.

There are twelve formulæ for lozenges, all of which, except that for Trochisci Acidi Carbolici, have *fruit paste* as a basis for medication. In most of the formulæ it is called "*black* currant paste," in others, "*red* currant paste;" which it is the compiler appears to be in doubt, but in a note he states the "lozenge manufacturers are quite conversant" with it. Trochisi Cubebæ are stated to "closely resemble the Brown's Bronchial Troches, which have so much reputation both in America and Europe, but black currant paste is employed, and less gum and sugar." Similar editorial notes are appended to many of the formulæ.

On the therapeutical value of this Pharmacopœia we can offer no opinion, but the high professional reputation in which the editor is held will be sufficient guarantee for the work in this respect,—throat diseases having been a speciality to which he has directed much attention. We regret, however, that the little book has not been more carefully compiled, as an accurate mind will have its faith much shaken in what is novel and good; it would have been much more useful if more generally correct.

Notes and Queries.

*** *In order to facilitate reference, correspondents are requested to mark their answers in each case with the title and number of the query referred to.*

No notice can be taken of anonymous communications. All queries or answers should be accompanied by the name and address of the writer.

COD LIVER OIL AND ESSENCE OF EUCALYPTUS.—M. Duquesnel states (*Journ. de Pharm. et de Chimie* [4] xv. 383) that cod-liver oil, flavoured with essence of eucalyptol in the proportion of one gram of essence to one thousand grams of oil, has neither the taste nor the odour of cod-liver oil. It is taken with facility, only leaving at the back of the mouth and on the tongue the taste of the essence which it contains. He adds that the malodorous eructations, so disagreeable when arising from cod-liver oil, are completely modified.

[317.]—BROWN HAIR DYE. — In answer to F. B. J., the acetate of lead will dissolve easily in six ounces of cold water, and the hyposulphite of soda in the remaining eight—boiling. — JOHN TULLY, East Grinstead.

[319.]—ADULTERATION OF OLIVE OIL.—Can any gentlemen oblige me with a test for the detection of any animal matter in olive oil.—A. P. S. (Exeter).

The following journals have been received:—The 'British Medical Journal,' June 29; the 'Medical Times and Gazette,' June 29; the 'Lancet,' June 29; the 'Medical Press and Circular, June 29; 'Nature,' June 29; the 'Chemical News,' June 29; 'English Mechanic,' June 29; 'Gardeners' Chronicle,' June 29; the 'Grocer,' June 29; the 'Journal of the Society of Arts,' June 29; 'Grocery News,' June 29; 'Journal of Applied Science' for July; 'The Doctor' for July; 'Neues Jahrbuch für Pharmacie' for March and April; 'British Journal of Dental Science'; 'Medical and Surgical Reporter,' No. 794; the 'Lancaster Guardian' for June 29.

Correspondence.

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

The Possibility of Effort.

Sir,—I was pleased to see in your last issue a letter on this subject of a far healthier and more encouraging tone than that of Mr. Ince, but I quite expected to have seen some authority step forward and remind that gentleman that of the many who annually pass the examinations, a great proportion do so with scarcely any help other than that derived from the study of the ordinary text-books, and hints from those who have already passed.

Now I wish it fully to be understood that in these remarks I refer to the "Minor" only, for it is with respect to this examination that I observe the greatest anxiety possesses young men. And further, I would guard against being thought to undervalue in the slightest degree the great advantages derivable from courses of lectures, laboratory teaching, or access to a qualified tutor. On the contrary, I place the highest value upon each and all of these aids, but my sympathy with the many apprentices and assistants who are far removed from their influence, induces me to record my impression that individual effort is easily able to accomplish the "Minor." A perusal of either of the previous letters would convey a contrary impression; yet, although my experience must be far less than that of Mr. Ince, every young man in my somewhat extended circle of personal acquaintance, with one exception only, whom I have seen set diligently to work, has accomplished it in periods of from four to twelve months. The ages of these candidates have varied between eighteen and twenty-one years.

With your permission, I would now state by what means the foregoing results were attained, putting my remarks into such form as shall enable the many anxious and comparative outsiders of our community to construct for themselves a line of action.

It is presumed on the part of intending candidates that they possess thorough acquaintance with the construction of prescriptions and methods of dispensing, with the appearance of the various chemicals and galenicals, and with the more common articles of Materia Medica. The possession of such knowledge ought to be a matter of course with all who have been three or four years in the trade; and such as have yet to acquire it, ought to bear in mind that they must qualify themselves thus far for their ordinary duties behind the counter before they entertain any immediate thoughts of submitting themselves to the examination.

The study of the various subjects should proceed simultaneously; but the first step should be the getting together of specimens of the organic materia medica; and when looking these over, reference should be made to any standard work on the subject, with a view of learning the method of obtaining them, their uses, and such knowledge as is set forth in the synopsis of the examination. The galenical preparations of the Pharmacopœia should be learnt by heart, and the processes for the manufacture of officinal chemicals well studied, Attfield's Chemistry being used for their explanation. The reactions of the salts should be studied experimentally. My conviction as to Botany is, that the best beginning in it is to go out into the fields and interest one's self in the wild flowers. The structure of these, carefully studied by the help of a good work on botany, will soon lead up to such a knowledge of structural botany as will ensure confidence under examination, and in all probability, will further lead to the subject being taken up afterwards as a source of amusement.

Briefly, then, it appears that a candidate for the "Minor" is required to show a thorough familiarity with the various aspects of those things which he is called upon to use daily; and for persons of average capabilities who make proper use of their time with a view to render themselves good men of business, a steady application to study in the spare hours after business will soon fit them to undergo the now dreaded ordeal.

E. Nuthall.

Norwich, June 24th, 1872.

Pharmaceutical Curiosities of Medical Practitioners.

Sir,—I do not know where your correspondent 'G. H' hails from, who writes on the above subject in last week's Journal, but I think he has just cause for complaint; and as it is a subject to which I have given some attention, I would like to add a few words to 'G. H.'s' communication, in the hope that some reform may be the result, in our locality at least, viz. the vicinity of the Valley of the Clyde. But in the first place, as I have, partly from curiosity and partly from an enquiring nature, been trying to discover the origin of 'G. H.'s' "Co.2," I beg to offer the following as the reason:—'G. H.' has probably heard of the new chemical notation; but having a large practice, he has not had time to "read up" on the subject; and having an idea that brevity is the soul of wit, has come to the conclusion that all acids are easily distinguishable by such symbols as "SO2," "CO2," and so forth. I shall be glad to learn that my conjecture is wrong.

But my main object in writing is to point out that such obscure prescriptions as those referred to by 'G. H.' are very common; and, if I mistake not, are becoming more common, especially in this district; and I know further that the practice is not carried on by "ignorant" medical practitioners, but by some who have a practice and reputation, as well as social position, which ought to be far above such miserable contrivances. What would 'G. H' think were he to receive such prescriptions as the following?—"Ung. Flav.," "Pil. Asiaticæ," "Lotio Oculi," "Lin. Co.," "Ung. Rub.," "Acid. Tonic. No. 2," "Pil. Nucis Co.," "Tinct. Alterative," etc. Yet these are but specimens of what have gone through my hands since I became connected with the drug business. I might give the initials of the authors of these wonderful cognomens, but deem it advisable for the present to withhold them. I have frequently sent to the physicians for explanations, but, unlike 'G. H.,' instead of finding the prescription coming into the shop in a more extended and comprehensible form, have been horrified by the reply that these could only be got at so-and-so's establishment. I have long since come to the conclusion, however, that the medical profession are not so much to blame in this matter as a certain unprincipled class of our own brethren in trade. If the profession were not encouraged or tempted by a bait of some kind, they would not be so terribly anxious to send patients distances of miles for medicine, which, were the prescription written in full, might be prepared at the patient's own door. This system of secret or tacit understandings between physician and pharmacist ought to be most strenuously opposed by all right-minded members of the trade. I would far rather have surgeon-druggists for my neighbours than such underhand dealers. I know some, however, who have gone into this system, and who would give a good deal now to get rid of it altogether; for they have discovered to their chagrin that the benefit is all on one side, viz. that of the medical practitioners. They have found out that unless they are dishonest by making an extortionate charge for dispensing and withholding the prescription, which they have no right to do, they are simply playing a game at filling the exchequer of the doctor, while they are preventing the money reaching its legitimate source, viz. their own pockets and that of their brother pharmacists. I am further convinced that it is an unprofitable speculation to most chemists who engage in the system, from the fact that in many cases they have to prepare large quantities of these particular medicines, to gratify the whim of the medical man, who, in time taking another notion, gets enamoured with some new nostrum, thus leaving the poor victimized druggist with a stock of, say half a gallon, "Lin. Co.," an article which nobody knows, or cares to know, anything about; and ultimately the doctor forgets all about it himself, and there it lies on the chemist's shelf "dead stock." As a general rule, however, I find that it is the young pharmacist just commencing business, who falls into this grave error, in the hope of procuring in a short time a good going business (though I have instances of old druggists, who ought to know better, not only carrying on the system, but doing all they can to extend it). But the hope of honourably increasing one's business by it is a delusion and a snare; and I would warn my younger brethren to give no encouragement to such a system, which is in many instances corrupting the morals of our young men. Let us ever remember that "It is not all gold that glitters," and that "There is a day of reckoning at hand," when honesty and uprightness shall prevail against all such contemptible expedients.

Ægis.

July 2nd, 1872.

Pharmaceutical Education.

Sir,—The idea of others obtaining benefits which he neither requires nor desires, seems to gripe 'Country Major Associate' very much, and to disturb that peace of mind which his residence in the country ought to afford him. He appears to "lay down the law" pretty stiffly, but I think he would have done better if he had given us more reasons and less axioms. I will, however, endeavour to deal with what little he has given us.

In the first place he declares that to aid country schools is unfair "to the Majors and Minors, who have been induced to proceed to London and elsewhere to acquire a good pharmaceutical training." With regard to this, I would merely ask him if the British Parliament was deterred from making education accessible to all classes, on account of a few who had been to college and had paid £100 for what would be now attainable for one-tenth of that sum? Next, he says that, the aim of the proposed scheme is to make the obtaining of degrees easier and cheaper than it has been to those who have already obtained them. Easier it cannot be unless the standard of the examinations is lowered, which every one knows is not the case. It is harder work for a student to prepare himself for the Minor with the help afforded by the provincial associations established at Bristol, Norwich or Northampton, than it would be at Bloomsbury Square. Cheaper it may be, but is not a man who has passed the Minor from Norwich or Bristol equal to one who has passed it from Bloomsbury? And if cheaper in the country, there will be no necessity for any one willing to work to be at the great expense of going to London to attend the lectures, etc. at the Square, a state of things which I think the Society would not be sorry to see, considering the great loss every year from the educational department; and if it is unfair to help the provincial associations, why help London with the funds of the Society?

Next, 'Country Major Associate' says it is unfair with regard to members in business that their subscriptions should be appropriated for what they do not care to support. I think it has been abundantly proved, both at the Annual Meeting and elsewhere, that the masters are entirely of an opinion that something must be done, the only question being how to be at the same time "just and generous." And is it a matter of indifference to the masters whether their assistants shall be well instructed or not?

'Country Major Associate' says it is unfair to registered apprentices. I believe it is entirely voluntary whether or no they subscribe half a guinea per year to the Society, so I cannot see that it should be unfair to them. Beside, in return they enjoy certain advantages which unregistered apprentices do not, and therefore let them be satisfied with that, and not seek admission into provincial associations at half price, so as to entail heavier expense upon the other members.

Then, lastly, 'Country Major Associate,' makes one sweeping denunciation that is "unfair to every one enrolled into the Society on account of its not being a good general scheme." Certainly, after such a bold assertion as this, one looks for something to back it up, but 'Country Major Associate' gives really nothing. He asks why should Tadcaster contribute to the support of an association at Manchester. Certainly they should not do so without receiving anything in return, but I think it ought to contribute to Manchester just as much as to London. Why should London have the advantage? But under the system of payment for results, Tadcaster might earn sufficient to carry on a school of its own, and though to a certain extent Tadcaster would contribute to Manchester, it would receive more from Manchester than it contributed. In the face of all this, I cannot understand what 'Country Major Associate' means by saying that the scheme has been shown to be neither "fair, possible, or general." There are several schemes being at present brought forward—which one does he mean? or does he mean that giving any aid at all to provincial associations is not 'fair, possible, general, or practicable?"

With regard to the system of payment for results, 'Country Major Associate' had better leave it in the hands of Mr. Schacht, as I do not think he can find abler ones to grapple with it.

Perhaps 'Country Major Associate,' or any other gentleman, can give me a reason why £600 a year should be granted to the London School of Pharmacy, and why Manchester and Norwich, as well as Tadcaster, should contribute towards it, and not receive anything in return?

Most cordially do I endorse the proposal contained in the last lines of 'Country Major Associate's' letter. No one could give better ideas of what is required than those gentlemen who have had such a large experience of teaching in that school which is the model after which all provincial associations are designed.

June 17th, 1872. G. T.

"*A Registered Student of the Society.*"—(1) Only plants collected in their native habitats are admissible. (2) None but British plants are allowed. (3) Lindley's 'School Botany" would not meet the requirements of the collector; the work used must be one on British Botany, as indicated in the published regulations for the Botanical Prize.

W. Dixon.—See Professor Bentley's paper on *Prunus Virginiana*, Pharm. Journ., 2nd ser., Vol. V. p. 97.

A. Wood.—(1) You can obtain the information you require by applying to Mr. Cooper, 28, Duke Street, Westminster. (2) We do not know of such a test.

"*Atropa Belladonna.*"—We have been favoured with the following note by Mr. R. Goodwin Mumbray, of Richmond:—

"The interesting paper on Belladonna contained in a recent issue directed my attention to a specimen in my garden, now in the third year of its growth.

"I brought the plant from Dorking, but it languished almost entirely away; at last it was cut down, and seemed quite dead. Having noticed that the soil in which it grew was calcareous, I gave the root a dressing with old mortar, which produced the best results, for the plant threw up three goodly stems; and last summer it grew to the height of $3\frac{1}{2}$ feet. This season it is at least 6 feet high, and has 22 stems, one of which I send for your inspection.

"Notwithstanding its deadly nature, the *Atropa Belladonna* does not escape the attacks of various caterpillars and aphides. It has also been visited by their natural enemy, the *Hemerobius*, the remains of whose curious eggs are apparent upon one of the leaves; the minute larvæ are no doubt busy with their prey."

H.M.—You appear to be under a mistake in assuming that the Pharmacy Act prohibits widows from carrying on the business of a chemist and druggist otherwise than it prohibits all unregistered persons from doing so. On the contrary, the 16th clause of the Act specifically states the means whereby a chemist and druggist may provide for his widow retaining and carrying on his business should he so desire. The other subject referred to in your letter is one which we think it inexpedient to notice, unless we see some distinct prospect of its being dealt with satisfactorily.

R. Clement.—Such a book, if published, might be obtained through Messrs. Williams and Norgate, Henrietta Street, W.C.

Morton.—The Preliminary examination is not at all dependent upon apprenticeship. All that is necessary is that you should possess a moderate knowledge of the English language, of Latin, and of Arithmetic.

"*Minor Associate*" is thanked for his suggestion, but we think it is one that could not be adopted in this Journal.

"*Non Liquet.*"—(1) See the answer to '*A Medical Student*,' on p. 1044 of the number for June 22nd. (2) The crystallized form is the best to use. The water of hydration is the same in both kinds.

W. J. S.—(1) Care is required in making the addition of water, if all that has been previously added has evaporated, and the temperature of the mixed plaster, oil and glycerine has been increased much above 212° F. If then water be added, steam is generated, which causes the explosion mentioned. (2) We do not know. It is not likely to occur if the Pharmacopœia directions are attended to.

"*Tyro.*"—We do not see much reason to object to the conclusion, provided the observations referred to were properly made. We consider the general character of the advertisement that you send, to be decidedly unwholesome.

"*Mel.*"—We think No. 1 is unobjectionable; but it is a question for a lawyer whether that is the case with No. 2.

Communications, Letters, etc., have been received from Mr. Southall, Mr. Whimpray, Professor Soubeiran, Mr. Thorp, Mr. Rimmington, "A Chemist," "Esse."

A. P. S. and "*X.*" are referred to the rule as to anonymous communications.

ANTISEPTIC PHARMACY.

BY WILLIAM MARTINDALE, F.C.S.,

Dispenser and Teacher of Pharmacy at the University College Hospital.

In a paper read at the Evening Meeting of the Pharmaceutical Society held on December 2nd, 1868,* I drew attention to some pharmaceutical preparations used as dressing in the antiseptic system of surgical treatment. Since then the views and medical appliances of the great apostle of that system, Professor Lister, have undergone considerable modification; the experiments of Professor Tyndall with cotton-wool, and the remarks of Professor Huxley and others on "Spontaneous Generation," together with a more extended trial of the preparations then in use, showed that the exclusion of atmospheric air from wounds under these dressings, was not necessary, provided it were freed from septic matter—the germs of putrefaction. I propose on the present occasion to explain the applications now used by him in the Royal Infirmary, Edinburgh, and also adopted in many of the London and provincial hospitals. In order to make the use of them intelligible, the field of medicine proper must be crossed, and that of surgery much encroached upon.†

In describing these preparations which I have had opportunity of seeing largely used, I am making free use of the description of them given by Professor Lister, in Holmes' Surgery,‡ and also of his Inaugural Address in Surgery, at the Meeting of the British Medical Association at Plymouth, 1871.§ He thus explains that—

"The main principles of the antiseptic system are well illustrated by a case of simple fracture, say a fracture of the leg from direct violence. Such an injury, though subcutaneous, is a most severe, contused and lacerated wound; and the interstices between the mangled tissues are loaded with extravasated blood. With the sole exception, that the skin is not divided, so as to expose the injured parts to the atmosphere, there are present in an aggravated form those conditions which we used to regard as inevitably involving violent inflammation, followed by the separation of sloughs under suppuration, with corresponding constitutional disturbance and serious attendant risk of fatal blood-poisoning. Yet, thanks to the unbroken integument, all proceeds quietly and surely towards recovery; the effused blood is absorbed; and the portions of the tissue killed by the violence are similarly disposed of; while repair is effected by a process which, though more slow, in consequence of the larger amount of effete material to be worked off, is identical with that of union by the first intention, which is commonly supposed to demand cleanly-cut surfaces, with accurate apposition. If, therefore, the effects of the atmospheric exposure could be avoided, primary union ought to occur under circumstances hitherto believed to be inconsistent with it, and our wounds, whether incised or contused, should follow the same safe and tranquil course as subcutaneous injuries. In order that we may attain that all-important object, the first essential is that we understand clearly how the atmosphere exerts its baneful influence. If an open contused wound is treated in the ordinary way, say by water-dressing, or fomentations, we know, as a matter of observation, that the blood within it undergoes putrefaction as if exposed to the air at the same temperature in a vessel of glass or other material. This fact explains the whole train of bad consequences. The products of putrefaction are irritating and poisonous substances; and though perfectly harmless when applied to a sore covered with granulations, which constitute a protecting layer destitute of sensibility and readily excited to suppuration instead of absorption, act very differently upon a recent wound, which violently resents the contact of the poison, yet helplessly imbibes it into circulation: the inevitable result being local inflammation and febrile disturbance. Meanwhile such portions of the tissue as have been killed by the violence of the injury, instead of retaining their original bland character, and serving as pabulum for their living neighbours, become constantly more and more acrid from progressive putrefaction in their substance, and not only irritate the weakened parts in their vicinity and retard their recovery, but operate on them with caustic effect, and thus extend the loss of vitality greatly beyond its original limits. The persistent abnormal stimulation at length gives rise to suppuration, which weakens the patient in proportion to its amount, and in severe cases often carries him off by hectic and occasionally pyæmia."

The numerous experiments made by Pasteur, Liebig and others, proving the origin of fermentation in saccharine and other fluids to be caused by germs of organisms undergoing a further development when placed in a suitable nidus, led physiologists to believe that the putrefaction occurring in wounds is caused by a similar action, and that the blood and serum of an exposed wound form a convenient hatchment in which germs, either floating in the atmosphere or otherwise brought into contact with these fluids are further developed, and in the wounds produce the characteristic inflammation, accompanied by the fœtid sloughing above mentioned; and, further, that the pure atmospheric air, or the oxygen it contains, is not itself an irritant to open wounds. Granting this, it is plain that putrefaction in wounds may be avoided without excluding the air, by dressing them with some agent capable of destroying the vitality of the atmospheric organisms, provided that it does not act with too great a violence upon the human tissues. For the purposes of antiseptic treatment, *volatility* of the germ-poison is an essential requisite, in order that the atmosphere round the dressing may be deprived of septic energy, so that no harm may arise from its introduction into the wound, which it is often quite impossible to avoid. There are many agents which fulfil the conditions of volatility combined with hostility to low forms of life, such as chlorine, sulphurous acid, benzine, creasote and carbolic acid (phenic alcohol). "Any one of these," as states Professor Lister, "I have ascertained by experiment, may be used so as to keep a wound from putrefaction, provided it be employed with the essential object steadily in view, that is to say, to prevent the possibility of a single living putrefactive organism being left in the wound at the conclusion of the first dressing, or getting access to it subsequently."

On studying Tyndall's experiments on the filtration of air by means of cotton wool, he thought the application of this seemed to promise valuable results in antiseptic surgery. Experimenting with it, he found that if cotton wool, impregnated with either chlorine or sulphurous acid, or with the vapour of

* See PHARM. JOURN., 2nd ser. Vol. X. p. 390.

† It will be obvious to the reader that I have no desire that pharmacists should trespass on such ground; the care and attention required even of the skilled surgeon, to ensure good results by this treatment, are such as will deter the amateur.

‡ Holmes' 'System of Surgery,' vol. v. sec. ed. p. 617, *et seq.*

§ 'Brit. Med. Journ.,' vol. ii., 1871, p. 225.

benzine or carbolic acid, was placed upon a wound or granulating sore, after washing the surface with a lotion containing the same agent, although the volatile antiseptic left the cotton in about a day, the blood or pus still effused beneath the cotton remained free from putrefaction for an indefinite time, provided that the discharge was not sufficiently copious to soak through the cotton and appear at the surface, in which case as the meshes between the fibres afforded ample space for the microscopic organisms to develope in, putrefaction spread in a few hours throughout the moistened part of the mass. This circumstance greatly interfered with the practical utility of the dressing, and it has since been superseded by the 'antiseptic gauze' (hereafter described); but the facts seemed to him important with regard to the germ theory. The cotton wool, though it lost its chemical antiseptic virtue in a day, yet kept out putrefaction for a month or more. It could not possibly keep out any atmospheric gas, which was necessarily diffused freely between its fibres, and got in for the same reason that the volatile antiseptic got out. That which it did exclude could only be the suspended particles of l ust. It followed, therefore, as a matter of certainty, that the cause of the putrefaction, through atmospheric influence, of blood or pus, or in other words, such materials as the surgeon has to deal with in treating wounds, are not the atmospheric gases, but dust. And the fact that this dust is deprived of its putrefactive energy by agents which are chemically so unlike as chlorine, sulphurous acid, benzine, and carbolic acid, but which agree in having a common hostility to animal and vegetable life confirms the view that the putrefactive particles are really organisms. Professor Lister used benzine because he knew that the entomologist employed its vapour to kill insects.

Of the antiseptic agents used by Prof. Lister and others, none have given such general, almost universal, satisfaction as *carbolic acid*. Its chemical properties are such, that it possesses in an eminent degree the *sine quâ non* for use in these dressings,—volatility; and it dissolves freely in such heterogenous solvents as fixed oils and fats, melted resins, alcohol, ether, glycerine and water. Its action is decidedly antiputrefactive; it checks the decomposition of dead animal matter, and (what is of grea importance to the comfort of patients in hospital wards where this system of treatment is pursued) it prevents the evolution of those fœtid gases which arise from decomposition, and it keeps the surrounding air sweet and healthy. The crystallized acid, which can now be had very pure, can be liquefied by immersing the vessel containing it in a hot-water bath; if then about six per cent. of water be added and agitated with it, it becomes hydrated, and when cooled will remain permanently liquid at ordinary temperatures. One fluid part of the hydrated acid will dissolve in twenty parts of water, forming a perfect solution. With a less quantity of water it forms an oily mixture, not a solution.

Water holds the particles of acid very feebly, and therefore liberates them readily to act upon any other substance. Hence a watery solution, besides being a very cleanly lotion, is very potent in immediate action, but very transient,—exactly the properties required of it for an application to a wound designed to kill once for all any septic organisms that may have got lodged upon it, and then leave the tissues free as possible from further irritation. Common resin, on the other hand, holds the acid with remarkable tenacity, and even at the temperature of the body gives it off very slowly; so that a large proportion of the antiseptic may be kept stored up in the resin in a form which acts very mildly, but for a long period. These are the qualities required for an external dressing to guard against the penetration of putrefactive fermentation from without; while the insolubility of the resin in water prevents it from being washed away in the discharges. The fixed oils occupy an intermediate position as regards their hold upon carbolic acid, and there are circumstances in which they form a most convenient vehicle for it. Carbolic acid has also the advantage of being a local anæsthetic, exercising a soothing influence upon a raw surface to which it is applied; while the disagreeable smell, which at one time was a serious objection to it, has been almost entirely removed by purifying it of the stinking compounds associated with it in the crude product.

(To be continued.)

THE GENUS EUCALYPTUS: ITS ACCLIMATIZATION AND USES.

Perhaps one of the most remarkable successes in the science of acclimatization, and one that promises to produce important results in the industrial and sanitary history of many European countries, is that which has attended the attempts made during the last twenty years to introduce the various species of *Eucalyptus*. The subject has been taken up with great warmth by the Société d'Acclimatation of Paris, and from an elaborate memoir, in which M. Raveret-Wattel recently presented to the members all the available information upon the subject,* we abstract the following particulars.

For many years various species of *Eucalyptus* had figured in the botanical gardens of Europe, and travellers who had seen the gigantic trees in their native country had been unanimous in their praise of the elegance and rapid development of these magnificent representatives of the Australian flora. But it was not until 1854, when M. Ramel, being in Melbourne, had his attention called to the growth of a young blue gum tree (*E. globulus*) by Dr. Ferdinand Mueller, the indefatigable Director of the Botanical Gardens there, that any extensive attempt was made at its naturalization in other countries. M. Ramel was not content with admiring the tree. In 1856 he sent some seeds to Paris, which were followed in 1857 and 1860 by other supplies. These were distributed, and the tree is now propagated and naturalized, not only throughout southern Europe, but in many localities in Asia, Africa, and America.

The *Eucalyptus globulus* is the species that has up to the present time principally attracted the attention of the public, from the elegance and exceptional vigour of the tree. But the greater portion of its numerous congeners are equally interesting from various points of view. Some produce resins, others yield oils susceptible of being employed in industry or therapeutics, and science is far from having said her last word respecting the part that may be played by these useful plants.

* L'Eucalyptus: Rapport sur son Introduction, sa Culture, ses Propriétés, Usages, etc. Par Raveret-Wattel. Paris: Bulletin de la Société d'Acclimatation, 1871–1872.

It would be out of place here to enter into a detailed botanical description of the members of this large genus. For such our readers are referred to Mueller's 'Fragmenta Phytographiæ Australiensis' or Bentham and Muellers' 'Flora Australiensis.'* We shall only allude to a few of the species, with their more striking characteristics, and in a further notice mention some of the products that they yield which have more particular therapeutic and chemical interest..

Like all the Myrtaceæ, the Eucalyptus is an evergreen, but it presents the peculiarity of changing its aspect at three or four years of age. The leaves, at first large, sessile and horizontal, take then an oblique direction, or even hang vertically to the roots, at the end of long petioles. To speak more exactly, they are only simple petioles much dilated and presenting on both sides a uniform organization. These modified leaves, or phyllodes, peculiar to a great number of Australian plants, are generally coriaceous and appear to be fitted to resist atmospheric accidents, such as tempests, the sirocco, or hail. They contain numerous pellucid glands, filled with an essential oil that diffuses an odour which is strong and penetrating without being disagreeable. These aromatic emanations are esteemed as possessing properties assisting the respiration and neutralizing marshy miasmas; the absence of fevers in Australian settlements where the tree is found being attributed to their influence. The bark, flowers and fruit are all equally covered by glands containing a very odorous essential oil.

The growth of the Eucalyptus is prodigiously rapid, even when transported far from its normal habitat, and nearly all the species early attain gigantic proportions. A tree ten years old ordinarily presents the development of a well-grown oak of a century, and it is not rare to meet in Australia with specimens in their fiftieth year 160 to nearly 200 feet high and 50 to 60 feet in circumference at the base. But notwithstanding this remarkable growth, the wood has a solidity that rivals the hardest woods of India, and has been used on the Australian coast for constructing quays, jetties etc., that admirably resist the action of water. It has also been utilized successfully in shipbuilding and for railway sleepers in India. One plank that was sent for the London Exhibition of 1851, but arrived too late, was 47 metres long, 3·50 metres wide, and 8 centimetres thick; and another, that was prepared for the Paris Exposition of 1855, but for which no vessel capable of conveying it could be found, was 51 metres long.

Apart from the valuable properties they possess, and considered simply as ornamental plants, the trees of the genus Eucalyptus are of great interest from their beautiful appearance and the singularity of their foliage. And here, the first place must be awarded to the *Eucalyptus globulus*, so named from the form of its flower bud when covered by the operculum. Elegant when young, majestic when it attains the colossal dimensions of mature age, this tree has always a superb decorative effect. The trunk from which the exterior cortical layers are often detached, as in the plane-tree, is smooth and ash-coloured, sometimes surrounded at the base by old fibrous bark. Its leaves, of a tint rather blue than green, play in the wind with effects of light and shade that recall those of the aspen. The odour of the bark, flowers, leaves and fruits is analogous to that of *Salvia officinalis*. On rocky hills by the sea shore, where it is exposed to the weather, it forms bushy shrubs that flower and fructify abundantly. But in sheltered places it attains a height of from 60 to 70 metres, and trees have been measured more than 100 metres in height. In the forests the larger branches rarely commence below 30 metres, and many trees may be seen with their straight tapering trunks unbranched to a height of 60 metres. In Australia the Eucalyptus has proved of much service in providing food for the honey bee, which has been introduced into the colony and increased in immense numbers. It is hoped that it will be of equal value in other countries where bee culture is carried on, especially as it provides the food at a time when other sources fail; for in changing its climate the Eucalyptus still obeys the calendar of its native hemisphere; with it the spring commences in September. Impervious to the attacks of insects, harder and more elastic than any other, their wood surpasses in specific gravity that of the teak and the Paul tree (*Shorea robusta*), long considered as presenting the maximum of density that could be acquired by ligneous fibre.

The *Eucalyptus Acajou* (*E. Mahogany* or *marginata*), popularly called in Australia the "Jarra" or "Djaryl," also merits attention. It has a vigorous growth, attains a colossal height, and furnishes a wood harder perhaps than that of *E. globulus*. This wood is principally employed in maritime works, and better than any other resists the attacks of insects and the teredo. In India it has been used largely on the railways for replacing the teak sleepers that had been destroyed by the dreadful ravages of the white ants. The wood is also susceptible of a high polish, and the markings are similar to the mahogany after which the tree is named.

The *E. rostrata*, Schlecht., or red gum-tree, is another large tree, furnishing a hard wood of a fine red colour, which is much used by the cabinet-maker. The bark yields an abundant supply of material to the paper-makers, which is utilized for packing-papers and pasteboard; filter-paper and blotting-paper of fair quality are also made from it.

The *E. amygdalina*, Labill., or narrow-leaved peppermint-tree, generally attains a height of 150 feet, but some have been met with in Australia measuring 480 feet in height. Its wood is very close grained, and elegantly veined. This species produces the largest proportion of odoriferous oil in the leaves, the yield being from two to four per cent. of the weight of the fresh leaves and young branches.

E. obliqua, L'Hér, or stringy bark-tree, is a very large tree, having a very strong wood. The fibre of the bark is employed largely by the paper-makers. Other species are the *E. microtheca*, Muell., or "black box" and *E. Stuartiana*,, F. Muell., or "apple-tree," both large trees, the latter furnishing good material for the manufacture of pasteboard; *E. corymbosa*, Sm., with very resinous wood, and bark yielding good paper material; *E. goniocalyx*, or spotted gum-tree, Muell., with leaves rich in volatile oil, and bark yielding excellent paper material; *E. inophloia*, Muell., *E. leucoxylon*, Muell., and *E. dealbata*, Cunn., trees of a similar description; *E. sideroxylon*, Cunn., with bark containing a peculiar resinous substance, which is obtained by distillation

* Vol. iii. pp. 185-261.

under the form of vegetable naphtha; *E. viminalis*, Labill., or "manna gum-tree," so called from a sweet saccharine substance, a sort of manna, that it excretes abundantly in the spring time from the leaves and young branches; *E. citriodora*, Hook., or "citron-scented gum," deriving its name from a very abundant volatile oil, easily obtained by distillation; *E. melliodora*, Cunn.; *E. odorata*, Schl.; *E. persicifolia*, Lodd., or "blackbutt," the leaves of which yield an agreeably-scented volatile oil by distillation; and *E. oleosa*, "or Mallee-tree," which, under the name of mallee-scrub, covers immense tracts in Australia. This last species contains a considerable quantity of essential oil in its leaves; and one of the towns that spring up as by enchantment in the gold regions, was for a long time lighted by gas extracted from this source. In the summer, the leaves and young branches are covered with a saccharine substance, sometimes so abundant that it resembles hoar frost. It is an excretion produced by the punctures of myriads of larvæ of a hemipterous insect.

We have thus briefly referred to some of the principal species of *Eucalyptus* mentioned by M. Wattel as more or less capable of acclimatization in Southern Europe, Algiers, Egypt and similar lands. In a further notice we propose to give some details respecting some of the economic products of the genus that may be supposed to be of more particular interest to pharmacists.

THE SPONGE FISHERY ON THE TUNISIAN COAST.*

Sponges are found on the whole length of the Tunisian coast, but, apparently, not in sufficient numbers to render their collection profitable, except in the shallows of Karkenah, Jerbar, Zarsis, and Biban. These shallows extend from Ras Kadijah and Bir Capoudia to Terna, a length of 45 miles. Those of Karkenah jut out 18 to 20 miles; these of Jerbah from 15 to 20, and the Biban shallows, being off an open beach, only from 3 to 4 miles. The maximum depth of these waters ranges from 12 to 75 feet. The Zarsis bank is about 18 miles from the coast. The shallows of the Island of Jerbah, the Zarsis Bank, Ras el Ghzira, Biban, Chneies and near Gilis have sandy and rocky bottoms, whilst those of the other fishing grounds are muddy.

Sponges grow either on rocky, sandy, or muddy bottoms, but the greater the depth the better the quality, both as regards texture and shape. In winter good sponges are fished off Karkenah, Agir, to the South of Jerbah, and Biban, and in summer on the Zarsis Bank and off Sefia and Legim; but the best are found on the rocks of the Islet of Camontes and off the village of Hataj el Scherki near Karkenah. The inferior qualities are procured from the shallows off Scebba and Luesa, whilst those coming from Chneies and Marabut, in the Gulf of Khabs, are the least esteemed of all, owing to their roots being red and quite rotten.

Tunisian sponges are of the quality generally known in trade as "horse sponges," and are used for washing house-floors, carriages, horses, etc. They are somewhat similar to those from the Bahamas, and other West Indian islands, although they are stronger, more elastic, and absorb a greater quantity of water, whereby they have a higher market value than the American sponges. In a natural state they are black, covered with a kind of slime and contain a certain quantity of mud and sand; their texture is coarse and the honey-combing large. No fine straw-coloured sponges, such as those coming from Benghazi, Asia Minor, and Greece, are found in Tunis waters, although the native fishermen procure in rocky places near Karkenah, Chneies, and Jerbah, small yellowish sponges of a fine texture; but these, known under the name of "haggemi," are comparatively of little value, owing to their small size, and seldom realize more than from 25*s.* to 35*s.* the cwt. The Tunis sponges received honourable mention in the London Exhibition of 1851.

The Bey claims fishery rights over all the above named waters, and for many years past a third of all the sponges fished, whether landed or not on Tunisian territory, have been considered as belonging to the revenue of the Regency, but as the duty is levied with difficulty, its collection has generally been adjudged to farmers for triennial periods in conjunction with the polypi fishery, which is carried on in the same waters. These branches of the Revenue have also been conceded by the Bey for the benefit of the Tunisian bondholders, and the Finance Commission has thought it advisable not to change the mode of utilizing it. MM. Colombel Frères et Devisme, of Paris, when the sponge and polypi duties were sold last year by public auction for a term of three years, were declared the highest bidders, and they consequently pay to the Finance Treasury an annual sum of £2200.

It appears, however, that MM. Colombel Frères et Devisme find it expedient to follow the example of their predecessors, and reduce the duties from a third to a quarter on all the sponges collected by the Greek and Sicilian fishermen, who are the most expert and industrious, and who, if they had to give up too large a share of their earnings, might abandon the fishery or have recourse to evasion of the farmers' duties. The foreign fishermen pay the duty in kind, the sponges being already washed.

Besides the annual payment of £2200 to the Tunisian Exchequer, the farmers have a yearly outlay of about £650 for agents and guards. In order, therefore, that they should not be losers by the undertaking, the two fisheries should produce at least £11,000 per annum. It is also necessary that they should themselves be engaged in the sponge trade, for they cannot calculate upon the native boats, which number from 250 to 300, collecting more than £3500 value of sponges in a season, and consequently if other merchants do not send for Greek and Sicilian fishermen, the farmers must do so, in order that an average harvest may be assured.

The markets for the sale of sponges are held at Sfax and at Jerbah from November until March. The sponges are generally unwashed, and disposed of in lots of 100 each, of all sizes, including "dead" sponges, viz., those detached by natural causes from their place of growth and found either floating on the sea or washed on the beach, and pieces of torn sponges strung in bunches. Each lot, therefore, varies in value, according to the quantity of "scarti," or refuse, it may contain; but, as a general rule, to form 1 cwt. of good, washed sponges, it is necessary to purchase ten lots, or 1000 unwashed and unsorted sponges, thus bringing the price to about 3*s.* 11*d.* per lb., as will be perceived from the following approximate statements:—

	Piastres.	Piastres.
1 cwt. assorted and washed sponges formed out of ten lots of the unwashed and unselected article, bought at . . . . per lot	80	= 800
Preparing the Sponges . .	10	
Export duty on 1 cwt. . .	31½	
		41½
		841½
Brokerage, etc., 5 per cent. . . .		42
		883½ = £22. 1*s.* 9*d.*

* Abstracted from a 'Report on the Tunisian Fisheries,' by Mr. Green, Her Majesty's Vice-Consul at Tunis.

Unwashed sponges are exported to Malta and Sicily, realizing from £4 to £6 the cantaro (175 lb.) at the former, and about £7 10*s*. the cwt. on the latter island. Occasionally the scarto thrown out from the washed lots, prepared by the Sfax merchants, is imported into Sicily and there sold at from £7. 15*s* to £10 the 110 lb. This scarto, it must be understood, is superior to the unwashed sponges mentioned as selling at £7. 10*s*. the cwt., for the sponges of which it is formed are only not of a sufficiently good quality for the Paris and other principal markets. The vast majority, however, of washed sponges is sent direct to Paris, where the large firms engaged in the trade have their head-quarters. Tunis sponges are sold there from 12 fr. to 13 fr. the kilogramme, so that the prices generally prevailing in the native markets leave a very fair margin to the advantage of the foreign merchant.

The fishery is most actively carried on during the three months of December, January and February, for at other seasons the localities where the sponges exist are over-grown with sea-weeds. The storms during November and December destroy and sweep away the thick marine vegetation, and leave the sponges exposed to view. The fishery is divided into two seasons, *i. e.*, summer and winter, the former commencing in March and ending in November, and the latter as I have noted above. But the collection of sponges is not very productive in summer, as it is confined to the operations carried on with diving apparatus that can only be used on rocky and firm-bottomed localities, or to the success of native fishermen, who wade along the shores and feel for sponges with their feet amongst the masses of seaweed. The sponges thus collected by the Arabs are also of an inferior quality, owing to the small depth of water in which they have grown. As, nevertheless, calm weather and a smooth sea are essential for the success of the fishermen, the winter season, although lasting three months, does not generally afford more than forty-five working days. The Arab inhabitants of the coast, Greeks—principally from Kranidi, near Nauplia (Napoli de Roumania)—and Sicilians are chiefly employed in the sponge fishery; the Greeks, however, being the most expert fishermen, whilst the Arabs are the least skilful.

Sponges are either obtained by spearing with a trident, diving, with or without the assistance of an apparatus, and by dredging with a machine somewhat similar to an oyster-dredge. The latter process, although only essayed in Tunisian waters this season (1871), promises to supersede all the others. The Arab fishermen, principally natives of Karkenah and Jerbah, employ boats called sandals, manned by four to seven persons, one of whom only is the harpooner or spearman, whilst the others manage the sails, etc. The spearman watches for the sponges from the bows of the sandal, and the boat is luffed round on his perceiving one, so as to enable him to strike it. The depth of the sea in which the Arabs fish is from 15 to 35 feet.

Although the Greeks are most expert divers, the majority of them use the spear. They employ small and light boats sufficient to carry a spearman and a oarsman. The boat is rowed gently along whilst the spearman searches the bottom of the sea by means of a tin tube of 14 inches in diameter by 19 inches in length, at one end of which is placed a thick sheet of glass. This tube is slightly immersed in the water and enables the fisherman to view the bottom undisturbed by the oscillations of the surface. The spears used by the Greeks are shorter than those employed by the natives and Sicilians, but with wonderful adroitness they are enabled to reach sponges covered by 60 feet of water. They hold in their hands from three to four spears, and dart them so quickly and with such precision, one after the other, that before the first has time to disappear under the surface, the second strikes its upper extremity, and thus gives it additional impetus to reach the sponge aimed at. I have had no opportunity of witnessing personally the dexterity of the Greek fishermen; but I am reliably assured that the above description of their method of fishing is correct and not exaggerated.

The Sicilians also fish with a spear and in small rowing boats, but do not understand the employment of the tube, and have not acquired the knack of the Greeks in using three or four spears, they consequently seldom secure an equal quantity of sponges, although they are always more successful than the Arabs.

The European sponge merchants send to Greece and engage the Greek fishermen for the winter season, and they contract to fish in the shallows of Karkenah and Jerbah, and to deliver up to the merchant all the sponges they may obtain, properly washed and dried, and free from stones and sand, at an approximate rate of 2*s*. 10*d*. a lb., all the local dues being borne by their employers. The spearmen receive an advance of £20 and the oarsmen £8 each before departing from Greece, but as they have to find the means of transport for themselves and their boats to the fishing grounds, the merchant is obliged to make a further advance of £8 to each boat's crew, which, during the season, is supplemented by another £8 to provide for the subsistence of the two men. From ten to forty of these boats are carried on board a single vessel, which not only conveys them to the fishing grounds, but remains there during the whole of the season, acting as a depôt for the fishermen and their produce, and ultimately as a means of repatriating them. From the foregoing it results that the merchant advances for every boat £44, therefore, for him to recover his outlay, he must receive about 340 lb. of washed sponges from each boat; but the debt is seldom cleared in one season, and the men have to engage to fish for a second term. The average produce of a Greek boat, in a season of forty-five working days, is 200 lb. of washed sponges of the value of £28, and as the farmer's dues are paid by the merchant, the boatmen have only to clear in the following season a balance against them of £16.

The Sicilian fishermen are also engaged by the Sfax sponge merchants in their own country; but, instead of the agreement being made separately with each fishing-boat, the merchants contract with the owners of vessels, who have from two to six boats, properly manned and and equipped. For every six boats an advance of £50 has to be made before departure from Sicily, and the merchants have also to furnish the fishermen with the means of subsistence during the fishing season; but if they happen to require more money than is absolutely necessary for their maintenance, it must be advanced, and a moderate charge is made for interest. The Greeks are only called upon to deliver their sponges on board their depôts; but the Sicilians must land theirs at Sfax, properly washed and dried, and consign them, without "scarti" (torn pieces), and free from sand and stones, to their employer, at the rate of £18. 15*s*. the cwt., after the farmer has withdrawn his quarter share. This is of considerable advantage to the merchants, who can exercise a closer supervision as to the manner in which the sponges have been washed and dried. Every cwt. of such sponges costs about £21, including the export duty of 15*s*. 9*d*., and all packing and shipping charges. Owing to the vicininty of their home, and their extreme frugality, the Sicilian fishermen are seldom in debt to their employers at the end of a season. The native fishermen rarely enter into special agreements with the merchants, but prefer selling their sponges unwashed, and by public auction, at Sfax.

The sponges collected by the Greeks and Sicilians, as I have already observed, are washed before delivery to the merchants; but those bought from the natives have to be prepared by the purchasers. The process of washing is very simple. The sponges are attached by strings of a dozen each, to poles driven in the sea near the beach; and in two or three days the wash of the tides clears them of their black coating. They are then hung up to dry and bleach in the sun.

The export duty levied on sponges is 15*s.* 9*d.* the cwt.; but the Custom-house returns do not afford a proper index of the quantities exported yearly, as nearly the whole of the sponges fished by the Greeks are not landed, but shipped direct from the depôts, on board each of which, however, there is a representative of the sponge farmer, to withdraw or dispose of the share due to him.

From the information I have been able to gather, it appears that the produce of this fishery is susceptible of considerable augmentation, by an increase in the number of fishermen; and, it is stated that, a new sponge is reproduced within a year wherever one has been removed.

THE CHEMISTRY OF THE HYDROCARBONS.*

BY C. SCHORLEMMER, F.R.S.

(*Continued from page* 5.)

Paraffins.—Kekulé first pointed out that when two atoms of carbon combine, the most simple, and therefore the most probable case, is that one combining unit of one atom enters into combination with one combining unit of the other atom. The group C_2 thus formed is consequently a hexad. When more than two atoms of carbon are linked together, they may combine in a similar manner, one-fourth of the combining capacity of one atom being saturated by one-fourth of the combining capacity of another. By saturating the free combining capacities of such a group with hydrogen, we obtain a series of hydrocarbons, having the general formula C_nH_{2n+2}, to which the name *paraffins* has been given. This name was originally applied to the solid members of the series, on account of their chemical indifference; but, as the gaseous and liquid members exhibit the same character, it appears convenient, as H. Watts has suggested, to apply the term paraffin as a generic term for the whole series.

The most characteristic property of the paraffins is that they are not capable of uniting with any other bodies, and for this reason they have also been called *saturated hydrocarbons.*

We are at present acquainted with a considerable number of paraffins, amongst which there are found many isomerides. To explain the isomerism in this series two assumptions have been made.

One, which found many advocates up to the year 1864, was that the four combining units of the carbon atom have not the same value or the same function. This assumption was made in order to explain the existence of two isomeric hydrocarbons having the formula C_2H_6, it being believed at that time that methyl gas was different from ethelhydride. But Crum-Brown has shown that there is a certain degree of inconsistency in this hypothesis (Trans. Roy. Soc. Edin. xxiii. 707). Butlerow, in endeavouring to explain the isomerism of these two hydrocarbons, argued that in methyl gas the two atoms of carbon were combined by two combining units of the same kind (which he called secondary affinities), each being the combining unit which in methyl iodide is saturated with iodine. In hydride of ethyl the carbon atoms are united in the same way as in other ethyl compounds, and therefore probably as in the acetyl compounds, one of which is acetonitrile or methyl cyanide; the one is therefore the combining unit of methyl, and the other that of cyanogen. These must be different, because the two hydrocarbons are not identical. To indicate this, Butlerow calls the free combining unit of cyanogen a primary affinity. We have thus in methyl gas two secondary affinities united together, and in hydride of ethyl a primary united to a secondary. "But by carrying this argument a little further, we arrive," says Crum-Brown, "at an absurdity; thus the carbon radical of acetic acid is the same as that of oxyacetic acid, and that again is the same as the carbon radical of oxalic acid, and therefore as that of oxalic nitrile or cyanogen gas. In cyanogen gas, however, we have the two carbon atoms united by two primary affinities; but we have before proved that in the acetic acid series they are united by a primary affinity of the one to a secondary of the other. It is obvious, then, that at least one of our assumptions is false."

About the same time I proved by experiment that methyl gas or dimethyl is identical with ethyl hydride; and since that time a few chemists only have made use of the above hypothesis in order to explain certain cases of isomerism.

If the four combining units of the carbon atom have the same value, isomerism in the paraffin series can only be caused by a different grouping of the carbon atoms; and in this case it is easy to find out the number of isomerides which can exist in the case of each member of the homologous series. According to this theory, the first three members are not susceptible of isomeric modifications, whilst the four-carbon paraffin, C_4H_{10}, can exist in two, and the five-carbon paraffin in three isomeric forms, etc.

This theory is completely borne out by facts. Of the three lowest members, no isomeric forms are known, but we are acquainted with two containing four atoms of carbon, and with three containing five atoms.

Some time ago I showed that all the paraffins of known structure may be divided into four groups:—

1. Those in which each carbon atom is directly combined with at most two carbon atoms.
2. Those in which one carbon atom is united directly with three others, or which contain the group isopropyl.
3. Those containing the group isopropyl twice.
4. Those in which one carbon atom is combined directly with four others.

Of these groups, the first, which I called normal paraffins, was at that time only imperfectly known. Indeed, the structure of some of the members was not proved at all; they were placed there only because it appeared for several reasons probable that they possessed a very simple structure. Since that time, however, I have increased their number, and proved that the hydrocarbons placed in this group are really normal paraffins.

The only means we hitherto possessed for determining the constitution of a paraffin was either to obtain it from an alcohol or other compound of known structure, or to convert the paraffin into an alcohol, and then endeavour to find out the constitution of the latter.

The latter method, however, has been surrounded by such difficulties that it appeared almost impossible to make use of it. I have, however, succeeded in overcoming some of those obstacles, and been able to obtain much larger quantities of the alcohols than formerly, so that I could study fully their products of oxidation. An investigation of the paraffins contained in Pennsylvanian petroleum showed that they belong to the first group, as the alcohols derived from them, as well as the acids obtained by oxidizing the latter, were found to be normal compounds.

Before I take leave of the paraffins, I have to say a few words about the paraffins *par excellence*, viz., the solid paraffins. These bodies, which resist so energetically the action of chemical agents that they have obtained their name from this fact, appear to be very unstable bodies at a high temperature, although, curiously enough, they are produced by destructive distillation. Thorpe and Young have shown (Proceedings of the Royal Society, xix. 370), that by distilling solid paraffin under pres-

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* A lecture delivered before the Chemical Society, April 4th, 1872. Reprinted from the 'Journal of the Chemical Society' for June, 1872.

sure it is almost completely resolved, with evolution of but little gas, into hydrocarbons which remain liquid at the ordinary temperature, and consist principally of olefines.

(*To be continued.*)

THE MEASUREMENT OF TEMPERATURE BY ELECTRICITY.*

BY C. WILLIAM SIEMENS, D.C.L., F.R.S., M.R.I.

The truth recently revealed to us by one of the younger branches of physical science has divested heat and electricity of their mysterious character, and has taught us to regard them simply as "modes of motion."

Light also has been shown to be identical in its nature with heat, and the only remaining physical agency, "chemical affinity," has been recognized as a force differing only in "quality of action" from the others. According to these views, force, in whichever type of action it presents itself, is as *indestructible as matter itself*, and is therefore capable of being *stored* up and *measured* with the same certainty of result. We have a unit of force or the foot lb., and a unit of heat, or the heat necessary to raise the temperature of 1 lb. of water through one degree Fahr., and it has been already proved that 722 units of force are the equivalent value of one unit of heat. Again, the chemical force residing in 1 lb. of pure coal is equal to about 14,000 heat units, or $14,000 \times 772 = 10,808,000$ ft. lb. $= 4825$ tons lifted one foot high.

Questions regarding the quantitative effects of heat present themselves, however, much less frequently for our consideration than questions regarding its *intensity*, upon which depends the nature of the phenomena surrounding us at every step, both in science and in ordinary life. The instrument at our command for determining moderate intensities or temperatures, the mercury thermometer, leaves little to be desired for ordinary use; but when we ascend in the scale of intensity, we soon approach a point when mercury boils, and from that point upward we are left without a reliable guide. The result is, that we find in scientific books on chemical processes, statements to the effect that such or such a reaction takes place at a *dull red* heat, such another at a *bright red*, a *cherry red*, a *blood red*, or a *white* heat—expressions which remind one rather of the days of alchemy than of chemical science of the present day. There are pyrometers, it is true, but these are either of a complex nature, or little reliance can be placed on them.

An instrument which fulfils, in principle, all the conditions essentially necessary in thermometry, and is, at the same time, the very first instrument that was ever proposed for measuring temperatures, is the air thermometer of Galileo. Theoretically, the expansion of a permanent gas at constant pressure is the most perfect index of temperature, it being the degree of energy of the atomical motion in an elastic fluid which determines its volume and constitutes at the same time its temperature.

This air thermometer consists simply of a bulb of glass with a long tubular stem, open to the atmosphere at its extremity. If the bulb be heated,—by dipping it, for instance, in boiling water,—and put into a holder with the hollow stem reaching downward into a cup of mercury, the air within the bulb will no longer communicate with the atmosphere, because the mercury is interposed. If the air within the bulb be now cooled by the external application of iced water, its heat motion will diminish, and its volume would be reduced proportionally if the external atmosphere could enter freely to fill up the vacancy thus created. But inasmuch as the external air cannot enter, a reduction of pressure will take place, which, according to the law of elasticity by Boyle, must be proportionate to the reduction of volume at constant pressure. The difference of pressure thus created between the bulb and the external atmosphere will be balanced by the column of mercury rising up into the tube, and the elevation to which the mercury attains is a true index of the temperature to which the air in the bulb had been previously heated. This is true with regard to all temperatures, from the lowest to the highest, and the instrument may be termed a universal thermometer. If the bulb could be cooled down to 273° Centigrade below the zero point, it would follow by the law of Charles that the elastic pressure of air would be reduced to nothing, that is to say, the motion of the particles of air, which we call heat, would have ceased, and we should have reached the point of absolute zero, a point which has been theoretically established also by other means.

Practically, such an instrument would be most inconvenient; its indications would have to be corrected by calculation for barometrical variations; the capacity of the descending tube, which contains air not subjected to variation of temperature, would have to be taken into account, and no reliable observations could be arrived at, without taking special precautions, such as are only within reach of the experimental physicist.

As the result of occasional experimental research, spread over many years, an instrument has been constructed by Mr. Siemens, by which he aims to accomplish a double purpose, the measurement of high temperatures and the measurement with accuracy of temperatures of inaccessible or distant places. If "electrical resistance in conductors" be substituted for "expansion of gases," this instrument presents many points of analogy with the air thermometer. Both these effects are functions of temperature, increasing with the temperature according to progressive laws; in the case of gases called the "law of Charles," in that of conductors "the law of increase of electrical resistance with temperature." The latter law, which is of recent origin, had been already partially developed by Arndsen, Swanberg, Lenz, and Werner Siemens, when in 1860 the author's attention was directed towards an application of it to the measurement of temperatures of places inaccessible to the ordinary thermometer.

The conductivity of a wire of platinum or other metal is greatly influenced by temperature. If the current of a galvanic battery be directed through two branches of equal resistance, each branch consisting of a free spiral wire of platinum and one of the coils of a differential galvanometer, no deflection of the needle occurs as long as the temperature of both branch circuits is the same. But if a flame or even a warm hand be brought in contact with one of the platinum coils, the electric resistance of the heated wire is increased, and the current through the cooler circuit preponderating, the needle on the face of the galvanometer is immediately deflected. A small instrument, constructed by winding thin insulated wire of any pure metal upon two small cylindrical pieces of wood, and enclosing the spirals in silver casings, taking care that the extremities of the spiral wires are soldered to thicker insulated wires leading to the battery and to the galvanometer respectively, might be employed with advantage in physiological research. If one case, which need not be larger than a small pencil-case, be placed in the part the temperature of which is required to be measured, and the other placed in a convenient medium, such as water, when, by the abstraction or addition of heat, the needle of the galvanometer is brought to an undeflected state, the temperature of such medium will be identical with that sought, and may be taken by a thermometer in the usual way, and the temperature may be read from time to time without disturbing the patient. It will be evident that such an instrument, modified to meet particular circumstances, might be used for measuring the temperature of

* Abstracted from a Paper read at the Royal Institution, March 1st, 1872.

inaccessible places, such as the interior of stores or cargoes of materials liable to spontaneous combustion; of points elevated above the surface of the ground; or of great depths below for meteorological purposes, or for measuring deep-sea temperatures.

In order to realize a pyrometer by electrical resistance, it is necessary to rely upon the absolute measurement of the electrical resistance of a coil of wire which must be made to resist intense heats without deteriorating through fusion or oxidation. Platinum is the only suitable metal for such an application, but even platinum wire deteriorates if exposed to the direct action of the flame of a furnace, and requires an external protection. The platinum wire used has, moreover, to be insulated and supported by a material which is not fused or rendered conductive at intense heats, and the disturbing influence of leading wires has in this case also to be neutralized. These various conditions are very fully realized by the following arrangement:—Thin platinum wire is coiled upon a cylinder of hard-baked porcelain, upon the surface of which a double-threaded helical groove is formed for its reception, so as to prevent contact between the coils of wire. The porcelain cylinder is pierced twice longitudinally for the passage of two thick platinum leading wires, which are connected to the thin spiral wire at the end. In the upper portion of the porcelain cylinder the two spiral wires are formed into a longitudinal loop, and are connected crossways by means of a platinum binding screw, which admits of being moved up or down for the purpose of adjustment of the electrical resistance at the zero of Centigrade scale. The porcelain cylinder is provided with projecting rims, which separate the spiral wire from the surrounding protecting tube of platinum, which is joined to a longer tube of wrought iron, serving the purpose of a handle for moving the instrument. If the temperatures to be measured do not exceed a moderate white heat, or say 1300° Centigrade = 2372° F., it suffices to make the lower protecting tube also of wrought iron to save expense. This lower portion only, up to the conical enlargement or boss of iron is exposed to the heat to be measured. Three leading wires of insulated copper united into a light cable connect the pyrometer with the measuring instrument, which may be at a distance of some hundred yards from the same. They are connected by means of binding screws at the end of the tube to three thick platinum wires passing down the tube to the spiral of thin platinum wire. Here two of the leading wires are united, whereas the third traverses the spiral, and joins itself likewise to one of the two former, which forms the return wire for two electrical circuits, the one comprising the spiral of thin wire, and the other returning immediately in front of the same, but traversing in its stead a comparison coil of constant resistance. The measuring instrument may consist of a differential galvanometer as before, if to the constant resistance a variable resistance is added. If the pyrometer coil were to be put into a vessel containing snow and water, the balance of resistance between the two battery circuits would be obtained without adding variable resistance to the coil of constant resistance, and the needle of the differential galvanometer would remain at zero when the current is established. But on exposing the pyrometer to an elevated temperature, the resistance of its platinum coil would be increased, and resistance to the same amount would have to be added to the constant resistance of the measuring instrument, in order to re-establish the electrical balance. This additional resistance would be the measure of the increase of temperature, if only the ratio in which platinum wire increases in electrical resistance with temperature is once for all established.

It has been necessary to undertake a series of elaborate experiments in order to ascertain what is the relation between the resistance and temperature in heating a platinum wire, with a view of finding a ratio of general application. Coils of thin wire of platinum, iron, copper and some other metals, were gradually heated and cooled in metallic chambers containing the bulbs of mercury thermometers, and for higher temperatures of air thermometers, and the electrical resistances carefully noted. The progressive increase of electrical resistance was thus compared directly with the increasing volume of a permanent gas (carefully dried) between the limits of zero and 470° C. A formula was established according to which the electrical resistance is constant at the absolute zero, and progresses in a ratio represented graphically by a tipped-up parabola. Although the comparison with the air thermometer could only be carried up to 470° C., the general correctness of this ratio has been verified by indirect means.

On the occasion of bringing this subject forward at the Royal Institution, Mr. C. W. Siemens showed the working results of the pyrometer by measuring the temperature of a mixture of ice and water, boiling water, molten lead, and the fire by which the lead was melted. The readings were respectively 2° C., 98° C., 330° C. and 860° C., the last representing a "cherry heat."

SORBITE, A SACCHARINE MATTER ANALOGOUS TO MANNITE, FOUND IN THE JUICE OF MOUNTAIN-ASH BERRIES.*

BY J. BOUSSINGAULT.

Mountain-ash berries, like cherries, plums, apples, etc., do not yield alcohol in proportion to the amount of saccharine matter which they contain. In a quantity of juice from these berries, containing 372·96 grams of saccharine matter, and fermented under favourable conditions, only 296·17 grams were decomposed, and the quantity of alcohol produced was but 135·09 grams, instead of 151·37 grams required by calculation.

The liquid containing the undecomposed saccharine matter yielded a crystalline substance, having, when dried, at 110°, the composition, $C_6H_{14}O_6$, and to which the author has given the name of *sorbite*.† It is isomeric with mannite and dulcite, but in the form of its crystals, in its melting point and other properties, it differs greatly from both those substances. Sorbite separates from aqueous solution in crystals containing $2C_6H_{14}O_6 . H_2O$, which melt at 102°. The anhydrous substance melts at 110°–111°, whereas mannite melts at 165°, and dulcite 182°. Sorbite is not a fermentation, as it can be obtained from the juice immediately after expression.—*Journal of the Chemical Society.*

FORMATION OF ASPARAGINE IN VETCHES.‡

BY A. COSSA.

Piria found asparagine in vetches which had been grown exposed to bright light, as well as in those grown in darkness. Some years after Pasteur (*Ann. Chim. Phys.*, 1857) grew a large quantity of vetches in the garden of the Academy at Strasburg, but did not obtain a trace of asparagine from 200 litres of the sap, whilst he found abundance in vetches grown in the same soil in a cellar. The author, therefore, grew some vetches in the month of July, and from a kilogram of those which had been exposed to light, he obtained 16·25 grams of pure asparagine, and from an equal weight of those grown in a cellar, he obtained 13·50 grams, the asparagine being proved to be identical in both cases; similar results were obtained in the months of August and September.

Piria's want of success probably arose from the circumstance that the sap of vetches, especially when grown exposed to light, readily ferments, the asparagine being decomposed and ammonium succinate being formed.—*Journal of the Chemical Society.*

* Compt. Rend., lxxiv 939–942.

† Pelouze, in 1852 (*Ann. Chim. Phys.* [3], xxxv, 292), obtained from mountain-ash berries, a crystallizable, non-fermentable sugar, called *sorbin*, having the composition of glucose.—*Ed. Journ. Chem. Soc.*

‡ Gazzetta Chimica Italiana, i 633–685.

The Pharmaceutical Journal.

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THE FREAKS OF THE FACULTY AND THE DUTIES OF DISPENSERS.

THE subject from which our text is taken is forcibly and unhappily illustrated on page 14 of the last number of the Journal, under the heading "Death from an overdose of Morphia." It will be remembered that this death originated in a misunderstanding as to the meaning of a prescription; the prescriber intending one grain of acetate of morphia to be made into six pills, instead of which the dispenser supplied six pills, each containing one grain of that salt. A correct copy of the prescription is printed at the foot of the page,* and we place it before our readers as a document well worthy of attentive consideration. Is this prescription clearly, comprehensibly, conventionally or carelessly written? We submit that it is not perfectly clear, inasmuch as candour compels us to confess that a very literal (though not very pharmaceutical) individual might (and did) read grain, instead of sixth-grain, doses. It is, however, according to our own belief comprehensible to a mind properly imbued with a knowledge of drugs and of the British Pharmacopœia; it is certainly conventional in form and expression, and we cannot declare that it is carelessly written.

But, to begin with the prescriber's part of the business, there was a want of strict accuracy in the whole proceeding. It is a very common freak of the faculty to rush into a chemist's shop, commit a prescription to paper, and supplement it by a string of verbal directions which the dispenser, also in hot haste, anxiously endeavours to commit to paper, and does it as best he may. The man certified to kill is gone, and the man certified to compound is left, and it is much to the credit of the latter that he does not oftener unwittingly appear in the witness-box in a case of (so-called) misadventure. Verbal directions of any sort or kind, in the prescribing of drugs, should be neither given nor taken. But the dispenser's part of this lamentable business is not by any means free from blame. It is his duty to know the British Pharmacopœia from beginning to end. He is reported to have possessed this knowledge, but we are fairly privileged to doubt it, when he is found compounding a dose that is known to be, under general circumstances, far more poisonous than the well-known "ounce" of Laurel Water. Mr. DISRAELI once told us that it was impossible to account for the marvellous eccentricities of stupidity, but it would appear, now and again, equally impossible to account for the eccentricities of thought. For, indeed, it requires no sophistry to show that (on the supposition that he knew his alkaloids and the rest of the Pharmacopœia) either the chemist was incapable of applying knowledge to proper purposes, or in too great a hurry to do so. The particulars connected with this sad occurrence give us an opportunity of reiterating the conviction that medical men should never give, and chemists should never receive, verbal directions in connection with the dispensing of medicines.

* "R. Acet. Morph. gr. j.
F. pil. vj.
One directly, and repeated every four hours if pain or sickness require."

PHARMACEUTICAL EDUCATION.

WE desire to call the special attention of our readers to the letter of Mr. G. F. SCHACHT at p 39. The request there made that every member of the pharmaceutical body who has any suggestion to offer concerning the proposed scheme for the assistance of provincial pharmaceutical education should communicate it to these columns, or directly to the Committee charged with the subject, is one that we hope will be freely responded to. As an instalment to the discussion which we suggested last week, we have been favoured with the following proposed resolutions from Mr. FRAZER, of Glasgow, who describes the circumstances under which they were drawn up in a letter printed at p 39.

PROPOSED RESOLUTIONS ON THE BEST MODE OF AIDING PROVINCIAL EDUCATION.

"That in consideration of the proved inadequacy of the machinery at present existing in the provinces for promoting such a Pharmaceutical education in them as will qualify our students and assistants for passing the various examinations, now required by law, before they can become Associates or Members of our Society; and, in consideration of the proved impossibility of finding any one system of educational appliances that will meet the exigencies of widely differing populations, and believing that the Members of our Society resident in the provinces are themselves the parties likely to be best qualified to determine how to take the utmost advantage of any scientific schools or institutes already existing in their respective neighbourhoods, or, where such are wanting, to initiate such schools or lectures as will best meet their special necessities, this Council* shall award a grant of money to the extent of one-third or of one half of the required expenditure to any enrolled or duly recognized association in aid of any portion of their scheme which shall have a distinct scientific educational object, and that whether in providing a library, a museum, or lecture-room, or in payment of the fees of the teachers or lecturers employed by the said associations.

"And, further, with a view to making the grants not only more liberally than hitherto, but more systematically than they can otherwise be made, as well as to

* Here I quote from Mr. Schacht s closing paragraph.

secure that the Society shall not at any time incur greater pecuniary responsibilities than its funds for the time being will properly warrant, in future all applications for money votes for educational purposes, for the year, shall be lodged with the Secretary of the Society not later than the first day of *July* annually, and that the Council shall decide on the reply to be given to each application at its usual monthly meeting in *October*. In the interval between the date of the applications and that at which the Council shall give their decision upon them the Local Secretaries, or other parties appointed for the purpose by the Council, shall examine into the respective merits of each case, and report on the same to the Council, for its guidance in duly proportioning the amount to be granted to each applicant."

Those of our readers who are interested in the important question of pharmaceutical education will be glad to learn that in deference to the desire which has been expressed for the opinions of the Professors in the Society's School of Pharmacy, Professor Attfield intends to read a paper at the meeting of the British Pharmaceutical Conference at Brighton, on the 13th August, which it is hoped will lead to a general discussion on the whole subject.

THE SCIENTIFIC MEETINGS AT BRIGHTON.

As the month of August approaches, during which the annual meetings of the British Association and of the British Pharmaceutical Conference are to be held, the central and local officials of those Societies are giving evidence of their intention, so far as possible, to make 1872 a notable year in their history.

The Secretaries of the Pharmaceutical Conference are preparing for issue a circular to members, in which it is stated the Meeting for 1872 will be held in the Royal Pavilion, under the presidency of Mr. H. B. Brady, F.L.S., F.C.S. On Tuesday. the 13th, at 10 A.M., the President will deliver an address; the reading and discussion of papers on pharmaceutical subjects will then commence, be continued in the afternoon till 4.30, and be carried on during Wednesday; an adjournment from 12.30 till 2.0 each day.

The meeting room will be open as a reception room for members, from 9 A.M. to 6 P.M., on Monday, August 12th, Tuesday, August 13th, and Wednesday, August 14th.

Members intending to be present are requested to communicate at once with the Local Secretary of the Conference, Mr. T. Glaisyer, 11, North Street, Brighton, or the local Vice-President, Mr. W. D. Savage, 4, Park Road East, Brighton, who will give all information concerning hotel accommodation, railway routes, etc., and engage rooms for any members.

Brighton is generally well known and much appreciated for the extent and beauty of its sea-front: from Hove on the west to Kemp Town on the east is a drive of three miles unequalled in the kingdom. The promenades (East and West), with the two piers, each extending nearly a quarter of a mile out to sea, are favourite resorts. The Marine Aquarium, the largest in the world, is expected to be opened in time for the visit of the British Association and the British Pharmaceutical Conference. The Public Free Library and Museum, a building of considerable extent erected on the Pavilion Estate by the Town Council, is fully expected to be opened in the course of a few weeks. The contents of the old Museum, with considerable additions, will be transferred to the new Buildings, and from sources of great attraction.

In the neighbourhood of Brighton is the old county town of Lewes, with its numerous churches, and a portion of the old castle containing an antiquarian collection; also Arundel Castle, Keep, and Park, the property of the Duke of Norfolk. From the Devil's Dyke, five miles from Brighton, a fine view, extending over portions of seven counties, may be obtained.

The proximity of Brighton to London, and the railway facilities specially offered for the occasion, will probably ensure a large attendance of members and contribute to the success of the meeting for 1872.

The general secretaries also announce that the local members of the Conference at Brighton propose to invite their brethren from a distance to a dinner, on Tuesday evening, August 13th.

Several papers are already promised for the meeting, and the subject of Pharmaceutical education will probably be very fully discussed.

The Secretaries of the British Association have also issued a circular stating that the forty-second meeting will commence at Brighton on Wednesday the 14th August, on which day Professor Sir William Thomson, LL.D., F.R.S. will resign the chair, and Dr. W. B. Carpenter, LL.D., F.R.S., will assume the Presidence and deliver an address. The various sections will then meet for the reading of papers at 11 o'clock, A.M., on the 15th, 16th, 17th, 19th and 20th August. On Thursday evening, August 15th, at 8 P.M., there will be a Soirée; on Friday evening, August 16th, at 8.30 P.M., a Discourse; on Monday evening, August 19th, at 8.30 P.M., a Discourse; on Tuesday evening, August 20th, at 8 P.M., a Soirée; on Wednesday, August 21st, the Concluding General Meeting will be held at 2.30 P.M. On Thursday, August 22nd, excursions will be made to places of interest in the neighbourhood of Brighton.

We are informed that a lady recently deceased has left a legacy of £500, free of legacy duty, to the Benevolent Fund of the Pharmaceutical Society. We believe that similar legacies have been left to the Royal Free Hospital, The Samaritan, St. George's, Westminster, St. Thomas's, Middlesex, Great Northern, Charing Cross, King's Cross, and the Brompton Cancer and Consumption Hospitals, and various other benevolent institutions.

CINCHONA CULTIVATION IN JAVA.

Professor J. Leon Soubeiran, of Paris has kindly placed at our disposal an extract from a letter that he has received upon the above subject from M. Van. Gorkom, of which the following is a translation:—

"Our cultivation of *Cinchona* prospers wonderfully and our medical men employ with advantage the barks and their extracts, but principally the 'quinium.' Thanks to the recent nomination of a chemist, M. Moens, as director of the manufactory which I have established in the midst of our plantations, we have the hope of soon being able to obtain directly the alkaloids necessary for use in our hospitals.

"Last May, there was a public sale at Amsterdam of 6000 kilogs. of our barks, at an average price of from two to three florins. The remarkable state of preservation of these barks, of which the odour and colour were very fine, was established. The annual expense of the cultivation is at present balanced by the production, and before 1876 all the cost of introduction will be covered. The individual plantations continue to multiply and very soon the barks of Java will seriously compete with the American barks in the European markets."

PERSIAN OPIUM.

According to information on the opium trade, collected by Colonel Pelly and furnished by that officer to Mr. Dickson, Her Majesty's Secretary of Legation at Teheran, Persian opium gives from two to eight per cent. of morphia. It is principally cultivated in Yezd and Ispahan, and partly in some of the Khorassan districts. The Yedz opium is considered the best. The crop of 1871 was computed at 1200 chests only, owing to the drought, but a good year's crop may produce 2500 chests. About 200 to 300 chests are said to be annually exported to London, 200 chests to Singapore, 200 to Java, and the remainder to China.

We have received an intimation that Mr. E. Alfred Webb, grandson of the late Mr. John Evans, has been admitted into the firm of Evans, Lescher and Evans. Mr. Webb studied at the School of Pharmacy, and was a prizeman in 1871.

The first number of a new periodical, and which it is proposed to make a monthly record of cryptogamic botany and its literature, has been received. It is under the able editorship of Mr. M. C. Cooke, and is called by the appropriate name of "Grevillea." It contains sixteen pages of text, and an excellent coloured plate, the drawing being executed by the Editor, and it is published at a price that is perhaps unprecedently low.

The Juries Bill, as amended by the Select Committee to whom it was referred, has been reprinted. It is satisfactory to find that the exertions of the Council of the Pharmaceutical Society have so far been successful, and that registered chemists and druggists are still included amongst the exemptions.

Provincial Transactions.

NORWICH CHEMISTS' ASSISTANTS' ASSOCIATION.

On Thursday, July 4th, the members who had regularly attended the lectures delivered at the rooms of the above Association, were kindly invited by Mr. Thompson to go for an excursion into the country. Accordingly about eleven started at 6 p.m. in a waggonette for Mulbarton Common, accompanied by Mr. O. Corder, who had kindly undertaken to assist them in examining any plants they might find. On their arrival, the party divided, to ramble through the fields for about two hours to search for specimens, and then returned to the inn, where Mr. Thompson had most liberally provided a substantial meat tea.

After thoroughly enjoying the delicacies displayed, they spent the remainder of the evening in playing various games, and strolling about the beautiful garden attached to the inn. At 10 p.m. the members reassembled, and after cordially thanking Mr. Thompson for his great kindness, proceeded home, having spent a most enjoyable evening.

Mr. Thompson, in his invitation, stipulated that only those who had attended regularly at the lectures should be present on the occasion, as he wished particularly to encourage uniform attendance on the part of the students.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, June 20th.

Deacon's Method of Obtaining Chlorine as Illustrating some Principles of Chemical Dynamics.

BY H. DEACON.

The Lecturer said that about two years ago, at Liverpool, he had given an account of his process for the preparation of chlorine from a heated current of hydrochloric acid mixed with air, which since then had been the subject of a great amount of research, with the object of ascertaining how this could be effected continuously, readily and at the smallest cost. This problem may be resolved into the following:—

1. As to the most suitable active or catalytic substance.
2. Whether the mass or the surface of the substance was the active agent.
3. As to the effect of temperature.
4. As to the best arrangement of the substance.
5. As to the effects produced by variation in the velocity of the current of gas.
6. As to the effect of various proportions of air or oxygen and HCl.

He had observed that the heated mixture of hydrochloric acid and oxygen or air does not yield chlorine, unless it is in the presence of some substance capable of being attacked by the hydrochloric acid, amongst which the copper compounds were eminently active.

Sulphate of copper was fixed upon for economic reasons; and almost all the experiments mentioned in his lecture had been made either with the pure sulphate or with pumice-stone or fragments of clay saturated with it. In experimenting, two clay tubes were generally employed, of different bores, glazed externally, and coated internally with sulphate of copper, placed side by side, and passing through the cork of a glass tube sealed at the other end. The mixed gases, on entering, first traversed the glass tube, and then passed out by the clay tubes. In the more recent experiments this apparatus was placed in a thick massive iron tube, heated externally by a furnace, so as to maintain a uniform temperature. This was measured by the change in electrical resistance of a fine platinum wire, and also by a mechanical pyrometer. The mixed gases were contained in gas-holders worked with strong sulphuric acid, both the amount of hydrochloric acid passed and the amount of chlorine produced being ascertained by passing the gases into a solution of caustic soda.

The Lecturer then explained the numerous diagrams and tabulated results of experiments with which his discourse was illustrated, from which it would appear that there is a certain comparatively small range of temperature, between the critical limits of which the percentage of hydrochloric acid decomposed varies greatly, and that this is not the same for the chloride as for the sulphate of copper, being higher for the latter, although it is the same whether solid sulphate of copper be used or merely pieces of brick saturated with it. This shows that the action is essentially a surface action. It is, however, remarkable that in experiments on a large scale, this temperature is invariably lower than in the laboratory experments, usually 100° or 150°; also, that when the mixed gases are passed through a series of parallel tubes, an increased velocity in the flow of the gas yields only about one-third the increase of the amount of chlorine produced that an irregular porous surface does under like circumstances.

From the results of all the experiments contained in the tables, the speaker inferred—

1. That with the same mixture of gases, at the same temperature, the amount of hydrochloric acid decomposed by the aid of a molecule of the copper salt, in a given time, depends upon the number of times the molecules of the mixed gases are passed through the sphere of action of the copper salt.
2. That in long tubes of the same diameter the number of opportunities of action in the same time are nearly the same at all velocities.
3. That in long tubes of different diameters the number is the same when the velocities of the currents of gas are in inverse proportion to the square of the diameters.
4. That in porous masses the opportunities of action increase with increased velocities, in nearly direct proportion.
5. That, other conditions remaining the same, the percentage of hydrochloric acid decomposed varies with the square root of the proportionate volume of oxygen to hydrochloric acid.
6. That the $CuCl_2$ formed bears no definite proportion to the amount of chlorine produced.
7. That as the sphere of action includes molecules not in contact with the copper salt, therefore hydrochloric acid must be decomposed under circumstances where the union of either element with the copper salt is impossible.

The President said he need scarcely ask them further to record their thanks to the lecturer, for the clear and comprehensive account he had given them of his numerous and interesting experiments on the mutual action of hydrochloric acid and oxygen in the presence of salts of copper. The process for preparing chlorine, at present used, was essentially clumsy and unscientific; the hydrochloric acid given off from the salt cake was first dissolved in water, and then treated with manganic peroxide in order to liberate the chlorine, giving rise at the same time, to a large amount of waste products, which were thrown into our streams and polluted them. As especially interested in our rivers, he sincerely hoped the process would prove a commercial success.

Dr. Williamson said he would like to ask a question or two for his own information. He understood that the mixture of air and hydrochloric acid was heated before being passed into the decomposing chamber; was it cooled again before it went into the chambers containing lime for the preparation of chloride of lime, and was the undecomposed hydrochloric acid previously removed by washing?

Dr. Debus would like to know whether the sulphate of copper was found to be unaltered after having been exposed to the action of the mixed gases for a considerable time, and also whether, when he used straight tubes with the mixed gases passing through at different velocities, the gas in both instances had attained the same temperature when it came in contact with the sulphate of copper.

Mr. Stevenson remarked that he had no practical acquaintance with Mr. Deacon's process; but he thought that if the old process continued to be used, we possessed a great advantage in Mr. Weldon's method for revivifying the manganese, so that, in this revolutionary period of the manufacture, we had the benefit of both processes.

Dr. Voelcker said the lecturer had made an allusion to the action of chromium on the mixed gases in the early part of his lecture; would he, perhaps, kindly explain what was its especial peculiarity?

Dr. Gladstone observed that many interesting points started up in one's mind in connection with the subject, and he should like to know more fully why the lecturer believed the sphere of action to include molecules not in contact, and that the decomposition was not due to direct chemical action. It appeared to him that it was unnecessary to suppose the cause to be the mechanical striking of the molecules of the gas against the sulphate of copper surface, in their passage through the apparatus, and therefore depending on the flow; for it must be remembered that, when a gas was mechanically in a state of rest, the molecules composing the gas are in a state of motion, and that when we heat that gas this rate of motion of the molecules amongst themselves varies, although the gas is still mechanically at rest.

Mr. Deacon replied that it was one thing to express clearly what one had carefully thought over, and another to answer offhand questions that embraced a wide field of inquiry; moreover, he had come there to speak simply on the scientific aspect of his subject, and he thought it would save the time of the Fellows present, and avoid going over old ground, if they would permit him to put aside all technical questions, and reply only to those which had a scientific interest.

In the first place, there is a definite range of temperature where chlorine is freely formed, but no chloride of copper; although at a higher temperature, the sulphate of copper is partly converted into chloride. This only applies to pure sulphate of copper, which, even after the action had been continued for six months, contained but mere traces of chlorine. In the presence of clay, however, the sulphate of copper is decomposed, and chloride formed, probably owing to its containing some base which combines with the sulphuric acid.

In the case where the exterior glass tube contained two clay tubes of different diameters, the gas coming in contact with the copper salt certainly had the same temperature, although moving with different velocities.

With regard to his allusion to chromium, he had expected—from the well-known oxidizing power of chromic acid—that it would have been very active, but, on the contrary, he had found that it was reduced to oxide of chromium, which is one of the most inactive substances.

With respect to the theory he had laid before them, without vouching for its correctness, he could say that it was the only way he knew of accounting for the results he had obtained.

BRITISH PHARMACEUTICAL CONFERENCE.

A Meeting of the Committee was held on Tuesday, July 2nd. There were present:—Messrs. Attfield, Carteighe, Greenish, Hanbury, Mackay, Moss, Savage, Schacht and Williams.

The Hon. Sec., Professor Attfield, read the minutes of the last meeting, which were confirmed, and then laid before the Committee the following report of the business transacted since last meeting:—

Year Book, 1871.—Since the previous meeting of the Committee 2000 copies of the Year Book of Pharmacy, 1871, had been printed; of these there remained in hand 257 copies. Of the 1743 which had been distributed, 1,600 had been delivered to members, 115 had been sold, and 28 presented to Journals and Societies.

Subscription.—Professor ATTFIELD further reported that in November, 1871, he had issued 1600 applications for subscriptions; in May, 1872, he had found a repetition of the applications necessary to the extent of 400, and on June 21st, 1872, had a third time applied for 300 of the subscriptions. At the end of the year, June 30th, 214 remained unpaid.

Subjects for Research.—In March of the present year, 1900 copies of the List of Subjects for Research, 1872, were posted to members. This list, before printing, was revised and extended by Professor Attfield, and a few questions added by some members of the Committee.

Finance.—Professor ATTFIELD reported that after paying all expenses for the current year, including the editing, printing, binding, publishing and delivery of the Year Book, a fresh expense of £9. 12s. 6d. for foreign journals required by the editor of the Year Book, general printing, and salary to Assistant Secretary, there remained a balance in hand of £47. 4s. 1d.

This amount was about the same as that left at the end of last year. It would thus be seen that the income of the Conference just balanced its expenditure.

Year Book, 1872.—The editor of the Year Book had reported to Professor Attfield that the MS. of the Year Book for 1872 was in a forward state; it would be completed quite as soon as that of last year. The printers had promised to produce the volume in a shorter space of time than before.

Mr. SCHACHT then read the following letter from T. H. Hills, Esq.:—

"338, *Oxford Street, June 6th*, 1872.

"DEAR MR. TREASURER SCHACHT,—At the meeting of the British Pharmaceutical Conference, held at Exeter, 1869, I had the good fortune of presenting to your then Treasurer and now the President, my friend Mr. H. B. Brady, a cheque for fifty guineas, suggesting that the Executive of the British Pharmaceutical Conference should present books or chemical apparatus of the value of £10 or guineas, to the Association of the Chemists and Druggists in the city or town in which the Conference met, for the purpose of assisting apprentices and assistants in their studies, and for the advancement of Pharmaceutical Chemistry.

"As this fund must be nearly exhausted, and as I learn or understand, that the experiment has proved useful, I venture to ask you, on behalf of the President and Council of the British Pharmaceutical Conference, to accept the accompanying (4) Russian bonds of £50 each, producing an income of £10 a year, which, I trust, may be kept as a permanent fund; the interest of which, £10 a year, can be used yearly for the purchase of books or apparatus, and presented to the Associations of Chemists and Druggists in the cities or towns in which the British Pharmaceutical Conference meets.

"Although I make these suggestions, I give the bonds without conditions otherwise than that the interest of the same shall be spent yearly for the advancement of Pharmaceutical education and research, under the direction of the President and Council of the British Pharmaceutical Conference.

"I remain, dear Mr. Treasurer Schacht,
"Yours very sincerely,
"T. H. HILLS."

The CHAIRMAN moved, and Mr. SAVAGE seconded the acceptance of Mr. Hills' gift, and that the letter be entered on the minutes of the meeting.

Moved by Mr. SCHACHT, seconded by Mr. MACKAY, and carried unanimously,

"That the members of the Executive Committee of the British Pharmaceutical Conference hereby record their opinion that the thanks of the entire Pharmaceutical community are due to Thos. Hyde Hills, Esq., for his munificent gift, which they regard as calculated to be of lasting benefit to the cause of scientific pharmacy.

"As representing the section of pharmacists which constitute the British Pharmaceutical Conference, they declare their high appreciation of the confidence reposed in them by Mr. Hills in thus constituting their Association the medium of his generosity, and they beg him to accept the assurance of their gratitude, and the expression of their warmest thanks."

After some discussion on the best mode of applying Mr. Hills' gift, it was resolved that a note be addressed to Mr. Hills to the effect that, bearing in view the fact that the Council of the Pharmaceutical Society is at present engaged in furthering some scheme for promoting Pharmaceutical education, the Executive Committee of this Conference prefers to postpone decision upon the principles of the process by which his generous gift shall be distributed.

The following gentlemen were unanimously elected members of the Conference:—

Adams, Frank; Adlington, W. B.; Appleby, Calvert; Balls, J.; Barrett, E. L.; Berry, E.; Berry, T.; Blake, A.; Bland, H.; Booth, W. G.; Brooke, Chas.; Brown, A. H.; Bremridge, R.; Chapman, F.; Chantler, R. P.; Cocksedge, H. B.; Cook, Richard; Cornelius, J.; Cosway, E. C.; Crawford, S.; Cross, William, M.D.; Davenport, G. A.; Delves, George; Dunkley, E.; Evans, J. O.; Eve, Charles; Foulger, S.; Garner, J.; Geary, —.; Goodliffe, G.; Gopal, Pandurang; Goodwin, J.; Green, S.; Greves, J. B.; Gunn, W.; Hadingham, J. W.; Hardy, S. C.; Higgins, W.; Hobbs, D.; Hodgkinson, C.; Hogg, J., F.R.G.S.; Horner, Edward; Horner, Edward, jun.; Howlett, W. H.; Huskisson, H. O.; Iliffe, T. P.; Kirkman, C. J.; Lazenby, J. W.; Lewis, R.; Lingwood, W.; Lloyd, Edward, jun.; M'Naught, A.; Marcham, J.; Martin, T.; Matthews, F.; Meldrum, D.; Moyle, J.; Newport, W.; Nickson, J.; Palmer, G. D.; Pattinson, J. S.; Pearce, C., M.D.; Pocklington, H.; Powell, W. A.; Pratt, W.; Probyn, C.; Purdy, J. T.; Rawlings, T.; Rich, S. W.; Richardson, T. J.; Riches, W. J.; Skoulding, W.; Slinger, F.; Smith, J., M.D.; Smith, J. S.; Smith, P. S.; Speechly, E.; Symes, E. W.; Thompson, G. B.; Todd, T.; Townshend, R.; Vizer, E. B.; Watts, C. C.; Wells, W.; Whitla, J.; Wills, E.; Wilford, J.; Wilkes, J. S.; Wright, T.; Young, J., M.D.; Young, T.

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

THE JURIES BILLS.

The House is to go into Committee on the Amended Bill on Monday, July 15th.

THE PUBLIC HEALTH BILLS.

The Committee on these Bills has been deferred till Friday, July 12th.

ADULTERATION OF FOOD, DRUGS, ETC. BILL.

This Bill, which has already been printed (Vol. II. p. 715), is set down for Committee on Thursday, July 11th. Lord Eustace Cecil has given notice of amendments in clauses 4 and 5 that would have the effect of making compulsory the appointment of analysts and the duties of inspectors in procuring samples of suspected articles for analysis. He also proposes to add the following definition of adulteration:—

"The word 'adulteration,' shall mean,—

"1. The admixture of any mineral substance (excepting the harmless compounds of potash, soda and ammonia) with any article of food or drink.

"2. The admixture of anything with an article of food or drink for the purpose of increasing its bulk or altering its natural strength or flavour, unless such admixture is declared by the dealer or vendor to the purchaser at the time of sale, or unless such admixture is clearly set forth in a label upon the article."

PAPERS PRESENTED TO PARLIAMENT.

Report of Sulphur Purification at Beckton Gasworks by the Gas Referees.

This Report has been made by the Gas Referees to the Board of Trade, in consequence of the disappointing failure of the sulphur purification at the magnificent gasworks at Beckton. For a considerable time there has been great dissatisfaction in the City of London with the gas supplied by the Chartered Company, in consequence of the large quantity of sulphur present in it. A correspondence, sufficiently acrimonious in some parts, accompanying this report, shows that for the last three years this point has been urged upon the attention of the responsible parties, and that the time of the completion of the large gasworks at Beckton has been looked forward to as the time when a satisfactory answer would be given to the complaints. But it is mortifying to find that, notwithstanding the care, skill and capital that have been brought to bear towards the solution of the problem how best to rid the gas of its impurities before its delivery to the consumers, the sulphur detected in the gas supplied from the new works when opened was more in proportion than in that from the older works. Of course, such a result was immediately made the subject of investigation, and various experiments were tried in order to remove this grave defect; but these were mostly of special interest only to the gas engineer; and we shall confine ourselves to mentioning some general conclusions at which the gas referees arrived, and which they hope will exercise a beneficial influence on the gas manufacture in the future.

The report relates exclusively to the sulphur in gas which exists in other forms than sulphuretted hydrogen. Of sulphuretted hydrogen not a trace has ever been found in the gas supplied from the Beckton works, although the test slips are now used for three or four hours continuously, instead of one minute, as prescribed by the Act of 1860. But the other forms of sulphur impurity have hitherto baffled the efforts of the ablest and most experienced gas engineers and gas chemists to eliminate them from the gas, or even to devise any certain method by which they may be materially reduced and efficiently controlled. The "purifiers" at the Beckton works are larger in proportion to the make of gas than at any other gasworks in the country; and it was hoped that the hitherto insurmountable difficulty would be at an end; but the result, described by the gas referees as a "complete and most startling failure," shows how little the subject is yet understood.

Opposite opinions have been maintained as to the best manner of using lime and oxide of iron in combination as purifying agents; one opinion being that the oxide should be placed before the lime, the other that the lime should be placed first. At Beckton, the former plan was adopted; but experiments made by the gas referees having convinced them that the gas should pass through the lime first, in June last the conditions were, at their request, reversed.

The new mode of purification came into operation in the beginning of August. At the outset the result was most successful and gratifying, the sulphur for some weeks averaging only 10 and 15 (instead of 43) grains per 100 feet of gas.

The superior efficiency of this arrangement over the other consists in this, that *clean* lime has no appreciable effect in eliminating the "sulphur," *i. e.* the sulphur compounds other than sulphuretted hydrogen; the lime has to be fouled by sulphuretted hydrogen (*i. e.* converted into sulphide of calcium) before it has this effect. Now, this "fouling," or conversion of the lime into sulphide, cannot be attained if the oxide of iron is used *before* the lime, for the sulphuretted hydrogen is taken out by the oxide; so that the lime, through which in this case the gas passes subsequently, is never converted into sulphide, and therefore cannot act upon the "sulphur." But when the gas is passed into the lime before passing through the oxide of iron (in other words, while the gas is still charged with sulphuretted hydrogen), the lime absorbs the sulphuretted hydrogen, thereby becoming sulphide of calcium, in which condition it tends to absorb the sulphur as it exists in the gas in other forms than sulphuretted hydrogen.

Unfortunately and most unexpectedly, the favourable change was only transient; for towards the end of September the sulphur again increased in quantity, and ere long became as great as before.

Another point to which the attention of the referees was directed was the temperature under which the gas was distilled from the coal. It may be roughly stated that a high heat causes the coal to yield a greater quantity of gas, though of inferior illuminating power. When the retorts are over-heated the hydrocarbons are more quickly given off, leaving the coke to be roasted, in which case a larger amount of "sulphur" would be produced than usual. According to the ordinary estimate, about one-half the sulphur originally in the coal remains in the residuary coke; but unquestionably the higher the heat to which the coke is subjected the larger will be the proportion of the sulphur driven off. Moreover, the hydrogen, having been already driven off, the sulphur vapour from the coke will tend to combine with the glowing carbon, forming bisulphide of carbon, *i. e.* the "impurity other than sulphuretted hydrogen." Although it would appear that on the whole the heat used at Beckton is lower than at other London gasworks, it is thought possible that part of the excess of sulphur may result from the overheating of particular retorts.

Sulphur exists in coal chiefly in combination with iron, as pyrites, and also to a small extent in union with lime and magnesia, as sulphates; but as the two latter compounds do not readily part with their sulphur, even under the high temperature of the retorts, it is only the sulphur which exists in the coal as pyrites that is given off in the gas, forming sulphuretted hydrogen, bisulphide of carbon, and it may be to a small extent other compounds not yet ascertained. It is the accepted belief in gasworks that some kinds of coal produce more bisulphide of carbon in the retorts than others; but it seems to the referees that it would be more correct to say that these kinds of coal only *tend* to produce more "sulphur" in the gas by yielding more or less of other products (NH_3 CO_2, etc.), which, as will appear in the sequel, considerably affect the action of the purifying processes upon the "sulphur" impurity.

This is a point that has never hitherto been noted, but in the proper elucidation of which the referees believe will be found an explanation of part of the failure.

The process of cooling and condensing the gas by a long series of pipes placed under ground (such as was mainly employed at Beckton), although possessing some important advantages over the other processes, especially as regards the illuminating power (*e. g.* 1, by preventing any sudden cooling of the gas; 2, by keeping the tar for a longer time in contact with the gas; and, 3, by being free from those sudden variations of temperature to which condensers in the open air are exposed), is, nevertheless, very defective as regards the main work of cooling and condensation, which is indispensable to perfect purification. If the gas is not properly cooled in the condensers before entering the scrubbers, the absorbent power of the water in those vessels is diminished; while if tarry vapour in large quantity is carried forward into the scrubbers, the scrubbing material (as sometimes happens) may be suddenly "fouled" to a degree which seriously affects the purifying action of the apparatus.

Scrubbers are used in gasworks mainly for the purpose of taking out, and retaining, the ammonia in the gas (a process which is a highly profitable one for gas companies); and they also eliminate a considerable portion of the sulphuretted hydrogen impurity. But, besides the ammonia and sulphuretted hydrogen, the scrubbers are capable of taking out a large portion of the carbonic acid in the gas; and this is the important point here. The portion of the carbonic acid not taken out by the scrubbers, of course, goes forward with the gas into the purifiers. Now, in the case of lime purifiers, the entrance of carbonic acid is of all things the most detrimental to their action; for it converts the lime into carbonate of lime, which has no effect upon the sulphur in the gas at all. However large or numerous the purifying vessels may be, in so far as the lime contained in them exists in the form of carbonate, they are perfectly useless; and, as already stated, *clean* lime also (though quickly absorbing sulphuretted hydrogen) has hardly any action upon sulphur in other form than SH_2.

These two facts show how it may happen that neither magnitude of the purifiers, nor frequent changes of the lime, have any corresponding effect in purifying the gas from "sulphur," which has hitherto been the case at Beckton. It is only when the lime exists as sulphide of calcium that it acts upon "sulphur;" hence the larger proportion of lime in the purifiers which can be maintained in the form of sulphide of calcium, the more efficient will be the purification from "sulphur."

When the lime is used before the oxide of iron (as since August has been the case at Beckton), the sulphuretted hydrogen in the gas, if it have a free field to act, will speedily and certainly convert the clean lime in the purifiers into sulphide of calcium; but, along with sulphuretted hydrogen in the gas, comes carbonic acid, which at this stage of purification exists in the gas in larger quantity than the sulphuretted hydrogen, and which has also a greater affinity for lime than the sulphuretted hydrogen has; consequently, the sulphuretted hydrogen can only seize upon that portion of the lime in the purifiers which the carbonic acid is not in sufficient quantity to occupy. In this way, only a small portion of the lime may be in the form of sulphide, the remainder being carbonate. Say that only one-fourth of the lime in a purifier exists as sulphide, then a purifier of one-fourth the size, if its contents existed wholly in the form of sulphide, would do as much work upon the "sulphur" as the larger one. As lime in the form of carbonate does not take up sulphur in any form, it follows that as soon as the remainder of the lime is occupied by the sulphuretted hydrogen, the purifier can take up no more sulphuretted hydrogen, and consequently becomes "foul," the sulphuretted hydrogen thereafter passing through it unabsorbed. Moreover, carbonic acid, having the greater affinity for lime, as it continues to enter the purifier, invades the part of the lime which exists as sulphide, expelling the sulphuretted hydrogen from the lime and taking its place; so that the contents of the entire purifier would ultimately be converted into carbonate, which, as already said, does not act upon sulphur in any form. Thus a purifier may be "foul" without being saturated with sulphuretted hydrogen at all; its contents existing wholly as carbonate of lime, and therefore powerless to absorb sulphur in any form. Such an excess of carbonate in the lime-purifiers, proportionately nullifying their action, is unquestionably, in the opinion of the referees, the true cause of the recent and unexpected failure in this branch of the gas-purification at Beckton.

Careful observations at Beckton show the temperature of the gas as it enters the scrubbers has averaged 100° F. throughout the past year; whereas in several of the London gasworks the temperature at the same stage of purification is only 60° or 70° F. Water at the temperature of 60° F. (barometer 30°) is capable of absorbing 780 times its own volume of ammonia, fully $2\frac{1}{2}$ times its volume of sulphuretted hydrogen, and one volume of carbonic acid. These figures show that water has a lesser affinity for carbonic acid than for the two other mentioned gas impurities; so that a very large quantity of ammonia and a considerable quantity of sulphuretted hydrogen may be taken up by water when the temperature is such that no portion of the carbonic acid in the gas is absorbed at all. As heat impairs the absorptive power of the liquor, it is obvious that the higher the temperature of the scrubbers the larger will be the quantity of carbonic acid (as well as of ammonia and sulphuretted hydrogen) which escapes from them unabsorbed and passes forward with the gas into the purifiers.

Thus, independently of experiments, it is perfectly certain that carbonic acid must enter the purifiers at Beckton in greater quantity than is usual in gasworks; and so far as any testings have been made, these testings corroborate this most important inference.

It is therefore evident that wherever lime purifiers are used, it is important above all things to keep out carbonic acid. Indeed, the anomaly observable at the Bow works, where two lime purifiers in winter are as efficient as the whole three are in summer, is probably to be accounted for on this ground; the temperature of the condensers and scrubbers being lower in winter than in summer, and consequently more carbonic acid (and also more sulphur) is taken out of the gas *before entering the purifiers* in the former case than in the latter. The difference also between the kinds of coal which have respectively a good or a bad name as regards "sulphur" may arise more from the amount of carbonic acid which they contain than from the amount of sulphur.

The referees think the prime object to be sought is to utilize and perfect the existing processes of purification; for, if these can be made to yield satisfactory results, the interests of the public require that this should be accomplished in preference to the introduction of other processes which would increase the cost of gas manufacture. They feel confident that such a result is attainable. Experiments which they have made show that lime in the form of sulphide of calcium (*i. e.* saturated with sulphuretted hydrogen) is a perfectly adequate purifying agent for "sulphur." In their laboratory experiments, they are able in this way to wholly remove the sulphur (about 26 grains per 100 feet) from the gas supplied to their office. So complete a result, of course, cannot be expected in gasworks; indeed, even in their laboratory experiments, they found that the purifying power of the material decreased on each subsequent day, owing, doubtless, to the carbonic acid in the gas (about 1 per cent.) gradually nullifying a portion of the material by converting it into carbonate of lime. Nevertheless, making due allowance for the difference between laboratory experiments and purification on a manufacturing scale, the referees feel assured that perfect results would be obtainable from the lime process of purification if carbonic acid were excluded from the purifiers; and also that the result will be adequate to the requirements of the public if the carbonic acid which enters the purifiers be kept down to the lowest point actually attainable in gasworks.

The problem to be solved is, how to take out all the carbonic acid from the gas without simultaneously taking out all the sulphuretted hydrogen? which latter element is needed to convert the contents of the purifiers into sulphide of calcium. And the essence of the difficulty consists in the fact that carbonic acid exists in the gas in very much larger proportion than sulphuretted hydrogen does; while there is no chemical substance which absorbs carbonic acid without also absorbing sulphuretted hydrogen.

Suicide by Cyanide of Potassium.—The Sale of Poisons.

On Wednesday, July 3rd, Mr. W. H. Garrington, the borough coroner, held an inquest at Portsea relative to the death of Charles West, sapper in the 32nd company of Royal Engineers.

Thomas Lawrence, a sapper, said he was at work in the tailor's shop, at Anglesea Barracks. At about six o'clock on Tuesday morning, West entered the room and asked him for a penny, saying he had got one penny and wanted another. Witness told him he had not got a penny to give him, upon which he went over to the shelf running across the room and took up one of the bottles there, asking, at the same time, whether there was cyanide in it. On being told that it contained cyanide of potassium, West put the bottle to his mouth and commenced to drink. Witness got off his board immediately and took the bottle away from him, but not before he had taken a good mouthful of the cyanide, about half a wine glassful. West then ran downstairs to the pump in the backyard, from which he pumped some water into a basin and drank it, but he almost immediately fell down. West struggled very much whilst on the ground, and froth came from his mouth. He became insensible when he fell, and his face became very yellow, whilst his lips became black. He was taken into a room and attended to by a surgeon, who directed his removal to the garrison hospital. It was customary to keep cyanide of potassium in the room; it was used for cleaning gold lace The bottle from which deceased drank belonged to witness, and was used by him in cleaning the gold lace on the non-commissioned officers' uniforms. On the 7th of June he sent for 6*d.* worth of cyanide of potassium, which he mixed in half a pint of water and placed in the bottle produced. There was no label on the bottle to indicate its contents. He often obtained cyanide of potassium at druggists' shops at other places where he had been stationed, and had never experienced any difficulty in getting it, on signing his name in the druggists' books.

A juror said he was in the habit of using cyanide of potassium, and he had always great difficulty in obtaining it from chemists in Portsea. It was almost a slur on the chemists of the town, but he knew they were very particular.

The Coroner said the witness referred to other places, as he had not yet bought any in Portsea.

Mr. Patrick Walter Stafford, assistant surgeon on the Staff of the Portsmouth Garrison, said that when he first saw West, he was in a dying state, in fact he died two minutes afterwards. Witness had made a *post-mortem* examination of the body, and found the stomach half filled with semi-coagulated fluid, which had a strong penetrating odour of prussic acid. He had analysed the contents of the two bottles produced, and found them to be a solution of cyanide of potassium of considerable strength.

Some evidence was given tending to show that the mind of the deceased was affected.

Thomas Kent, sapper, said he recollected being sent by the first witness (Lawrence) on the 7th of June to buy some cyanide of potassium. He went to the shop of Mr. Woollons, chemist and druggist, in Queen-street, Portsea, and asked for six pennyworth. Witness was in uniform. The person in the shop asked him if he knew what it was used for, and witness replied for cleaning gold lace and chains. He was not asked his name, and saw no entry made in the book of sales of poisons; he signed no book. He was supplied with the article he asked for without further demur, except that he was cautioned that it was a rank poison.

The Coroner said the law was that a person to whom a sale of poison was made should enter his name in a book, and, he believed, the purpose for which he required it.

A juror said he was in the habit of obtaining it, and he had to sign his name in a book and to say the purpose he wanted it for, and he knew of an instance in which a person could not obtain the poison until he took some friend with him.

The witness said there was a label marked "Poison" on the packet given him.

The Coroner, in summing up, said the only point for the jury to consider was the state of the mind of the deceased when he took the poison, as the evidence was so clear and conclusive of his having taken it, and there was no question that was the cause of death. They had the evidence of the last witness that he purchased the poison at the shop of Mr. Woollons. It was in very constant use, and no doubt druggists were frequently called on for it, which rendered it the more incumbent on them to surround the sale of it with all the precautions the law demanded. In the Sale of Poisons Act there were certain provisions that when any poison was sold the sale should be entered in a book, and Mr. Woollons, or whoever sold the poison, had clearly committed a breach of the law in that respect. If any one asking for the poison was not known to the person to whom he went, he must take some one with him to prove he was the person he pretended to be, and also to satisfy the vendor he required it for a legitimate and proper purpose. Chemists were required to keep a book in which to enter the dates, the names of the article and the quantity, the purpose assigned for its purchase, and then the signature and residence of the person buying it. That was, so far as he recollected, what was required, but all druggists were bound to enter any sale of poison. Mr. Woollons was not there to make an explanation, and it would be unfair and unjust for him to make any further comments on this point. The Coroner next referred to the fact of the poison having been kept in the tailor's shop, as it was—the bottle being carelessly placed on the shelf, without any mark on it to denote it was poison. He pointed out how easy it was for any one to abstract it, and also the danger likely to occur by a person half drunk, and therefore with a natural craving for drink, mistaking it for gin or something else, and taking up the bottle and drinking from it. Accidents of that sort had occurred. He hoped that Lawrence would have this concoction, or anything else which was deleterious or poisonous, which he was obliged to use in his business, labelled and kept in a place of security.

The jury, after a short deliberation, returned a verdict that deceased died through taking the poison, but that there was no evidence to show the state of his mind at the time. The foreman stated that the jury endorsed the opinion of the Coroner, both in regard to the sale of the poison and also as to the easiness of access to it in the workshop.—*Portsmouth Times.*

Suicide of a Chemist by Prussic Acid.

An inquiry into the circumstances attending the death of Mr. Frederick Stockman, aged 41 years, who committed suicide by poisoning himself, was held at Gosport on Saturday last, by Edward Hoskins, Esq., county coroner. The widow of the deceased deposed that the deceased was formerly a chemist and druggist, living in Forton Road, and on Thursday she last saw him alive. He had been suffering from mental depression for some time. At dinner time witness sent one of the children into the shop to ask him to come to dinner, but he told the child to go away, whereupon witness herself went out. He told witness to serve the customers; but she replied, "There is no one here to serve," and added that she would not go indoors without he accompanied her. She, however, at his request, went in; and in about two minutes, hearing a strange noise in the shop, she proceeded there, and found her husband sitting in a chair insensible. Thinking he had fainted, witness sent for a next door neighbour, who afterwards summoned a doctor; but witness thought, before medical aid arrived, the deceased was dead. He had been for some time past troubled in business matters, and witness thought this had turned his mind.

Mr. George Perfect, a retired chemist, residing at Southsea, stated that he had known the deceased for the past thirty years, and he was generally of a desponding disposition. Witness knew that he had recently had great trouble in pecuniary matters, and also in his business, which he purchased in September last. It did not come up to his expectations, and in consequence he showed considerable despondency. Witness last saw him on Tuesday in London, where they had been trying to arrange his affairs, but they found they had gone so far that a trial was inevitable. He (deceased) was so excited that at times he was incoherent, and displayed great absence of mind. From his last interview with him, witness did not believe he was in his sound senses.

Mr. William B. Smith said he knew deceased, but had never noticed any peculiarity about him. On the Thursday afternoon witness was called to the house, and found him in a chair behind the counter, breathing very heavily. Witness applied restoratives to the nostrils, but they were ineffectual, and deceased died about two minutes afterwards. As they were laying him on the floor, Mr. Smith detected a strong smell of prussic acid, and on looking round, he found the bottle produced, from which the smell proceeded, standing on the counter almost empty.

Dr. John Butcher, of Spring Gardens, said on Thursday he was called to see the deceased, and on examining him found him to have died from taking prussic acid,—such a large quantity, he thought, as to produce almost instant death.

The Coroner, in summing up, characterized the case as a lamentable one, and left the question for their determination whether or not deceased was in a sound state of mind when he committed the act. The evidence certainly tended to show that he had been, in consequence of his affairs, in a state almost, if not quite, bordering on insanity.

The jury immediately returned a verdict of suicide while of unsound mind. —*Hampshire Telegraph and Sussex Chronicle.*

Review.

Air and Rain: The Beginnings of a Chemical Climatology. By R. Angus Smith, Ph.D., F.R.S., F.C.S.

The science of chemical climatology promises to be an extensive and important one, since this large volume, containing the results of an enormous number of experiments, which have occupied the author during the last eight or ten years, is still truly only concerned with the beginnings of the subject. The book is very well written, and is remarkably free from errors of the press. The hieroglyphic on the cover is rather puzzling, and is apparently not explained in any part of the work; but it seems to be the symbol for "Air" suggested by Bergmann in the last century.

The introduction gives a terrible list of the substances commonly to be found in air, including carbonic acid, hydrogen and its compounds, hydrochloric, sulphuric and sulphurous acids, sulphuretted hydrogen, the multiform *débris* of living things, living things themselves, chloride and sulphate of sodium, nitrate of ammonium, lime salts, iron, phosphates, iodides, "and probably a little of everything, at times, . . . which the sea or the surface of the land may contain;" so that the author says, "instead of thinking it nothing, we are now inclined to go nearer to the other extreme."

A very important correction is made of the statement, often found in works on physiology, that air can support respiration until it contains ten per cent. of carbonic acid. It is shown by a number of careful experiments that human beings cannot long endure an atmosphere containing more than four per cent., the higher numbers having probably been obtained by experiments of very short duration. But although as much as two or three per cent. of carbonic acid causes but little annoyance, it is shown that this is only true when other impurities are absent. The senses detect the difference between the air of the streets and of the parks of London, where the difference of the carbonic acid is only ·004 per cent., the real annoyance arising from organic matter and gases from putrefaction. Hence the quantity of carbonic acid found is significant, "because it almost always comes in bad company."

The passage on page 67 should be commended to the attention of the authorities concerned. It is there shown that the atmosphere of a London law court contained a less amount of oxygen than any place above ground except the gallery of a theatre which had been extremely crowded for a whole evening. Dr. Smith says deliberately that this court was worse than a midden, that it was not to be voluntarily borne, and that the feeling of relief on coming out was remarkably pleasant. The air of the lantern of the same court was worse still. Can it be reasonable to expect justice to be administered by men working in such a "black hole of London," especially as the judges are seated aloft, and so subjected to the atmospheric sewage of all present?

It is somewhat surprising after the numbers in the earlier part of the book showing that, as far as oxygen and carbonic acid are concerned, the air of the western parts of London is rather better than that of the remainder of the metropolis, to find that the rain-water of the western and west central districts contains a much greater proportion of chlorides, sulphates, and free acid than that of other districts.

The paragraph at page 414, on the sense of smell, is extremely important, and to the chemist raises the question whether a laboratory, with its atmosphere almost always charged with varying odours, is a proper place in which to exercise it. Ought not things whose odour is to be examined to be first carried into the open air? Dr. Smith says, in order to give the sense of smell a fair field, "The organ must work in pure air, and the substance to be tested must be put to it for a short time only."

Perhaps the most valuable part of the whole book is that devoted to the subject of ventilation, of which people talk so much, and know and do so little. We are told that the amount of organic matter exhaled into the air increases with the temperature, while the carbonic acid does not; and as the latter is not perceptible when not in excessive quantity, we ventilate freely in warm weather to get rid of the active annoyance of organic matter, but are careless on this point in the cold season; so that the result of want of ventilation is in summer a feeling of closeness, and in winter of drowsiness caused by the accumulation of carbonic acid and consequent lowering of vitality. This is principally spoken of in connection with public places of assembly, but is also true of private houses. We are told that ·16 per cent. of carbonic acid affects a candle sensibly; what then is likely to be the effect on the human frame of the atmosphere of a bedroom which contains ·23 per cent., as in Pettenkofer's analysis given on page 49? Yet it is true that for a great part of the yearthe majority of bedrooms are entirely without adequate ventilation, and many are carefully made as nearly air tight as possible. An oppressive and powerfully odorous atmosphere is submitted to from a dread of injury from night air, which is, rightly or wrongly, supposed to be eminently deadly. It would be a very great service to mankind if medical men would investigate and speak fully and freely on this point. Dr. Smith appears to think that the air of the night is rather better than that of the day; and it seems impossible that it can be so harmful as that in a room without ventilation.

It seems hard to give any adverse criticism on a book so full of valuable information as this, but there are two points which call for notice. On page 274 it is said that sulphuric acid or sulphate "increases inland, even without smoke, on account of the decomposition of vegetable and animal matter. This is best seen in the table of proportions." But in the table on page 273 (which appears to be the one referred to) the inland Scottish places contain the smallest quantity given in the whole table; and inland English places contain much less than English country places, or the average of Scottish country places. The statement may be true, but it does not follow from the results here given.

Then on page 509 the statement that a porous soil removes offensive material "by an agency within itself," is likely to convey a false idea. The action in question depends upon a sufficient supply of oxygen being afforded; and if this is not done, the soil has little or no power within itself to remove organic matter. The overloading referred to on the preceding page is in most, if not in all, cases due to the excess of organic matter over the oxygen, and if the latter be abundantly supplied, the amount of organic matter which can be destroyed is almost unlimited. In the paragraph on the application of sewage to soil, the same important item is again omitted, although porosity of soil would be of little use if the aeration were insufficient; and sewage itself never contains enough dissolved oxygen to burn the whole of the organic matter.

These, however, are but slight faults in view of the weighty merits of the book, which cannot fail to have a most important and valuable influence on sanitary science. We rarely meet with books so amply filled with experimental results, and so notably free from dogma.

Obituary.

REUBEN CRAVEN PAYNE.

We regret to have to record the death of another of those gentlemen against whose names in the calendar the date "1841" shows that they were "founders" of the Pharmaceutical Society. Mr. Reuben Craven Payne, Pharmaceutical Chemist, of Bridgewater, died on Thursday, June 28th.

Mr. Payne was born in 1808 at Tottenham. Himself a prominent member of the Society of Friends, he was the son of Mr. Peter Payne, a "convinced Friend;" his mother being of the well-known Quaker family of Pryor. He was educated at the school of Joel Lean, situated at Frenchay, near Bristol, which had a deservedly high reputation as the first Quaker school of the time. After leaving school he studied for some years the business of chemist and druggist at the establishment of Messrs. Allen, Hanburys and Barry, of Plough Court. While in London he formed an intimate friendship with Dr. Martin Barry, F.R.S. (after whom one of his sons was named); and with Alexander Barry, F.R.S., who died from an explosion that occurred whilst conducting some scientific investigations at Furnival's Inn, as well as with John Thomas Barry, who was a partner in the above-named firm. He continually frequented the debates in both Houses of Parliament, especially those having reference to the improvement of the criminal code. In after years he often told, in his family circle, interesting anecdotes of episodes in the House and its lobbies in connection with the passing of these great measures.

Shortly before 1836, Mr. Payne purchased a business that had been established at Bridgewater. In 1837, he married, and afterwards lived in the comparative seclusion that is usual among members of the Society of Friends, especially those of the old school. Amongst his few intimate friends at Bridgewater were two or three neighbouring clergymen and Mr. Andrew Cross, the electrician.

Mr. Payne was very fond of art, and himself painted in oil, both landscape and figures, with considerable power. Passionately fond of nature, there was not a rare bird or flower, or beautiful view in the county that he did not know perfectly. To wait for the kingfisher along some stream that it haunted; or, in the evening, to wait under a tree frequented by the nightingale; or, indeed, to watch the habits of any beast, bird or insect was his delight.

Mr. Payne leaves two sons,—Mr. John Horne Payne, M.A., barrister, and Dr. Martin Henry Payne, who is now in New Zealand,—and a daughter, recently married to Mr. Lewis Thompson. Anxious to give his children the best possible education, he had them educated at home, until the age of fifteen, by resident tutors. To complete their education, his sons were afterwards sent to travel on the continent for some time. In 1852, Mr. J. Horne Payne was sent to University College; he took his B.A. degree with double honours at the London University, in 1857, and in 1860 the degree of M.A. in Branch II. mathematics.

Mr. Payne's kindness to the poor was such that none but his immediate relations mourn him more, and his funeral was accompanied to the grave, not only by a large number of the well-to-do inhabitants of the town, but by numbers of the poor who showed by their tears their regret at his loss. During the cholera season which visited the town some years ago, *none* was more unremitting in aiding by personal attendance on the sick poor from very early morning till late at night; but, generally speaking, his aid was quietly and unobtrusively given, though he never refused to render it.

For two months previous to his decease Mr. Payne was confined to his bed, and his death, from gradual paralysis, was preceded by insensibility for several hours.

We regret to have also to record the death of Mr. Pickering (of the firm of Butler, Pickering and Beckett), of Leicester, who was found dead in bed on Sunday morning, July 7. On Saturday evening, before retiring to rest, he vomited blood and complained of being unwell, saying at the same time he would go to bed. His son, who was sleeping with him, on awaking about half-past one, found him quite dead. Mr. Pickering has been a member of the Pharmaceutical Society since 1842.

Notes and Queries.

*** *In order to facilitate reference, correspondents are requested to mark their answers in each case with the title and number of the query referred to.*

No notice can be taken of anonymous communications. All queries or answers should be accompanied by the name and address of the writer.

[320].—SILVER COATING FOR STEEL.—Can any reader oblige me with a formula for silver coating for steel, etc.?—D. G.

Correspondence.

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

PROVINCIAL PHARMACEUTICAL EDUCATION.

Sir,—Will you kindly further the purpose which the Council had in view in publishing the outline of their scheme for promoting Provincial Pharmaceutical Education, by giving the best prominence you can spare to these few lines.

Their object is to urge upon every member of our body who has a thought upon the subject to communicate it at once, either through your columns or by letter to some member of the Committee.

It may not be possible to reply to each individual correspondent, but I am sure that every suggestion will receive careful consideration.

The Council are most anxious to devise a scheme that shall prove generally satisfactory to the trade at large; and, as in this matter they are treading upon almost strange ground, they feel that the way would be largely prepared for them, and their labours would be much assisted by the fullest expression of opinion upon every point bearing upon the question.

G. F. SCHACHT.

Clifton, July 10th, 1872.

Sir,—As a contribution to the forming a judgment by the members of the Pharmaceutical Society on the above all-engrossing topic of the hour, I shall esteem it a special favour if you can find space in the Journal for some proposals on on the subject that I had intended to submit to the Council at its last meeting as an amendment upon an intended motion on the subject by one of my fellow-councillors.*

In asking a consideration of my own proposals, I cannot avoid expressing the deep sense I have of the great obligations under which our Society is laid to Mr. Schacht for his very valuable paper on the subject, as published in the Journal of to-day. It will amply repay the most careful study of its contents. It embraces all I advocate on the subject, and I venture to place my own proposals before the Society with no view of detracting from its merits, but solely because, in some aspects of it, it may, as it appears to myself at all events, be more readily appreciated and carried into actual operation.

DANIEL FRAZER.

Glasgow, July 6th, 1872.

P.S.—It is due to Mr. Schacht to add that though I, after reading them in the committee on the previous day, omitted to bring the following resolutions before the Council on Wednesday, largely because of the withdrawal of the motion to which I had intended to move them as an amendment—as notified to the Secretary some days previously—I did not so even more because of the fact, brought out in our discussion in committee, that his scheme really does embrace all that mine does. I may also add that I have now the best reason to know that before Mr. Schacht again brings his scheme before the Council, this feature of it will be made even more explicit.

Sir,—At the last meeting of the Council, on July 3rd, I see, from the report in the Journal that Mr. Schacht has propounded a most able, very comprehensive, and highly practicable scheme for promoting scientific pharmaceutical education throughout the country. I rejoice to find that the Council has accepted the principle of it. By doing this they have wiped away the reproach which was very generally felt that, as far as this subject is concerned, they were an organised hypocrisy to the country members of the trade.

The scheme itself is an admirable one, and with some slight alterations in details, and with the additions so nobly and so judiciously proposed by Mr. Hills, especially that of assisting small classes, it may be made to comprehend the requirements of the entire trade throughout the kingdom. I consider that assistance to small classes should be made one of the "Principles of the Scheme." The suggestion of Mr. Baynes, that a small capitation grant should be given to associations for students who had attended the classes a certain number of times is well worthy of attentive consideration.

I see from the report of the discussion which followed the introduction of the scheme that a member of the Council, whilst approving of it, doubted the propriety of employing lecturers, a statement which I have read with considerable surprise, coming as it does from an old member of the trade. My own opinion is that the success of a school of pharmacy is, to a very large extent, dependent upon the ability of its lecturers. What would the medical profession think, if one of its members should express a doubt as to the wisdom of employing lecturers on anatomy, surgery, and other branches of science!

I am also glad to find that Mr. Baynes has proposed reinvesting some of the funded property of the Society. I trust he will persevere until he has reinvested the whole of it. I cannot see the wisdom of investing money at three per cent., when large Insurance Companies invest immense sums of money on real security at four per cent. There are times when Railway Debenture Stocks and Guaranteed Perpetual Preference Stocks may be bought to pay four and a half per cent., securities quite as safe as Consols. This would make a very important addition to the income of the Society.

ATKINSON PICKERING.

Hull, July 8th, 1872.

Sir,—The scheme proposed by the Council to promote pharmaceutical education in the provinces is undoubtedly a step in the right direction, but it does not go far enough. It deals unfairly with all apprentices and assistants not in connection with an educational trade association; in fact, it is modelled too strictly on the Government Science Classes principle. It may be necessary in conducting the government classes, that the student should be under the supervision of a properly constituted committee, which is to see that the payments are made only on account of those for whom the classes are intended. But such regulations are unnecessary with the body of chemists. Of course the grants of the Society must be paid to pharmaceutical students only; and this can be secured without making it necessary for students to belong to any association or to be under the control of any committee during his studies. If all registered apprentices, and perhaps assistants, eligible to pass the Modified examination, be entitled to receive payments on results, in aid of pharmaceutical education, then, and then only, will the Council be acting in fairness to those young men residing in those districts where there are no such associations or classes. If a registered apprentice passes the necessary examination, he should receive the grant to reimburse him the expenditure he must have incurred to gain the requisite knowledge, which in other more favoured places, would have been borne by the masters as a body. If a student belongs to such an association as is contemplated in the scheme, then the grant should be paid to that body which has given the student increased means for study. Let any one take a map of England and Wales, and mark each place having, or even likely to have, classes for pharmaceutical students, and the unfairness of the scheme will at once be apparent. There are many assistants and apprentices residing fifty or sixty miles away from any such educational centre, and it is impossible for them to attend classes at such a distance; I think even ten or twelve miles will generally be found an inconvenient distance.

RALPH ROBINSON.

Rochdale, July 10th, 1872.

Sir,—In answer to 'G. T.' respecting money spent on the School of Pharmacy at Bloomsbury, I would remind him of what has been more than once stated in your pages. First, that the reason money is spent at all on Education by the Pharmaceutical Society is that, up to the present time, pharmaceutical education has not been able to pay its own expenses. Second, that whatever amount of money belonging to the whole Society has thus been expended has been spent for the benefit of the whole trade, four-fifths of the students coming from provincial towns, such as those mentioned by 'G. T.' The School of Pharmacy in London is not the London School of Pharmacy, it is a school for the whole country. This distinction has not been made by 'G. T.' and other correspondents.

N. D

* See p. 29.

Reporters at the Council Table.

Sir,—And so the skies have not fallen yet! And that antiquated gentleman who dates his membership before the deluge, will be able to add to what must be a long and varied experience! He will have attained the knowledge that the Council of the Pharmaceutical Society have permitted an independent report of their last meeting to be made without showing themselves to be either fools or conspirators. But I dare say that he has found out before this time that we all "live and learn."

The *rôle* of Nestor has been reverenced for many centuries, and gentlemen whose grey hairs have become a crown of glory—how white must be the hair of the gentleman in question!—are rather partial to attempting the part. This is on the whole a fortunate thing for the world; but it is necessary that they should be correct as well as concise in their pragmatical utterances, or they will lose reputation as prudent counsellors and persuasive orators, and their crinal crowns will be mistaken for caps and bells.

What does our ancient friend mean by saying that it is "usual for the deliberations of representative bodies, charged with administrative and executive duties only, to be conducted privately?" Does he go to sleep and only wake up once in a millennium? Did his last somnolence commence before the publication of newspapers? If so, I hope that before he takes his next nap he will make a note that in the present day there are such bodies as school boards, boards of works, and vestries,—bodies that although they are charged with "administrative and executive duties only," conduct their deliberations in public.

On the other hand, the remark that "legislative functions, on the contrary, are properly exercised in public, but these are not within the function of the Council," is peculiarly unfortunate. For if it can be said of any body that Parliament has delegated to it legislative powers, such may be said of the Pharmaceutical Society. And, I agree with the opinion expressed by a speaker at the Annual Meeting of 1871, that "it is a very proud privilege, a great distinction, to have been associated with Parliament in making laws for our own government." As to the evident sneer about boards of directors and committees of trades unions, I must confess that I do not see the force of it, unless they had representatives in the days of Noah who bore as bad a reputation as they do now. Perhaps your correspondent belonged to an antediluvian limited liability company, and lost one of his earlier fortunes by it.

But seriously, Sir, I congratulate the Council upon what they have done, although it will require tact and judgment on the part of the chairman to avoid the bringing forward of matters better discussed in committee. It will also throw extra responsibility upon yourself, but I am sure that will be undertaken cheerfully under the circumstances. The result I believe will be a great gain to the Society, by the creation of a more active current of opinion between the members and their representatives; whilst those individuals whose tender consciences and timorous dispositions have hitherto compelled them to stand aloof—reaping all the advantages without assisting in purse or person—will be relieved from that painful necessity. They will see that our councillors are not persons who are continually plotting the injury of outsiders, but gentlemen who look upon the welfare of the Society as identical with the welfare of the whole trade.

A Post-Diluvian.

Death from an Overdose of Morphia at Morecambe.

Sir,—Mr. Johnson, in his evidence before the Coroner says, "it is usual to mention in the prescription the materials of which the pills are to be made; but it is *not usual* to say divide." Allow me to inform him that it is *most unusual* not to say divide, for in 441 prescriptions which I have before me, selected from Neligan and Druitt, in *no instance* are the ingredients given for more than one dose of either pills, powders or draughts without the word "divide" or "forma;" and where ingredients are directed to be mixed with mucilage, syrup, etc., "q.s. ut fiant pilulæ xij," or, as the case may be, is the invariable custom. It is also most unusual to give verbal directions for dividing pills, when the prescription for their ingredients has been handed to the dispenser. I have dispensed prescriptions for surgeons in different parts of the country for the last fourteen years, and during all my experience, I never came across a similar instance to this. Had the writing of the prescription been completed in the usual way, I think there is every probability this lamentable accident would not have occurred.

Alexander Ellis.

Skelton-in-Cleveland, July 9th, 1872.

The Benevolent Fund and its Donors.

Palmam qui meruit ferat.

Sir,—In the Calendar of the Pharmaceutical Society, 1871, the subscribers and donors to the above-named Fund, are marked by an asterisk. Many of our junior members may not be aware that at the commencement of our Society, for four years, the annual subscription of members was two guineas, viz., 1841, 1842, 1843, 1844, and the object was that a moiety might go the Benevolent Fund.

In the First and Second Volumes of the Journal the members are styled "Founders;" and the context shows that they were considered founders both of the Society and of the Benevolent Fund. Their annual subscriptions formed the nucleus of both Funds. This subject is fully admitted in the Journal for November, 1844, Vol. IV. p. 198, etc.

Now, under these circumstances, why is the honour now taken from the old members? In the Calendar, why is not a star of the first magnitude attached to their names?

Joseph Leay.

Chilcompton, Bath, July 1st, 1871.

Dispensing Prices.

Sir,—A few days ago the following prescription was brought to me by a retired surgeon to be dispensed:—

℞. Acid. Nitro-Mur. dil. . . . ℥ss
Extracti Cinchon. Flavæ liq. ʒij
Tincturæ Lupuli . . . . . ℥iss
Liquoris Taraxaci . . . ad ℥vj
M. ft. Mist.

and for which I charged the very low sum of two shillings, cutting it as I imagined as fine as possible, which he thought remarkably high; in fact, more than he ever paid for a similar mixture during a practice of over thirty-five years.

When he required a repetition, and at the same time being desirous of obtaining the same at a reduced price, he went to a "quasi"-wholesale and retail establishment—at one time an eminent house in the City; they asked one shilling and ninepence for a single bottle, but would make a reduction if two were taken, dispensing double quantity for three shillings, being, in fact, within two or three pence per mixture of what the ingredients cost wholesale.

All that I have to remark is, that if such once eminent firm is satisfied with so small a percentage of profit I am not, as I have not yet discovered the valuable secret of buying and selling at the same price so as to make it pay.

Ægles.

Clifton.

"*Inquirer.*"—We should recommend you to make it according to the B. P. formula, omitting the sugar.

G. E. Crick.—(1) Wanklyn and Chapman's 'Water Analysis' and Sutton's 'Volumetric Analysis.' (2) The article on "Organic Analysis," in Watts's 'Dictionary of Chemistry.'

S. E. Pritchard.—Probably Bentley's 'Manual of Botany,' published by J. and A. Churchill, would meet your requirements.

"*Chemist and Druggist.*"—You appear to have misunderstood the purport of the circular. It is not said that persons not carrying on business are liable to have their names struck off the Register, but that failure to reply to the question as to present address will, after a certain time, become a legal justification for the Registrar striking off the names of persons so failing.

"*Invalid.*"—Probably you would obtain the information you ask for from any respectable surgical instrument maker.

Communications, Letters, etc., have been received from Mr. Odling, Dr. F. Porter-Smith, J. W. Yates, Mr. H. C. Mason, Mr. R. J. Davis, Mr. Balmanno Squire, W. B. S., "Minor Associate," "Glasgowensis," "Alpha."

ANTISEPTIC PHARMACY.

BY WILLIAM MARTINDALE, F.C.S.,

Dispenser and Teacher of Pharmacy at the University College Hospital.

(*Concluded from p. 22.*)

When a surgical operation has to be performed on a previously unbroken integument, the part being first well cleansed with an aqueous solution of carbolic acid, Professor Lister then imbues the atmosphere surrounding it, both previously, while the incision is being made, and as long as the cut surfaces are exposed, with a cloud produced by a spray apparatus from an aqueous solution of carbolic acid, one part in 100.* A rag or "guard" soaked in the carbolic solution is employed to cover the wound while the spraying from the atomizer is discontinued, but this should be commenced again before the removal of the "guard." At the conclusion of the operation, the wound and adjacent parts are thoroughly cleansed from blood, etc., by sponging them with the same carbolic solution. Thus it is ensured that no putrefactive organism has the chance of entering the wound alive. The same precautions are necessary at each fresh dressing of the wound.

The wound being thus free from the elements of putrefaction at the completion of the operation, it remains to carry out the other division of the antiseptic treatment, viz., to apply such external dressing as shall securely guard for the future against the penetration of septic ferment from without. "For this purpose," says Professor Lister, "the most convenient material I have yet arrived at is the 'Antiseptic Gauze,' made by impregnating a cotton cloth of open texture—a kind of book-muslin—with a mixture of carbolic acid, resin, and paraffin, in which the resin serves as a vehicle for the acid, while paraffin is added to prevent inconvenient adhesiveness." The proportions which he has found best for carbolizing this material are the following; it is manufactured on a large scale by Messrs. J. F. Macfarlan and Co. of Edinburgh:—

Antiseptic Carbolic Gauze.

Take of

Carbolic Acid, in Crystals . . .	1 part.
Common Resin	5 parts.
Paraffin	7 parts.

Having melted the acid and resin together, the carbolic acid is added and dissolved. In this mixture the muslin, in six yard pieces folded to fit the press, and previously warmed by placing it in a hot stove, is immersed until the whole of its fibres are thoroughly permeated by the carbolized vehicle, the latter being kept liquefied in a trough heated by steam. A number of these impregnated clothes are then placed in a hydraulic press between hot metallic plates and the pressure applied quickly, so that the cloth is left with rather less than its own weight of the mass; the individual fibres being charged, but the interstices left open. For hospital purposes Professor Lister states the clothes may be washed and recharged over and over again to save expense. "The saving of expense" is rather doubtful, as the difficulty in washing them free from the resin, paraffin and the discharge from the wounds, and the attendant danger of not getting them free from the latter before recarbolizing, are such as almost prohibit this kind of economy, because the fabric itself can be purchased for about the cost of labour expended in cleansing that which has once been used. The gauze when freshly carbolized is soft and slightly moist to touch, but on exposure to the atmosphere it becomes somewhat harsh and crisp; it should, therefore, be kept closely packed, and as little exposed to the air as possible.

This carbolized dressing, while it absorbs the discharge, holds the antiseptic firmly lodged in its fibres, where it is retained by the insoluble resin, and it is to this circumstance that it owes its superiority over most other porous applications. It is wrapped round the wound folded into a pad of about eight layers, and surrounded by a piece of impermeable tissue—that known as "hat-lining." This compels the effusion of serum from the wound to travel along the whole extent of the antiseptic investment (which should reach several inches beyond its margin) before the discharge can come in contact with the open air. The hat-lining is generally placed within the outermost layer of the antiseptic gauze. While the discharge is free the dressing should be changed daily, but as it diminishes, the intervals may be increased till, when it is merely a few minutes in the twenty-four hours, the gauze may be left undisturbed for a week together.

The gauze is also extremely useful in the form of antiseptic bandages. These are employed to secure and complete the dressings. They are to be had, cut by machinery, of the firm above mentioned, in six-yard lengths three inches wide.

Antiseptic Catgut for Ligatures.

Take of

Carbolic Acid, liquefied by the addition of 6 per cent. of water .	1 part.
Olive Oil	5 parts.

Mix by agitation; this forms an emulsion, not a perfect solution on account of the presence of the water. Immerse the catgut for two months in the emulsion contained in a covered vessel, taking care not to let the hanks of gut touch the bottom of the vessel, by having a few pebbles or a perforated diaphragm on which to rest it. Should it come in contact with the water which separates from the emulsion, it becomes soft and slippery, and will not bear the requisite strain or keep its hold when tied. The advantage which sutures of this kind possess is that, in time the parts of them imbedded in the tissue are absorbed and, therefore, do not require removal—the exterior portion and knots then fall off with a touch. This circumstance renders the cat-gut unfit for sutures intended to retain their hold for a considerable period, for which a material less amenable to absorption by the tissues is to be preferred, such as the silk thread generally used for sutures, carbolized in the following manner:—

Antiseptic Silk for Ligatures.

Take of

Carbolic Acid, in crystals . . .	1 part.
Beeswax	9 parts.

* Since writing the above, I learn that Professor Lister now recommends this solution to be of the strength of one part in 40. He used it of this strength a few years ago, but thought that it was then unnecessarily active and caused some irritation; he has, however, returned to it, as he finds the weaker is not always sufficiently antiseptic. A modified kind of putrescence having occurred in some cases, which he attributes to this source when the weaker lotion and spray were used.

The acid is dissolved in the melted beeswax. In this solution the silk is then placed, and when thoroughly steeped, it is drawn through a cloth to remove the superfluous wax.

It is always to be remembered that the action of the antiseptic is itself injurious, so far as its direct influence upon the tissues is concerned. If carbolic dressings be used they retard cicatrization; they also operate with especial energy on the cuticle; and even when far too dilute to produce excoriation, that is to say, to destroy the perfect epidermis, they will, if applied direct to a wound often entirely prevent the production of young epithelial cells. It is therefore necessary to protect the cicatrizing part by interposing between it and the gauze a layer of some impermeable material. But carbolic acid is a remarkably penetrating substance, passing through, by a kind of endosmose action, gutta-percha and india-rubber with the utmost facility, though not dissolving them; it has thus been difficult to devise an efficient protective. That now used is the *protective oiled silk*. Oiled silk is first coated on both sides with *copal varnish*, and when dry brushed over with a mixture of

Dextrine	1 part.
Starch, in powder	2 parts.
Aqueous solution of carbolic acid (1 in 20)	16 parts.

The granular starch enables the dextrine solution to apply itself better to the varnished surface, and the solution of carbolic acid is used rather than mere water for the same purpose. When used, a piece slightly larger than the open wound is previously dipped in the aqueous solution of carbolic acid to free it from any septic poison and applied as a "protective" of the parts from the irritation of the exterior carbolized dressings. The dextrine mixture reconciles the varnished surface of the oiled silk to the aqueous solution of carbolic acid, so that when immersed in the latter before application to the wound, it has an even superficial aqueous layer; this prevents any danger of the varnished oiled silk adhering to the margin of the wound.

Carbolized Oil.

Take of

Carbolic Acid, in crystals . .	1 part.
Olive Oil	from 4 to 19 pts.

Heat the carbolic acid till liquefied, and add it to he olive oil. It is used of various strengths for different purposes. The surgical instruments, previous to use, are generally wiped with a piece of lint dipped in carbolized oil.

Carbolized Collodion.

Take of
Carbolic Acid, in crystals,
Collodion, of each equal parts.

Liquefy the crystals by a gentle heat, add the collodion and agitate till a jelly is formed. This is a useful application to an aching carious tooth.

Injection of Chloride of Zinc for Sinuses.

Take of

Chloride of Zinc	40 grains.
Distilled Water	1 fluid ounce.

Dissolve.

Mr. Campbell de Morgan, of Middlesex Hospital, introduced the above, which has the peculiarity of producing a persistent antiseptic action upon a cut surface, the effect of a single application prevents the occurrence of putrefaction for days together, in spite of the immediate vicinity of active septic agency. This is most strikingly exemplified by its effects on wounds resulting from the removal of tumours of the jaw. It is used by Professor Lister to inject the sinuses which may be left in the unhealthy parts after an operation; the carbolic dressings are applied externally in conjunction with it.

Oakum.—It was this substance employed at a surgical dressing during the American War which suggested to Professor Lister the more refined application, 'antiseptic gauze.' The commercial oakum—that prepared from old tarred ropes—has been found generally not sufficiently antiseptic in its action. The article known as *marine lint*—tow impregnated with wood-tar—is more efficacious, but not so agreeable or manageable a dressing as the 'antiseptic gauze,' although it is often useful as a padding in conjunction with the latter. These preparations containing wood-tar will of course owe their antiseptic properties principally to the creasote this contains.

Among the other antiseptic remedies the *sulphocarbolates of soda, potash, lime, ammonia* and *zinc* have been noticed in the columns of this Journal. Of others, again, such as *boracic acid, oil of juniper* and *thymic acid*, the applications have not yet come into such general use as to merit notice.

THE MICROSCOPE IN PHARMACY.

BY HENRY POCKLINGTON.

(*Continued from page 2.*)

Gentianæ Radix.—On a cursory glance the root of Gentian is seen to consist of two portions separated from each other by a tolerably well-marked brownish-yellow ring. The tissues within this ring consist of parenchyma cells and vascular tissues; without it, of parenchyma cells, a few ligneous cells, and the usual cells of the cortical layers. The cells of the centre vary considerably in size and shape. Those forming in some specimens the false medulla are very large, sinuous in transverse section, and thin-walled. Those cells more intimately intermingled with the vascular tissues have thicker walls, but wholly free from secondary deposits, and are much more globular in shape. The distribution of the vessels is in irregular wedges, whose bases form the yellowish brown ring already spoken of, but isolated vessels occur in what would otherwise be entitled to be called the medulla. The vessels are rarely accompanied by the ligneous cells commonly found as components of vascular tissues. The vessels themselves are very interesting, but it is somewhat difficult to give them a distinctive name. They may perhaps be regarded as transitional between the ordinarily well-marked pitted vessel and the "spiral," as there are in many of them as it were attempts on the part of the sclerogenous deposit to break away and form the true spiral, which, however, I have not found to occur in any of the very numerous sections I have examined. The "pitting" or reticulations in many of the vessels is complicated by sudden breaks and the commencement of an entirely different pattern for some distance, when the former is recurred to or a third entirely new pattern commenced, but there is little or no interlacing of reticulations as in *Pareira* and very markedly in the non-Pharmaceutical *Sanseviera*. The original membrane between the thickening layers or bars of the larger cells is very thin and easily broken, and unless great care is exercised in making sections, will cause the observer to conclude that true spirals are not only present, but very abundant, but it does not appear ever to be wholly absorbed so as to form perforate vessels. The elongated parenchyma cells (sometimes woody fibre) which accompany the not common laticiferous vessels, forming with the vessels the vascular system of this root, are commonly stained brownish yellow, the colouring matter being easily removed by boiling water. The cell contents are starch granules of slightly variable shape and size, generally round, with a very indistinct hilum, and small. They are not sufficiently characteristic to require description. The cortical layers consist, beginning at the innermost layers, of multiangular parenchymatous cells with thick walls, and not very intimately attached to each other, with frequent very small intercellular spaces. Nearer the bark these cells are smaller, have thinner walls, and become more sinuous until the immediately sub-cuticular layers are reached, where their shape approximates to the normal cubical type, which, however, only occurs in the layer below the highly coloured cells of the sub-cuticle. The outermost cells are difficult to make out; and do not differ in any way from the usual type.

The root of Gentian is a good subject for the moderately advanced microscopist to try his hand upon, as it is somewhat complicated, without presenting special difficulties.

THE GENUS EUCALYPTUS: ITS ACCLIMATIZATION AND USES.

(*Concluded from p.* 24.)

When M. Ramel first called attention to the immense value of the *Eucalyptus* as a forest-tree, he claimed for it as one of its most valuable properties, an anti-miasmatic action in marshy districts. This theory, received at first with some doubt, was tested by planting the tree in three Algerian stations that had become notorious for their unhealthiness. The result has been that among the workmen who, four or five years since, were sorely tried by fevers, not a single case now occurs. The trees have absorbed the excess of humidity in the soil, and caused the total disappearance of the morass.

Its success as a therapeutic agent is also now well established, and has been recently referred to in this Journal.* So popular has an infusion of its leaves become as a febrifuge, especially in cases where quinine has not been successful, that M. Alunnada says that his trees were completely stripped of leaves, and he was still unable to supply many people that came to him for the remedy.

Employed as an antiseptic, the essential oil will be very useful in putrid fevers, fœtid suppurations, etc. Dr. Gimbert states that, mixed with albumen or fresh fibrin, it prevents decomposition; injected into the veins of an animal, it prevents or retards putrefaction for a long time. Clots of blood of injected rabbits and rats have been kept three months without alteration; the tissues were dried, mummified, and exhaled the eucalyptic odour. Some drops evaporated in an apartment corrected bad odours that had been persistent for several days, and it has been successfully employed for embalming.

In an alkalimetric investigation made by Baron von Mueller he found that the ashes of the Eucalyptus wood contained a larger proportion of potash than the elm or the maple, which are the trees most esteemed for that purpose in America. The yield from the latter trees is estimated at 10 per cent. of the ashes, while that from the Eucalyptus is as much as 21 per cent.

The products obtained by the destructive distillation of Eucalyptus wood are similar to those obtained from other woods,—pyroligneous acid, tar, methylic alcohol, carbonaceous residues, etc. Besides the various solid and liquid substances, certain gaseous products are collected, which are more or less abundant according to the relative constituent elements of the wood. The leaves and young branches are particularly rich in hydrocarbons, and are sometimes employed in the preparation of gas for lighting purposes.

The barks of various species, as has been already mentioned, furnish ample materials for the papermakers. They are also used in Australia, and in Spain and Portugal, on a large scale for tanning. Nearly all are possessed of energetically astringent properties, due to their richness in tannin, and probably many other principles yet undefined. M. Hoffmann, of the laboratory attached to the Melbourne Botanic Gardens, while engaged in estimating the tannic acid contained in various Eucalyptic barks, has sought to determine the value of the numerous astringent principles accompanying the gum resins produced by these trees. The following figures give the proportion of tannic and gallic acids in four species:—

	Tannic Acid.	Gallic Acid.
E. Stuartiana . . .	4·6	0·7
E. longifolia	8·3	2·8
E. corymbosa	2·7	0·8
E. odorata	20·4	0·8
E. dealbata	4·9	0·4

It has been found, however, that there is a great difference in barks of trees grown in different places, for while M. Cloez found the bark of a tree grown in the Jardin des Plantes, Paris, gave scarcely any indication of tannic acid with persalts of iron and solution of gelatine, in Egypt, M. Maillard de Marafy has found it so abundantly that he is of opinion it will surpass the accessory products in importance. Leaves of *E. globulus*, taken from a plantation near Alexandria and pulverized like sumac, when used upon cotton and wool in the same proportion as the best Sicilian sumac, gave an intense black that left nothing to be desired.

According to Dr. Sicard, the leaves and young branches yield by distillation (1) a distilled water, opaline in colour, bitter in taste, and having the odour of the bruised leaves, but more pungent; (2) an essential oil with a fragrant odour resembling that of lavender, but more penetrating, and a special perfume; (3) a yellow gum, having an agreeable aromatic taste, sweet at first, but bitter and styptic after a short time.

* Volume II. (1871-72) p. 703.

M. Cloez has investigated the essential oil, and a summary of his results has already been given.* The subject has also been studied by Messrs. Johnson and Bossito at the request of Baron von Mueller. In France, these essences have scarcely yet gone beyond the laboratory, but in England they have been used in various ways, principally in perfumery. Each species seems to yield its peculiar essence, but they only present slight differences; they are, therefore, classed in groups based upon similarity of odour, and some other characters they possess in common. With rare exceptions they are of a yellowish colour, due to an oleo-resin, a product of oxidation, which they hold in solution; the paler essences—poorer in oleo-resin—have the characteristic odour in the highest degree. All are obtained by aqueous distillation of the leaves and young branches. The following are the best known:—

Essence of E. Amygdalina.—*E. amygdalina* is one of the species yielding the most essence, about 3 litres from 100 lb. of leaves or young branches. The utricles containing the oil may be seen by holding the leaf between the eye and the light. The essence is a clear, transparent, pale yellow liquid, of piquant odour, resembling essence of citron, and fresh sweet taste, and after-taste like camphor. It boils at 330° F. It does not evaporate so quickly as turpentine. Iodine forms with it a brown solution which, when warmed, gives off vapours that are yellow, red, violet, green and blue by turns. It is soluble in all proportions in turpentine, volatile and fixed oils, benzine, naphtha, ether, chloroform, absolute alcohol and rectified spirit. With agitation, water will dissolve 1·1 per cent. of its own weight. This essence does not take fire readily in contact with a flame unless warmed, but burns brilliantly and with much smoke. Like all the other essences it possesses great solvent powers.

Essence of E. oleosa differs but little from the preceding in its physical and chemical properties; it is very limpid, pale yellow in colour, and sweeter in taste than others of its class. Its odour is similar to that of mint. Boiling-point 170° C., rising gradually to 177° C., and then remaining stationary. It burns with a smokeless, scentless flame. The yield is about 20 oz. from 100 lb. of leaves or young branches. It is a good solvent of resins.

Essence of E. sideroxylon resembles in taste and odour the preceding. It is very limpid, and of a clear straw colour. It takes fire with difficulty in an open vessel, but burns in a lamp with a very luminous flame. Yield about 16 oz. from 100 lb. of leaves.

Essence of E. goniocalyx.—Pale yellow, with a strong, pungent, rather disagreeable odour, and strong repulsive taste. It burns with a brilliant white flame without either smoke or smell. Yield about 16 oz. from 100 lb. of leaves.

Essence of E. globulus.—Very limpid, and nearly colourless, when prepared from young leaves; the utricles containing the essence being in them larger, but less numerous than in the developed leaf, and the yield less in quantity.

Essence of E. corymbosa.—Colourless, with an odour sweetish when compared to the others, and recalling the essence of *E. amygdalina*, combined with a trace of oil of roses, but with neither its pungency nor freshness. The taste is slightly bitter, leaving an after flavour of mint irritating to the throat.

Essence of E. fabrorum.—Limpid, transparent, reddish-brown, with a sweetish odour, not quite so disagreeable as *E. goniocalyx*. 100 lb. of fresh leaves yield about 8 oz. of essential oil.

Essence of E. fissilis.—Resembling the preceding; and the yield being the same. Odour less strong and comparatively agreeable. Good solvent for resins.

Essence of E. odorata.—Yield variable but inconsiderable; colour pale greenish-yellow; odour resembling camphor.

Essence of E. Woollsii.—Odour of camphor; taste sweet and aromatic; yield 3 oz. from 100 lb. of leaves.

Essence of E. rostrata.—Not very abundant, 100 lb. of leaves yielding scarcely 1 oz. It varies in colour from pale yellow to a reddish amber tint. Odour and taste similar to that of *E. odorata.*

Essence of E. viminalis.—Colour yellowish green; odour disagreeable; taste similar to that of *E. odorata.* Yield inconsiderable.

These essences are employed in the manufacture of varnish. Some resins do not dissolve in them at ordinary temperatures; but all or nearly all, dissolve upon the application of heat. Gutta percha, which resists for a long time their solvent action in the cold, dissolves when the temperature is raised, but a portion is deposited upon the cooling of the liquid.

The Eucalyptus yields as many gum resins as there are species, but they are all very similar in their physical characters. They are found in trees of all ages, in cavities running in the direction of the grain of the wood. They might be obtained in a liquid state by means of incisions, but this method has not hitherto been practised. When solid they form little angular masses, occasionally striated and enclosing pieces of the wood; the colour is usually a deep red-brown, sometimes veined with yellow or olive green and dull in appearance; sometimes of a beautiful uniform red shade, transparent and brilliant. Dried in a water bath they lose 20 per cent. of their weight; present a vitreous fracture and are easily powdered. They have a styptic taste, without bitterness, colour the saliva red, and adhere to the teeth. All are not equally soluble in water; the gum of *E. fabrorum* being completely soluble, even in the cold, while that of *E. corymbosa* is insoluble without the addition of a few drops of ammonia. In aqueous solution all the gums give an acid reaction with litmus paper, but with other reagents they offer points of difference. The precipitate obtained with solution of gelatine does not appear to correspond in quantity with the strong astringent taste; sometimes no precipitate is formed at all. With acetate of lead an abundant gelatinous precipitate is formed; salts of iron give rise to various shades of green or black. The mineral acids cause a thick flocculent deposit. Some of these gums, especially that from *E. resinifera*, are imported into this country under the name of "Botany Bay Kino."*

Finally, there are two varieties of a peculiar substance commonly called "Eucalyptus manna." One occurs in small, rounded, irregular opaque white masses, having an agreeable sweet taste. It is exuded abundantly in summer through punc-

* Volume I. (1870-71) p. 78.

* See Pharm. Journ. Third Series, Vol. II. p. 102.

tures or wounds made in the leaves and young branches of *E. viminalis*. It consists principally of grape sugar containing about 6 per cent. of mannite. The other variety is the secretion of a hemipterous insect, and is found at certain seasons in abundance upon the leaves of *E. dumosa*. It is in little white or yellowish cones, covered with woolly filaments, in which are deposited the larvæ of the insect.

THE CHEMISTRY OF THE HYDROCARBONS.*

BY C. SCHORLEMMER, F.R.S.

(*Continued from page* 27.)

Olefines.—By abstracting two atoms of hydrogen from the paraffins we obtain the second group of hydrocarbons, called by Guthrie the olefines.

These olefines exhibit in their physical properties, as specific gravity, boiling-points, etc., great resemblance to the corresponding members of the paraffin series. They are, however, easily distinguished from the latter by the fact that they combine with great energy with the elements of the chlorine group, for which reason they have also been called non-saturated hydrocarbons.

To account for their constitution there exist three hypotheses:—

1. They contain carbon atoms with free combining units.
2. One of the carbon atoms is no longer a tetrad, but a dyad.
3. One carbon atom is linked with two combining units to two combining units of another.

The first hypothesis found many adherents some years ago. Amongst these, Lothar Meyer has very clearly stated the reasons why the hypothesis that the so-called non-saturated compounds contained free combining units was much more probable than the view adopted by Kekulé, that a double linking of carbon atoms occurred in them. He says ('Ann. Chem. Pharm.,' cxxxix. 285) "that in the first place this hypothesis offers no philosophical difficulty; that it cannot be astonishing that under certain conditions one or more affinities remain unsaturated; on the contrary, it would be wonderful if such non-saturated affinities did not exist."

"For certain compounds this theory is even unavoidable, as for nitric oxide, carbonic oxide, the vapour of mercury, cadmium," etc.

Now, according to this theory, the most simple olefine known, ethylene, C_2H_4, ought to exist in two isomeric forms, viz.:—

$$\begin{array}{ccc} CH_3 & \qquad & C\ \ _2\text{—} \\ | & & | \\ CH\text{=} & & CH_2\text{—} \end{array}$$

However, experiments made by Meyer and by Tollens for the purpose of obtaining an isomeride of ethylene failed. But although the two isomeric modifications of ethylene have not been obtained, yet it was stated that two different chlorine-substitution products of ethylene exist, viz., *monochlorethylene* or *vinyl chloride*, obtained by Regnault, and *chloracetene*, which Harnitz-Harnitzky prepared by the action of phosgene upon aldehyde. As both compounds had been repeatedly investigated by other chemists, their existence could hardly be doubted, and could only be explained either by assuming free affinities or by the theory of dyad carbon. The existence of a compound isomeric with chlorethylene is certainly of the highest importance to the theory, because, as Kekulé has pointed out, if the existence of dyad carbon is proved in such a simple case, the same assumption is at least admissible in more complicated cases. Kekulé, in conjunction with Zincke, therefore repeated Harnitzky's experiments ('Ann. Chem. Pharm.' clxii. 125). They said that from their theoretical standpoint, the existence of chloracetene not only appeared improbable, but that the properties ascribed to this body, as well as the reaction by which it was formed, were so remarkable that it appeared necessary to make the personal acquaintance of chloracetene. Although it appeared improbable that this body was really isomeric with Regnault's vinyl chloride, yet it might be a polymeride, which by dissociation yields a lighter vapour. It was also possible that vinyl chloride had not been obtained in a pure state, and was identical with chloracetene, and there was also the probability that all the statements about this latter compound were erroneous. The result of this investigation was that the last view was the correct one. They found that the most remarkable property of this remarkable compound was its non-existence.

According to the theory of dyad carbon, only one ethylene can exist having the constitution CH_3—CH. But that the known ethylene has not this constitution is proved by the fact that its chlorhydrin yields by oxidation monochloracetic acid ('Zeitschr. f. Chem.' [2], vii. 263).

Another proof against the existence of free combining units, or of dyad carbon, is found in the fact that only one propylene is known, of which hydrocarbon four modifications ought to exist, according to the theory of free combining units, viz.:—

$$\begin{array}{ccccccc} CH_2\text{—} & \quad & CH_2\text{—} & \quad & CH\text{=} & \quad & CH_3 \\ | & & | & & | & & | \\ CH_2\text{—} & & CH\text{—} & & CH_2\text{—} & & C\text{=} \\ | & & | & & | & & | \\ CH_2\text{—} & & CH_3 & & CH_3 & & CH_3 \end{array}$$

or only the latter two in the case of the dyad carbon theory.

Friedel and Ladenburg, as well as Butlerow, failed to obtain an isomeride of common propylene. The two former chemists tried to obtain the last of the four forms by acting with sodium upon the so-called methylchloracetol, $CH_3-CCl_2-CH_3$, but obtained, instead of it, only the well-known propylene, which was formed by a molecular change taking place.

From these and other examples, we must conclude that the olefines contain neither dyad carbon nor free combining units, and that they are really saturated compounds, containing two carbon atoms linked together by two combining units of each.

Butlerow has some time ago added a fresh proof of the correctness of this hypothesis; of this I shall have to speak when I come to the next group.

The number of isomeric olefines capable of existing is larger than that of the corresponding paraffins, as the double linking of the carbon atoms can take place in different parts of the hydrocarbon. Thus there exist only two butanes, but three butylenes, viz.:—

$$CH_3\text{—}CH_2\text{—}CH\text{=}CH_2$$
$$CH_3\text{—}CH\text{=}CH\text{—}CH_3.$$
$$\left.\begin{array}{l} H_3C \\ H_3C \end{array}\right> \text{=}CCH_2.$$

The number of isomerides known is, however, not large at present; nearly all those which have been better investigated contain the two carbon atoms, which are linked together by two combining units situated at the end of the chain. These may therefore be considered as being derived from ethylene by the substitution of a monad alcohol-radical for one atom of hydrogen, thus:—

$$\begin{array}{ccccccc} CH_2 & \quad & CH.CH_3 & \quad & CH.C_2H_5 & \quad & CH\left\{\begin{array}{l} CH_3 \\ CH_3 \end{array}\right. \\ \| & & \| & & \| & & \| \\ CH_2 & & CH_2 & & CH_2 & & CH_2. \end{array}$$

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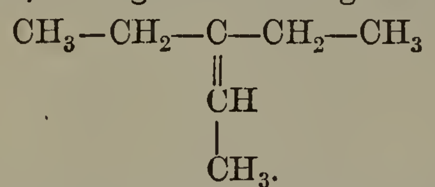
* A lecture delivered before the Chemical Society, April 4th, 1872. Reprinted from the 'Journal of the Chemical Society' for June, 1872.

The constitution of these olefines has been fully proved by experiment. On combining them with hydriodic acid, secondary iodides are formed, which, when converted into alcohols, yield acetones, containing the group methyl, as an oxidation they yield acetic acid, besides another fatty acid. Now Popoff has established the law that when an acetone is oxidized, the more simple alcohol-radical always remains combined with the group carbonyl, whilst the other is oxidized by itself, yielding a fatty acid containing the same number of carbon atoms as the alcohol-radical itself (*Ann. Chem. Pharm.*, cxlv. 283, and clxi. 285). Thus when hexylene, obtained from mannite, is subjected to the above reactions, we obtain acetic acid and butyric acid:—

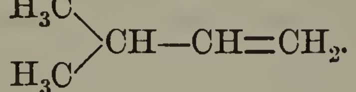
Hexylene, or butyl-ethene.	Secondary hexyl-iodide.	Secondary hexyl-alcohol.	Methyl-butyl-ketone.	Butyric acid.
C_4H_9	C_4H_9	C_4H_9	C_4H_9	$C_4H_{10}O_2$
				Acetic Acid.
CH	CHI	$CH.OH$	CO	$CO.OH$
CH_2	CH_3	CH_3	CH_3	CH_3.

Besides these olefines, Butlerow has lately described some in which carbon atoms situated in the middle of the chain are linked together by two units. The constitution of these bodies, which were obtained from tertiary compounds, is easily understood, as the constitution of the alcohols from which they have been derived is well known. Thus, on acting with alcoholic potash on the iodide of triethyl-carbinol, $CI(C_2H_5)_3$, a pseudoheptylene is obtained, having the following constitution:—

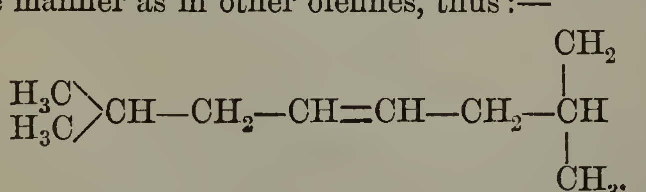


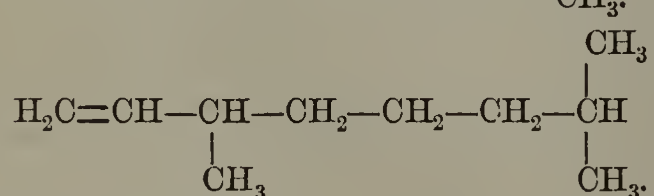
Besides the olefines which are derived from compounds having the general formula $C_nH_{2n+1}R$ (R representing a monad radical), by the abstraction of HR, there exists another group, formed by the polymerization of the members of the first group. Of these poly-olenes, as Schneider calls them, only one, diamylene, has been more closely studied by this chemist (*Ann. Chem. Pharm.*, clvii. 185). This hydrocarbon, which is most readily formed by shaking amylene together with cold dilute sulphuric acid, yields, as the first product of oxidation, diamylene oxide, which by further oxidation splits up, with formation of carbon dioxide, acetic acid, and amethenic acid, $C_7H_{14}O_2$, a peculiar compound which is isomeric with œnanthylic acid, from which however it differs by exhibiting only very feeble acid properties.

Erlenmeyer has shown that amylene has the following constitution:—

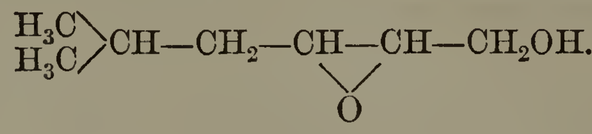


Now as diamylene combines as easily with bromine as amylene does, it would appear as most probable that in the former compound two carbon atoms are combined in the same manner as in other olefines, thus:—

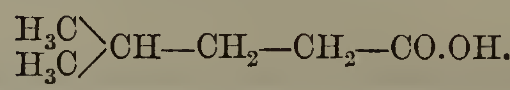
(1) 

(2) 

But if either of these two formulæ expressed its constitution, two atoms of hydrogen would have to change places during its formation from amylene. This, however, appears improbable, as diamylene is so easily formed in the cold. By assuming the first formula as correct, the constitution of amethenic acid would be—

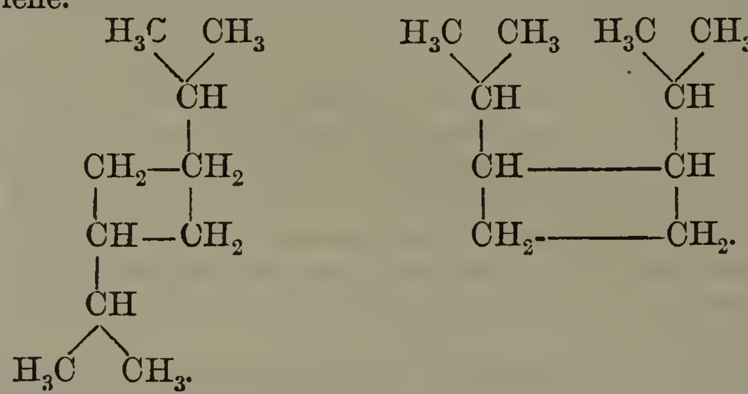


which represents an alcohol and not an acid. Accepting the second formula, we should have for amethenic acid—

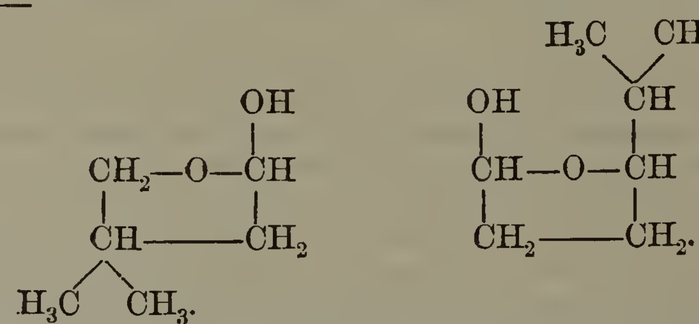


which would be a strong acid, because it contains the group carboxyl, and, moreover, no acetic acid could be formed at the same time.

It appears, therefore, most probable that one of the following formulæ represents the constitution of diamylene.



The acid would then have one of the following formulæ:—



Both explain equally well why this singular compound is so weak an acid, as both contain the group $HC{=}O$ | CH or carboxyl in which half an oxygen atom is replaced by hydrogen.

(*To be continued.*)

THE LAST NEW METAL, INDIUM.*

BY WILLIAM ODLING, ESQ., M.B., F.R.S.

The word "element" is used by chemists in a peculiar and very limited sense. In calling certain bodies elements, there is no intention on the part of chemists to assert the undecomposable nature or essence of the bodies so called. There is not even an intention on their part to assert that these bodies may not suffer decomposition in certain of the processes to which they are occasionally subjected; but only to assert that they have not hitherto been proved to suffer decomposition; or, in other words, to assert that their observed behaviour under all the different modes of treatment to which they have been exposed, is consistent with the hypothesis of their not having undergone decomposition.

The entire matter of the earth then, so far as chemists are yet acquainted with it, is composed of some sixty-three different sorts of matter that are spoken of as elementary; not because they are conceived to be in their essence primitive or elementary, but because, neither in the course of nature nor in the processes of art, have they been observed to suffer decomposition. No one of them has ever been observed to suffer the loss

* Lecture delivered at the Royal Institution, Jan. 19, 1872.

of any substance different from the substance of its entirety, so as to leave a residuary substance different from the substance of its entirety. Thus chemists are incapable of taking away from iron, for example, a something that is not iron; or of taking away from it anything whatever, so as to leave a residue that is not iron; whereas they are capable of taking away from iron-pyrites a something which is not iron-pyrites but is sulphur, so as to leave a residue which is not iron-pyrites but is metallic iron.

The notion of all other material bodies being constituted of, and decomposable into a limited number of elementary bodies, which could not themselves be proved to suffer decomposition or mutual transformation under any circumstances whatever, but could, on the contrary, be traced respectively through entire series of combinations, and be extracted at will from each member of the series, is a notion which, undergoing in course of time a gradual development, was first put forward in a definite form by Lavoisier; until whose time, some residue of the great alchemical doctrine of the essential transmutability of all things—that the substance of all things was the same, while the form above was different—still prevailed. To Lavoisier is due the enunciation of the principle,—departed from, however, in a few instances by himself,—that all bodies which cannot be proved to be compounded, are in practical effect, if not in absolute fact, elementary, and are to be dealt with accordingly.

Of the many definite substances known to chemists before the discovery of hydrogen gas, the following were afterwards recognized by Lavoisier and his colleagues as elementary. First, the seven metals known to the ancients, namely, gold, silver, mercury, copper, iron, tin, and lead, distinguished respectively by the signs of the sun, moon, and planets; and each conceived to have some mystic connection with the particular orb or planet of which it bore the sign, and not unfrequently the name. Then three metals which became known at the latter end of the fifteenth or beginning of the sixteenth century, namely, antimony, discovered by Basil Valentine in 1490; bismuth, mentioned by Agricola, 1530; and zinc, mentioned by Paracelsus, ob. 1541. An elementary character was also assigned to the non-metals carbon and sulphur, which had been known from the earliest times; to phosphorus, discovered by Brandt, of Hamburg, in 1669; and to boracic acid, now known to be a hydrated oxide of boron, first discovered by Homberg in 1702, and still occasionally spoken of as Homberg's sedative salt. The list was further swelled by four metals which, in Lavoisier's time, had been but recently discovered, namely, cobalt and arsenic, identified simultaneously in 1733 by George Brandt, of Stockholm; platinum, discovered in 1741 by Woods, assay-master at Jamaica; and nickel, discovered in 1751 by Cronstedt.

The only other bodies known before 1766, and afterwards included in the class of elements, namely, the alkalies and earths, had during the quarter of a century immediately preceding been made the subjects of especial study. The differentiation of potash from soda, both previously known by the common name of alkali, was indicated by Duhamel in 1736, and more completely established by Marggraf in 1758. The differentiation from one another of lime or calcareous earth, silex or vitrifiable earth, alumina or argillaceous earth, and magnesia or bitter earth, was accomplished by the labour of many chemists, more particularly Marggraf, Bergmann, and Scheele; prior to whose researches silex, alumina and magnesia, together with their different combinations and commixtures with each other and with lime, were held to be but impure varieties of lime. The nature of the difference between the caustic alkalies and earths and their respective carbonates, was made known by Black in 1756; while the real constitution of the alkalies and earths, as metallic oxides, though suspected by Lavoisier, was not established until the beginning of the present century, by Davy and his contemporaries and followers.

Table I.—Elements, etc., in Order of Discovery.

..	Gold	☉
..	Silver.	☽
..	Mercury	☿
..	Copper	♀
..	Iron	♂
..	Tin.	♃
..	Lead	♄
1490	Antimony	B. Valentine.
1530	Bismuth	Agricola ?
1541	Zinc	Paracelsus ?
..	Carbon	
..	Sulphur	
1669	Phosphorus	Brandt.
1702	Borax -on	Homberg.
1733	Arsenic	G. Brandt.
,,	Cobalt	
1741	Platinum.	Woods.
1751	Nickel	Cronstedt.
	Soda-ium	Duhamel.
1736	Potash	Marggraf.
to	Lime	
1758	Silex	Bergmann,
	Alumina	and
	Magnesia	Scheele.
1766	Hydrogen	Cavendish.
1771	Fluor -ine	Scheele.
1772	Nitrogen.	Rutherford.
1774	Chlorine.	Scheele.
,,	Oxygen	Priestley.
1774	Manganese	Gahn.
,,	Baryta -ium. . . .	Scheele.
1778	Molybdenum . . .	
1781	Tungsten.	Delhuart.
1782	Tellurium	Müller.
1789	Uranium	Klaproth.
,,	Zirconia -ium . . .	
1791	Titanium.	Gregor.
1793	Strontia -ium . . .	Hope.
1794	Yttria -ium. . . .	Gadolin.
1797	Chromium	Vauquelin.
1798	Glucina -um. . . .	
1802	Tantalum	Hatchett.
1803	Cerium	Klaproth.
,,	Palladium	Wollaston.
,,	Rhodium	
,,	Iridium	Descotils and Smithson Tenant.
,,	Osmium	
1811	Iodine	Courtois.
1817	Lithium	Arfwedson.
,,	Selenium.	Berzelius.
1818	Cadmium	Stromeyer.
1826	Bromine	Balard.
1828	Thorinum	Berzelius.
1830	Vanadium	Sefstrom.
1839	Lanthanum	Mosander.
1841	Didymium	
1843	Erbium	
1844	Ruthenium	Claus.
1846	Niobium	H. Rose.
1859	Cæsium	Bunsen.
,,	Rubidium.	
1861	Thallium	Crookes.
1863	Indium.	Reich and Richter.

The successive recognition of the elementary gases, quickly following Black's remarkable discovery of earbonic acid gas, began with the identification of hydrogen by Cavendish in 1766. This was succeeded by the discovery of nitrogen by Rutherford in 1772; of chlorine and fluoric acid, the latter now held to be a fluoride of hydrogen, by Scheele in 1774; and of oxygen by Priestly in the same year.

Thus prior to the discovery of the first of the elementary gases, twenty-three kinds of solid matter, and one liquid body, mercury, were known, which afterwards became recognized as elements. Between then and the present time, thirty-three kinds of solid matter, and one liquid body, bromine, have been added to the list—the discovery of the earliest of them occurring almost simultaneously with, or even just preceding, that of the last discovered of the elementary gases.

Among the number of bodies discovered prior to 1803, when Davy effected the decomposition of the alkalies, several, at first thought to be elementary, are now known to be compounds of oxygen with other bodies still regarded as elements; and conversely, two bodies, namely, chlorine and fluorine, at one time thought to be oxides, have since become regarded as elementary; but in none of these cases did the discovery of what is now considered to be the real constitution of the bodies add or subtract an element to or from the list.

From the period of the modern or Lavoiserian conception of elements and compounds down to the beginning of the nineteenth century, the recognition of new elements occurred with much frequency, at short but varied intervals. After then, the discoveries became somewhat less frequent; but even within the last fifty years, no fewer than twelve new elements have been added to the list, being at the rate of one new element every four years. Throughout, the periods of discovery have been somewhat irregular in their occurrence. Thus in the years 1802 and 1803, six new elements were discovered, namely tantalum, cerium, palladium, rhodium, iridium and osmium; within the succeeding fourteen years only one new element, but that a very important one, namely, iodine; and in the fifteenth and sixteenth years, three new elements, namely, lithium, selenium and cadmium. The longest barren interval, one of thirteen years duration, took place between the discovery of niobium, by Rose, in 1846, and that of cæsium and rubidium, by Bunsen, in 1859. The last discovered of the elements, namely indium, being fully seven years old, and there being no reason to consider our present list as anything like complete, or to apprehend any cessation of additions thereto, it is now quite time for some other new element to be made known. For we may reasonably anticipate the discovery of new elements to take place at irregular intervals possibly for centuries to come, and our list of the elements to be increased at least as much in the future as in the past.

The fresh discovery, however, of any abundant elementary constitutent of the earth's crust would seem scarcely now to be expected, seeing that of the thirty-two elements which have become known since the year 1774,—the year of the discovery of chlorine and oxygen and manganese and baryta,—the great majority belong to the class of chemical curiosities; while even the four or five most abundant of the since discovered elements are found to enjoy but a sparing although wide distribution in nature, as is the case, for example, with bromine and iodine; or else to be concentrated but in a few specially localized minerals, as is the case, for example with strontium and chromium and tungsten. Of course it is difficult to appraise the relative abundance in nature of different elements; more especially from the circumstance of those which are put to commercial uses being everywhere sought for, and those not put to commercial uses being habitually neglected,—save indeed by the man of science, to whom the peculiar properties of some of the less familiarly known elements, as palladium, osmium, erbium, didymium, uranium and thallium, render them objects of the highest interest.

A very notable point with regard to the last-discovered four elements, namely, rubidium, cæsium, thallium and indium, is their successive discovery within a few years of each other, by one and the same process, namely, that of spectrum analysis. This process, invented and made available as a means of chemical research by Bunsen and Kirchoff in 1856, consists simply in allowing the light given off by different ignited gases and vapours, limited by means of a fine slit, to pass through a prism or succession of prisms; and in observing the so-produced, brightly-coloured, widely extended image of th- slit. It has been known from the days of Newton, thae by the passage of heterogeneous light through a prismatic highly dispersive medium, its differently refrangible constituents become widely separated from each other, so as to furnish an elongated coloured spectrum. But whereas the spectra of incandescent solid and liquid bodies are continuous, and not distinctive of the particular luminous bodies yielding them, the spectra of incandescent gaseous or vaporized bodies are found to be discontinuous, and to consist of one or more bright lines of different colour, thickness and position, according to the nature of the particular incandescent gases or vapours from which the light through the slit is proceeding. In this way it is found that the spectra of the different chemical elements, alike when free and in combination, are perfectly definite, and characteristic of the particular elements vaporized and made incandescent.* And in many cases, the spectra or portions of the spectra of particular elements, even when present in the most minute proportion, are so extremely well marked and distinctive, that the presence or absence of these elements is determinable with the greatest ease and certainty, by a mere inspection of the emission spectra yielded by the incandescent gases or vapours under examination. Moreover, gases and vapours are further capable of affecting heterogeneous light which is passed through them; and of thus yielding absorption spectra, in which the characteristic lines of the above-described emission spectra are reversed, so as to appear, unaltered in position, as black lines or intervals in an otherwise continuous band of colour.

(*To be continued.*)

A SIMPLE QUICKSILVER LUTE.

BY H. KARSTEN†

In cases where tubes cannot be connected by india-rubber, corks, etc., the author makes a gas-tight junction by making the two tubes to be joined vertical, the lower one capable of sliding within the other; when in this position the open end of the upper or outer tube is surrounded by mercury retained by a cup, through the bottom of which the smaller tube passes. The whole apparatus is most easily constructed, and can readily be taken to pieces and put together again.—*Journal of the Chemical Society.*

THE ACTION OF BONE CHARCOAL IN SUGAR MAKING.

BY C. WERNEKINCK.‡

The author, starting from previously known facts, frames an hypothesis to account for the action of animal charcoal in decolorizing vegetable solutions and in absorbing lime from a solution of sugar-lime. He connects the undoubted fact that such charcoal absorbs and condenses large quantities of the atmospheric gases with the powers named, by assuming that the decolorizing power is due to the oxidizing power of condensed oxygen, and the lime absorbing action to the carbonic acid contained in the pores. He does not quote any experiments in support of his view.

The abstractor states that animal charcoal deprived of its gases by heating to redness in a Sprengel vacuum is capable of decolorizing a solution deprived of dissolved air (and retained *in vacuo*) as perfectly as the ordinary material.—*Journal of the Chemical Society.*

* For some qualifications of this statement, *vide* Roscoe's 'Spectrum Analysis.'

† Deut. Chem. Ges. Ber., v. 282.

‡ Dingl. Polyt. J., cciii. 63–66.

The Pharmaceutical Journal.

SATURDAY JULY 20, 1872.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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PHARMACEUTICAL EDUCATION.

THE acceptance by the Council of the principles of Mr. SCHACHT's scheme for promoting pharmaceutical education, and the wish that has been expressed for free criticism and discussion of the whole subject in order that it may now be settled upon a durable basis, will no doubt increase the growing interest which has been taken in the question for some time past. As we have before suggested, the columns of this Journal afford a convenient medium for interchange of opinions.

In order, however, to make the discussion as profitable as possible, it will be necessary that those who take part in it should have a clear conception of the object entertained by the founders of the Pharmaceutical Society. If this were more perfectly understood, not only by the trade generally, but even by members of the Society, there would be no occasion to comment upon the sentence in Mr. ATKINSON PICKERING's letter last week to the effect that the Council, as far as this subject was concerned, had been an organized hypocrisy to the country members of the trade, and it is probable that sentence would not have been written.

This statement was put forward by a leading actor in the education movement as expressing an opinion very generally entertained, but without any disparagement to its author, we have no hesitation in declaring that it has no foundation in fact, nor indeed any excuse, save the writer's enthusiastic appreciation of the need there is for better means of educating the rising members of the trade.

We can appeal to no higher authority upon this point than the printed words of the prime originator and founder of the Society, Mr. JACOB BELL. In a paper entitled "The Constitution of the Pharmaceutical Society of Great Britain," read by him at the Introductory Evening Meeting of the Pharmaceutical Society, May 11th, 1841,* he said :—"The ultimate objects contemplated in this Society are the "union of the Chemists and Druggists of Great "Britain into one ostensible, recognized and independent body; the protection of their general "interests, and the advancement of the art of Pharmacy. They consider that their own interest, as "well as the safety and welfare of the public, demand "that no person shall become an apprentice in their "business who has not had the advantage of an "adequate fundamental education; and that no person shall dispense medicines who has not undergone an examination as a test of his competence "to perform that important office. But in order to "afford ample means of acquiring the requisite qualifications, and in order to ensure the greatest possible uniformity in the system of education, the "chemists and druggists consider it expedient to "establish a School of Pharmacy as a prominent "feature of their Society."

* Pharm. Journ., 1st ser. Vol. I. p. 7

Here there is a definite purpose kept in view; the raising of the body of chemists and druggists from the uninfluential and unsatisfactory position which it then occupied. A better and more available means of education was seen to be the principal requisite, and for this purpose, and for fixing a standard sufficiently high, a school of pharmacy was established. At no time was a promise held out that this education should be provided for those who were not prepared to pay for it, or that by facilitating the entrance into the trade of the largest possible number of persons, the Society should become a machine for increasing competition amongst those in business, or for providing an unfailing supply of "assistants" on the lowest possible terms; and without fear of being tedious, we may supplement this prospective sketch with some reference to the subsequent proceedings of the Society in regard to education.

In the Report presented by the Council to the first Annual Meeting of the Pharmaceutical Society, the following sentences occurred:—

"It should be considered that the Society is established for the *general* good of the trade, and that "the solid advantages which are ultimately to emanate from it will benefit the members in the "country as well as those in the metropolis. . . . "It is only by the joint assistance of the whole body "that an establishment for conducting the business "of the Society can be maintained—that its library "and museum can be established and kept up—and "that the foundation can be laid for an economical "and systematic education of the rising generation. "This latter advantage is principally for the "younger branches of the Society, who will have "to incur an *additional expense*, in proportion to the "extent to which they avail themselves of it; but "the plans of the Society are intended to diffuse "general benefit, by furnishing throughout the "country a supply of competent assistants to the "trade, and well-qualified Chemists and Druggists "to the community at large. . . . The Members "will perceive that it has been the object of the "Council to commence their educational plan upon "a scale compatible with the present means and convenience of the trade generally, which plan may be "modified and enlarged, as circumstances may ren-

"der expedient. Much of the usefulness of the 'Society depends upon the prosperity of the School "of Pharmacy, and that can only be secured by the "value of the instruction it affords, and by the en-"couragement afforded to it by the Members and "Associates.

So far the Society has succeeded in its main object: the necessity of special educational qualifications in the pharmacist has been recognized by the public. As a result of this recognition, if as much wisdom be shown by the pharmaceutical leaders of the future, as by those of the past, a few years will bring round the time when the practice of pharmacy will be a monopoly of examined men, a monopoly no less beneficial to the public than to those possessing it. Therefore, in this as in other cases, there is no reason why special technical training should be provided at too low a cost; neither has the man who seeks such training any right to assume that it shall be provided for him at less than its market value.

We do not lose sight of the desirability that pharmaceutical pupils should have within reach means for acquiring a knowledge of the scientific principles upon which the art of pharmacy is based. But we must again reiterate what was well put by Mr. Nuthall in his letter, page 19, that the essential foundation of this knowledge is to be acquired by experience in the shop, and that it should be a matter of course for all who have been three or four years in the business, and not a thing that they begin to seek for the first time after the lapse of that initiatory period. However, there can be no doubt that, even where the pupil has the advantage of a master capable and willing to instruct him, he will be benefited in supplementing such practical instruction by hearing scientific principles systematically enunciated by other persons. With this end in view, and true to its original policy, the Council of the Society has ever sought, and still seeks to know how it may assist to the attainment of the best education possible those who have already helped themselves. But this would be more effectually accomplished if, instead of four-fifths of the "country members of the trade" remaining outside the Society and resting satisfied with expressing dissatisfaction with the efforts of the Council, they came forward and helped in providing for the want which they so readily recognize. In fact, it may fairly be said that the Society, as a voluntary association, has already completed its labour in the cause of education, and that, in having succeeded in making education compulsory, it has done the work it originally projected. It is now the time for those who have been at best mere lookers-on to come forward and give their aid in making the advantages of that work accessible to all.

It may be as well to remark that the use of the phrase "payment for results" has in some quarters led to complete misapprehension of the object sought; an instance of which occurs in an opinion expressed last week by a correspondent that the grants of the Society must be made to "pharmaceutical students only." It is ridiculous to suppose that the Society will ever pay students for acquiring that which is of benefit to themselves. But the proposition is, that where a local association has organized educational machinery, and as a result produced students who are able to pass the examinations, then the Society shall make a grant to such local association in proportion to the work it has accomplished.

It would be a pity, however, if the discussion of this subject should tend to make any student dubious as to what may be accomplished without such extraneous help. We quite agree with Mr. Nuthall's opinion that "individual effort" is easily able to accomplish the "Minor," in which the candidate "is required to "show a thorough familiarity with the "various aspects of those things which he is called "upon to use daily." Those who are disposed to try the experiment, may be encouraged by knowing that the test is not an excessively stringent one, as is evident from the fact that the failures during 1871 were less than 37 per cent. of the whole number examined, a small proportion when compared with the recent matriculation examination at the London University, when only 196 candidates passed out of 512, more than 61 per cent. having failed.

THE PHARMACEUTICAL CONFERENCE.

A sentence in the circular just issued by the Secretaries of the British Pharmaceutical Conference, to which we alluded last week, must be our apology for referring to a subject which we think is worthy of the attention of the leaders of that body. It is stated that the local members of the Conference at Brighton intend inviting their brethren from a distance to a dinner on the evening of the first day's meeting. We by no means wish to cavil at the kindness intended, nor to suggest in the remotest degree that it is not offered in the heartiest manner; but we do consider that it is a matter of serious doubt whether it is politic to allow such a practice to become established, as it may sometimes prove extremely onerous to those who have to carry it out. The fact is, in accordance with the idea of the originators of the Conference, its place of meeting has hitherto been, and probably will be in the future, ruled rather by the decision of the British Association than by any special invitation; and although a hearty welcome and reception have never been lacking, we think it should be understood that all which is required or expected from the resident pharmacists is that they would kindly assist in the organization of the necessary arrangements for securing a successful meeting. We believe that a well-conducted excursion, which every member might attend or not, as he pleased, and to the expenses of which each should contribute his share, affording as it would greater freedom of intercourse and better opportunities for making acquaintances, would be far preferable to allowing the local members to be called upon to act more or less in the character of hosts.

THE COSTS OF THE BETTS SUITS.

The defence of the Betts Suits has proved to be no exception to the general rule, that even when most successful in repelling an attack in the law courts the defendant is severely punished in having to pay the difference between the real and the taxed costs. We are sorry to learn that there is still a balance of upwards of £700 due to the Solicitors for the expenses incurred in defending the above suits. The sum is a large one; and the gentlemen who so generously and promptly came forward as guarantors of the funds necessary for meeting the common danger should be at once relieved from the responsibility. As was shown by the number of suits actually commenced, no chemist and druggist, perfumer, oilman or tradesman selling capsuled bottles, was free from the risk of one, and if all those who have had their battle so well fought for them was to send at once a contribution to the Chairman of the Defence Fund, Mr. W. T. Cooper, 26, Oxford Street, W., or to the Treasurer, Mr. Lionel Newbery, 37, Newgate Street, the necessary sum would soon be raised. In reply to former appeals of the Committee, donations to a considerable amount were promised, many of which remain unpaid to the present time. It is hoped that now the final result is known, these may be forwarded without further delay to either of the above gentlemen.

On Monday last, Mr. G. H. Savage, M.D. Lond., a son of Mr. W. D. Savage, of Brighton, was elected to the office of Junior Physician to Bethlehem Hospital from a large number of candidates.

Many of our readers will hear with regret that the present is the last session in which the School of Pharmacy at Bloomsbury Square will have the services of Dr. W. A. Tilden as Demonstrator in its Laboratory, that gentleman having been recently appointed Lecturer on Chemistry in Clifton College.

Dr. Quain has given notice that at the next Comitia of the College of Physicians, he will move that the list of "recommendations" to the Committee of Reference as to the working of the Conjoint Examination Scheme shall be openly discussed. It has recently been decided that an abstract of the proceedings of each meeting of the College shall be suspended in the hall of the building, and thus an officially correct record of all the business which is transacted at the Comitia will be accessible to the Fellows and Members and to the medical press.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

July 10th, 1872.

Present—Messrs. Ainslie, Aitken, Buchanan, Kinninmont and Young.

Professor Maclagan was also present on behalf of the Privy Council.

Three candidates presented themselves for the Major Examination; of these, *one* failed. The following *two* passed and were declared duly qualified to be registered as Pharmaceutical Chemists:—

*Metcalfe, Wilson	Sheffield.
Munro, John Morrison	Bridge of Allan.

Ten candidates presented themselves for the Minor Examination; of these, *three* failed. The following *seven* passed, and were declared duly qualified to be registered as Chemists and Druggists:—

*Gordon, John	Aberdeen.
Marshall, James	Over.
Macmillan, James	Perth.
Bremner, Allan Hugh	Edinburgh.
Tocher, John	Aberdeen.
Fingland, William	Wavertree.
Davidson, James	Falkirk.

The above names are arranged in order of merit.

The following presented themselves for the Modified Examination, and passed, and were declared duly qualified to be registered as Chemists and Druggists:—

Beattie, Walter	Portobello.
Forsyth, James	Montrose.
Hutchison, John	Irvine.
McKenzie, William	Glasgow.

PRELIMINARY.

The following is the result of the Examination held on the 1st instant:—

England and Wales.

Two hundred and eighty-two candidates presented themselves for this examination; of these, *ninety-two* failed, and the following *one hundred and ninety* passed and were duly registered as Apprentices or Students.

	Whyte, Alexander	London.
	Jeffries, Benjamin	Brixton.
Equal.	Heritage, Julius Harvey	London.
Equal.	Jones, Thomas Pryce	Wrexham.
	Walker, Charles Henry	Liverpool.
Equal.	Campbell, Henry	Hammersmith.
Equal.	Davies, Samuel	Swansea.
Equal.	Bowler, William James	London.
Equal.	Ronchetti, Thomas Angelo	Stockton-on-Tees.
Equal.	Webb, William James	Melbourn.
	Starling, William Egerton	Tunbridge Wells.
Equal.	Francis, James	Liverpool.
Equal.	Row, George Commins	Braintree.
	Cox, Frederick John	Newark.
	Whewell, Herbert	Birmingham.
Equal.	Hircock, George Walter	Kettering.
Equal.	Simpkins, George Star	Minchinhampton.
Equal.	Powell, Walter Morris	Wrexham.
Equal.	Thomas, Arthur Wm. Wynne	Bala.
Equal.	Crook, Arthur Williams	Preston.
Equal.	Lodge, Arthur William	Merthyr Tydvil.

* Passed with Honours.

	Crowden, Francis	Keswick.
	Judd, Arthur Woodward	Portsmouth.
	Breese, Thomas	Norwich.
Equal.	Brunt, George Henry	Norwich.
	Gourd, William	Devonport.
	Havelock, Thomas William	Hexham.
	Toon, William	Haslar.
	Higson, John	Blackburn.
	Robertson, John	Plymouth.
Equal.	Mason, William Drury	Louth.
	Jones, Thomas	Tenby.
	Foster, Robert Kossuth	Bolton.
Equal.	Ellis, George Waddington	Great Yarmouth.
	Hall, Charles	Melton Mowbray.
	Parsons, Henry	Shaftesbury.
Equal.	Hapworth, William Stone	Preston.
	Taylor, James Bennett	Bedford.
	Livesey, James Thomas	Preston.
	Downing, Henry Francis	Leeds.
Equal.	Fisher, Sidney	Wolverhampton.
	Marris, Wm. James Graburn	London.
	Curnow, William Albert	Swansea.
	Howells, Thomas Rees	Aberdare.
	Richardson, William Henry	Boston Spa.
	Newton, Robert Smart	Sunderland.
	Squire, Frederick John C.	Plymouth.
Equal.	Cocksedge, Ernest	Royston.
	Giles, William Egbert	Merthyr Tydvil.
	Moore, Joshua	Preston.
	Smith, Joseph	Manchester.
	Stacey, Alfred	Ramsbottom
Equal.	Easton, William Coryndon	Braintree.
	Knight, Ramsey	Birmingham.
Equal.	Robinson, Stanley	Stalybridge.
	Walton, Charles Foster	Manchester.
Equal.	Dixon, Walter Henry	Aberdare.
	Jenkyn, Thomas	Penzance,
	Norfolk, John William	Beverley.
	Rudkin, Stephen James	Sileby.
	Waddington, John William	Kettering
	Woolston, Thomas Henry	Faversham.
Equal.	Davies, Philip Henry	St. Asaph.
	Parnall James B.	St. Austell.
Equal.	Miller, Edward	Oakham.
	Whitaker, John	Southport.
Equal.	Ashbourne, Charles	Birmingham.
	Billinge, Mark	Hyde.
	Dale, James Francis	Coleshill.
	Paul, Wm. Edmund	Scarborough.
	Price, James	Market Drayton.
Equal.	Chattwood, Joseph	Manchester.
	Harding, Edward	Manchester.
	North, Josiah	Reading.
Equal.	Edwards, David	London.
	Miller, Alexander Kenneth	London.
Equal.	Clark, Walter George	Leeds.
	Elkington, Walter Thomas W.	Leicester.
	Everingham, William	Beverley.
	Jones, William	Oswestry.
Equal.	Andrew, Frederick Wm.	Falmouth.
	Looker, John Evans	Altrincham.
Equal.	Coleman, Walter Wallace	London.
	Smith, Thomas James	Spalding.
	Whitton, Richard	Lincoln.
Equal.	Chadwick, Wm.	Lytham.
	Read, William	Havant.
Equal.	Mason, Samuel	Newark.
	Redding, John Howard D.	Brigg.
	Singleton, Richard	Preston.
	Wood, Henry	Malton.
Equal.	Clerke, William Burdett	Leamington.
	Higgs, Alfred	London.
Equal.	Allan, Jas. Henry	Stockton-on-Tees.
	Birkett, John Robert	Morecambe.
	McBoyle, John	London.
	Mantle, Alfred	Oxford.
Equal.	Bartlett, Hubert	London.
	Perry, Edward Charles	Wareham.
	Richards, Frederick	Carlisle.
Equal.	Ashwell, Lawrence Thomas	London.
	Davy, John Robert	Epworth.
	Llewellyn, Thomas Henry	Haverfordwest.
	Leighton, Tompsett	Strood.
Equal.	Francis, Frederick Charles	Cheltenham.
	Loveday, Joshua William	Louth.
Equal.	Collins, Robert, Enos	Boston.
	Husbands, John Edwin	Bristol.
	Games, John Henry	Skipton.
	Lea, John	Hinstock.
	Maddison, Thomas Harwood	March.
Equal.	Furness, Joseph Machin	Liverpool.
	Laverack, William Henry	Bradford, Yorks.
	McCallum	Berwick.
	Paull, John	London.
	Symons, Francis Borgia	Nottingham.
Equal.	Barber, Edward Anderson	York.
	Cooper, Frank Peacock	Nottingham.
	Hall, Peter	Sunderland.
	James, Joshua	Cardigan.
	Passmore, Charles Frederick	London.
	Steward, Henry Clarke	Ludlow.
Equal.	Atkins, Harry	Woolwich.
	Bodger, John William	Peterborough.
Equal.	Broadhead, Richard	Manchester.
	Davies, David	Cardigan.
	Firman, John William	Boston.
	Phillips, George Edward	Ashbourne.
Equal.	Anderson, James Johnstone	Epworth.
	Bennison, Richard	Stokesley.
	Downing, Frederick	Falmouth.
	Davies, Daniel Rees	London.
Equal.	Austin, Josiah jun.	Birmingham.
	Bishop, Charles Henry	Darlington.
	Blackmore, Robert	Bristol.
	Cooke, Charles Francis	Dorking.
	Martin, Anson Edwin	Birmingham.
	Radford, Charles	Nottingham.
Equal.	Balchin, Edward Samuel	Devizes.
	Symons, Netherton Hosking	Penzance.
Equal.	Bennett, Samuel Kingdom	Willesden.
	Hilton, Howard Christopher	Manchester.
	Jarvis, Clarence Frank	Birmingham.
Equal.	Morgan, Augustus Kinsey	Newport, Mon.
	Smith, Arthur Harry	Eccleshall.
Equal.	Phillpot, George Frederick	Kidderminster.
	Slater, Thomas	Stone.
	Wigginton, Alfred	London.
	Jepson, Joseph Morley	Grimsby.
Equal.	Coverdale, John Henry	Grimsby.
	Holyoake, Francis	London.
	Skinner Richard	Oxford.
	Sturton, Joseph Ashworth	Cambridge.
Equal.	Grace, John Frederick F.	London.
	Meaden, Frederic Fletcher	Smallthorne.
	Fidler, John	Liverpool.
Equal.	Berry, John Bright	Northampton.
	Hutchinson, Joseph	Rotherham.
Equal.	Bilton, John Walter	Newcastle-under-Lyne.
	Sage, Thomas Payne	Leicester.
	Weary, China Thomas	Plymouth.
	Woodall, John Leigh	Manchester.
	Robinson, Edward	Birmingham.
Equal.	Hawksley, Herbert Linney	Manchester.
	Mackaness, Charles	St. Neots.
Equal.	Preston, William	Barnoldswick.
	Richardson, George	Hexham.
	Russell, Charles Harridge	Greenwich.
	Wilkinson, Arthur	Manchester.
Equal.	Gibson, Frederick	Blackpool.
	Rees, Joseph Henry Williams	Clutton.
	Whitlock, Draycott Kelly	Southampton.
	Stevens, Henry George Lewis	Bury St. Edmund's.

Equal.
Bradford, George Henry ...... Bradford, Yorks.
Crowther, Arthur .... Tickhill.
Robinson, Joseph White ...... Wigton.
Russell, William Frederick Robert, Norwich.
Wise, James .... Wycombe.

Equal.
Harding, Arthur .... Leicester.
Sutcliffe Isaac .... Manchester.

Equal.
Bunning, Henry .... London.
Dring, John .... Canterbury.
Lissaman, Alaric Alexander .. Foleshill.
Porter, Albert .... Abingdon.

Equal.
Hendy, Albert Henry .... Bristol.
Williams, William Thomas .. Cardiff.

Hall, Ralph .... London.
Lister, Charles Edward ...... Manchester.

Equal.
Clark, Walter Henry .... Louth.
Hyde, Charles .... Fareham.

Scotland.

Forty-two candidates presented themselves for this examination; of these, *twenty-four* failed, and the following *eighteen* passed and were duly registered as above:—

White, Thomas Lee .... Edinburgh.
McNaught, Louis Arthur .... Dumfries.
Cairnie, David Dandie ...... Perth.
Robertson, William .... Peebles.
Gardner, Robert .... Dollar.
Brown, Walter .... Kirkpatrick Fleming.
Kirkpatrick, John Stuart .... Dumfries.
Billing, Charles Edward ...... Edinburgh.
Arthur, Charles .... Edinburgh.
Stewart, Hamilton .... Musselburgh.
Welch, George .... Leith.
Mudie, Isaac .... Dundee.
Keith, Alexander Reid ...... Arbroath.
Murdoch, John McGill ...... Glasgow.
Loudon, William T. .... Dunfermline.
Flint, Charles Bruce .... Glasgow.
Cross, Robert .... Glasgow.
Blaine, Thomas James Stewart. Hawick.

The following certificates have been received in lieu of this examination:—

Certificate of the College of Preceptors.

Palmer, Stephen .... Cambridge.

Certificates of the University of Cambridge.

Bateman, Frederick A.N. .... Great Yarmouth.
Fell, John James .... Lancaster.
Wilkerson, William James.... Epsom.

Certificate of the University of Edinburgh. (?)

Murray, Robert Dalzell ...... Edinburgh.

Erratum on p. 9, col. 1, line 34.—Shenstone, Wm. Edward, should have been Shenstone, William Ashwell.

The following is a list of the Towns at which the Examinations were held, with the numbers of Candidates annexed:—

England and Wales.

	Candidates.	Passed.	Failed.
Aberdare	1	1	
Abingdon	1	1	
Ashbourne	1	1	
Ashton-under Lyne	3	2	1
Aylesbury	1		1
Bedford	1	1	
Berwick	1	1	
Beverley	2	2	
Birkenhead	1		1
Birmingham ..	10	8	2
Bishop Auckland	3		3
Blackburn	4	1	3
Blackpool	1	1	
Bolton	1	1	
Boston	2	2	
Bradford	5	3	2
Bridgnorth	1		1
Brighton	1		1
Bristol	7	4	3
Bury St. Edmund's	1	1	
Cambridge	2	1	1
Canterbury	1	1	
Cardiff	1	1	
Cardigan	3	2	1
Carlisle	3	3	
Cheltenham....	1	1	
Cockermouth ..	1	1	
Colchester	3	2	1
Coventry	2	1	1
Darlington	1	1	
Derby	2		2
Devizes	1	1	
Devonport	2	1	1
Doncaster	3	3	
Flint..........	2	2	
Grimsby	2	2	
Hanley........	2	1	1
Harrogate	1		1
Hastings	1		1
Haverfordwest	1	1	
Hereford	1		1
Huntingdon ..	1	1	
Hyde	2	1	1
Ipswich	1		1
Kidderminster	1	1	
Launceston	1		1
Leamington ..	1	1	
Leeds	6	3	3
Leicester	7	6	1
Lincoln	1	1	
Liverpool......	5	3	2
London	40	28	12
Louth	6	4	2
Ludlow	1	1	
Macclesfield ..	1		1
Maidenhead ..	1		1
Manchester	17	12	5
Market Harborough	2	1	1
Merthyr Tydvil	3	3	
Neath	1		1
Newark	1		1
Newcastle-on-Tyne	1	1	
Newcastle-under Lyne	1	1	
Newport, Mon.	2	1	1
Northampton ..	2	2	
Norwich	6	3	3
Nottingham ..	5	5	
Oswestry	1	1	
Oxford	2	2	
Penzance	2	2	
Peterborough ..	4	3	1
Plymouth	5	3	2
Portsmouth ..	6	4	2
Preston	7	6	1
Reading	1	1	
Rochester	1	1	
St. Austell	1	1	
Salisbury	1	1	
Selby	1	1	
Scarborough ..	1	1	
Sheffield	3	1	2
Shrewsbury....	1	1	
Southampton ..	2	1	1
Southport	1	1	
South Shields ..	2		2
Spalding	2	1	1
Stafford	3	3	
Stamford	1		1
Stockport......	2	1	1
Stockton	4	3	1
Stoke-on-Trent	1		1
Stroud	1	1	
Sunderland	2	2	
Swansea	2	2	
Tavistock	1		1
Tenby	1	1	
Torquay	2		2
Truro	2	2	
Tunbridge Wells	1	1	
Wakefield	1		1
Wareham	1	1	
Wednesbury ..	1		1
Welchpool	2		2
Wigan	1		1
Wolverhampton	1	1	
Wrexham	3	3	
Wycombe	1	1	
Yarmouth	1	1	
York	3	1	2

Scotland.

	Candidates.	Passed.	Failed.
Aberdeen	8		8
Banff	1		1
Dumfries	3	3	
Dundee	4	2	2
Dunfermline ..	2	1	1
Edinburgh	12	7	5
Glasgow	6	3	3
Kilmarnock....	2		2
Perth	3	1	2
Stirling	1	1	

The Questions for Examination were as follows:—

Latin.

Translate into English two or more of the following sentences:—

1. Ad hæc Ariovistus respondit. Jus esse belli ut qui vicissent, iis, quos vicissent, quemadmodum vellent, imperarent: item Populum Romanum victis, non ad alterius præscriptum, sed ad suum arbitrium, imperare consuesse.
2. Hac oratione habitâ, mirum in modum conversæ sunt omnium mentes, summaque alacritas et cupiditas belli gerendi innata est; princepsque decima legio per tribunos militum ei gratias egit, quòd de se optimum judicium fecisset: seque esse ad bellum gerendum paratissimam confirmavit.
3. Tere Myrrham cum Carbonate in vase prius calefacto; tum adjectâ sulphate, iterum tere, dein omnia simul contunde ut fiat massa.

4. Misce.—Cochleare unum singulis horis exhibeatur, quâque vice phialam agitando, ut permisceatur pulvis.
5. How many degrees of comparison has the Adjective? Give two examples of regular, and two of irregular comparison.
6. In what case is *duration of time* put? Give two examples.
7. Write the genitive singular of each of the following nouns:—Electuarium, confectio, phiala, nox, mens, robur, ramus, pyxis, quercus, stamen.
8. Give the infinitive present of each of the following verbs:—Doleo, dormio, fingo, frico, misceo, rogo, scribo, capio.
9. Decline the noun Ætas.

ARITHMETIC.

10. Multiply £6. 12*s*. $4\frac{1}{4}$*d*. by 345.
11. Bring 4298 farthings to pounds.
12. If 17 bushels and 2 pounds of roses cost £3. 0*s*. 8*d*., how much will it be per pound and per bushel, reckoning 6 pounds to the bushel?
13. Add $\frac{1}{5}$, $4\frac{1}{3}$, and $\frac{4}{5}$.
14. From 270·2 take 76·4075.

ENGLISH.

15. What is a *common noun*, and under what condition does it obtain the force of a proper noun? Give two examples.
16. What is meant by collective names? Give two or more examples.
17. Write the female of the following nouns:—Abbot, tiger, cock-sparrow, bridegroom, testator, marquis, ram, earl, Francis, and monk.
18. In the Structure of Words, explain the meaning of roots and derivatives, and give examples.
19. Correct the following:—I should not differ with them, if I was him. This is the friend which I love, and that is the vice as I hate.
20. Write from fifteen to twenty-five lines upon *one only* of the following subjects:—
    A. The Pleasures of a Garden.
    B. The Study of History.
    C. The Books I have read.

Proceedings of Scientific Societies.

PHILADELPHIA COLLEGE OF PHARMACY.

At the meeting of this College on June 24th, 1872, the President, Dillwyn Parrish, in the chair, the following communication from the Philadelphia College of Physicians was read, and after discussion referred to a Committee:—

"*Preamble and Resolutions passed by the College of Physicians of Philadelphia, May* 1st, 1872.

"Whereas, cases of accidental poisoning and of the internal administration of medicines intended only for external use are so common; and, whereas, every possible safeguard should be employed to prevent such accidents, therefore,

"Resolved, by the College of Physicians of Philadelphia, that it be recommended to all druggists to place all external remedies in bottles, not only coloured so as appeal to the eye, but also rough on one side, so that, by the sense of touch, no mistake shall be possible even in the dark.

"Resolved, that all bottles containing poisons should not only be labelled 'poison,' but also with another label, indicating the most efficient and convenient antidote.

"Resolved, that a copy of these resolutions be presented to the American Medical Association, to the College of Pharmacy of Philadelphia, and to the American Pharmaceutical Association, and that their assistance be asked in bringing about so desirable a reform."

A communication was also read to the effect that the committee appointed at the last meeting of the Convention of the teaching Colleges of Pharmacy of the United States, held at St. Louis in September last, had agreed to recommend the following questions for discussion at the next meeting of the Convention, to be held in Cleveland, Ohio, in September next:—

1. Analytical Chemistry. Is it essential for a thorough pharmaceutical education? If so, should it not be embraced in the curriculum of the Colleges of Pharmacy, and how much time should at least be devoted to the lectures and to laboratory instruction?

2. Would it not be advisable that the questions at the examinations in writing for the degree of graduate in pharmacy be annually reported and, if deemed necessary, discussed by all the colleges represented in the Convention of the teaching Colleges of Pharmacy, for the purpose of establishing, as nearly as may be possible, a uniform standard for graduation?

3. Pharmaceutical degrees. In order to stimulate the acquirement of scientific attainments amongst graduates in Pharmacy, is it not advisable to establish one or more higher degrees? If so, upon what basis ought such degrees to be conferred?

The following delegates were elected to represent the College at the next session of the American Pharmaceutical Convention, to assemble in Cleveland, Ohio, on the 3rd of September next, viz.: Wm. Procter, jun. Prof. John M. Maisch, Prof. Edward Parrish, Joseph P. Remington, Edwin McC. Boring.

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

The Juries Bill.

Monday, July 15*th*.

In answer to a question as to the arrangement of business for the remainder of the session, Mr. Gladstone enumerated various bills which the Government proposed to abandon for the present session, one of them being the Bill for the Amendment of the Law relating to Juries.

The Public Health Bill.

Tuesday, July 16*th*.

On going into Committee on this Bill, Sir M. Lopes said that sanitary improvement was a national matter, and the whole expense of it ought not to fall on local funds. This, however, he limited to the common charges—Medical Officers, etc.—admitting that sewage and water were strictly local matters. The question ought not to have been mooted until the previous controversy about local taxation had been settled. On the whole, however, though he would have preferred a wider measure, on the principle that half a loaf is better than no bread, he acquiesced in the Bill going on, and refrained from proposing an amendment of which he had given notice.

Mr. Vernon Harcourt, speaking on behalf of borough authorities, declared that they would prefer to pay for their own officers and be free from central control, and called on Mr. Stansfeld to declare that he would not interfere perpetually with local control.

Lord R. Montagu regarded the Bill as an obstacle to a comprehensive measure of sanitary reform, and criticized specially the provisions relating to the local authority. The Town Councils were generally composed of men who broke the law by polluting the rivers, and Guardians had no other object but to keep down the rates. He was in favour of an intermediate central authority to control the local boards, and to act as a "buffer" between them and the State.

Colonel Barttelot having protested vigorously against the country being handed over to an army of doctors,

Mr. Stansfeld defended generally the course he had taken with regard to the Bill, and particularly his selection of the local authorities. He repudiated any desire to override the local authorities, and assured Colonel Barttelot that there was no intention of creating a great medical hierarchy, though he pointed out to him that the assistance of the medical profession was indispensable.

Mr. Disraeli remarked that the question now was, not whether the Government could have passed a more complete and comprehensive measure if they had given their minds to it at the beginning of the session, but whether this Bill would make the sanitary legislation of the country more efficient. No candid mind could doubt this, and as Mr. Stansfeld's reasonable concession had removed the financial objections to the measure, he advised the House to pass it at once as a preparatory step.

Mr. Newdegate and Mr. Read spoke against the Bill, and Mr. Henley expressed a decided opinion that the ratepayers would not thank the House for what it was about, and that the Bill would hang up and stop all sanitary improvements until next year. The House then went into Committee, but the Committee immediately adjourned until Thursday.

Alleged Poisoning by Arsenic.

At the Chelmsford Assizes, on Monday, July 15th Ellen Day Kittel was put on her trial before Baron Martin for the wilful murder of Elizabeth Kittel by poisoning her in October last.

The case for the prosecution was, that on the 5th of October last year the prisoner gave the deceased some beer in a bottle, and immediately after taking it she became very sick, and died on the Tuesday following. The prisoner was represented to have uttered threats against the deceased, and to have told several persons that she intended to be married to her husband before the following Christmas; and this was actually carried out, for in less than two months after the death of the unfortunate woman the prisoner was actually married to him, and they were living together at the time the present charge of wilful murder was preferred against her. When the death took place a coroner's inquest was held, the father of the prisoner being the foreman of the jury, and a verdict of "Natural Death" was returned. A good deal of talk, however, appeared to be going on in the neighbourhood in reference to the affair, and the marriage of the prisoner with the husband of the deceased so speedily after her death, and other circumstances, led to the matter being taken up by the authorities, and the result was that the body of the deceased was exhumed, and the contents of the stomach were sent to Mr. Stephenson, Professor of Chemistry at Guy's Hospital. It was then ascertained that a very large quantity of arsenic was present in the body, and this poison was no doubt the cause of death; and, after a long inquiry by the local magistrates, the prisoner was committed to take her trial upon the present charge. There did not appear to be any doubt that poison was the cause of the death of the deceased, and evidence was given that a relative of the prisoner's father was a vermin killer and sheep dresser, and that he was constantly in possession of arsenic for the purposes of his occupation, and the case for the prosecution was that the prisoner had visited him shortly before the death of the deceased, and that she could have easily obtained possession of poison if she had wished to do so.

The following is the evidence more particularly referring to the obtaining and detection of the poison:—

Mr. Cook, a surgeon at Manningtree, proved that he was called in to attend the deceased on Sunday, the 9th of October, and she complained of vomiting and purging. He prescribed for her. She died on the 10th October, and witness was examined at the coroner's inquest. No *post-mortem* examination was made at this time. After the body had been exhumed witness made a *post-mortem* examination in conjunction with Dr. Nunn, and he subsequently delivered the stomach, a portion of the bowel, and the spleen, liver, and kidneys to Professor Stephenson, of Guy's Hospital.

Cross-examined—Witness only saw the deceased once. She told him that she had been suffering from her liver for several years. Witness gave a certificate that she died from liver disease, and at the time he certainly concluded that this was the cause of death. He also believed that syncope, occasioned by loss of blood from an accident she had sustained in her bedroom, had accelerated her death. The deceased made no complaint of having taken beer or anything else that had disagreed with her; but she did say that she had been gathering sloes in a field and had eaten them. Sloes would very often occasion vomiting and purging. Supposing she had not taken any poison at all, in the condition of debility in which she was on Sunday, the syncope would fully account for the death. There was nothing whatever on the Sunday to indicate that the deceased had taken poison. He only knew by report that the prisoner, at the present time, was far advanced in pregnancy.

Re-examined—The symptoms he observed on the Sunday were symptoms of arsenical poisoning, but they might have been produced by other causes. If he had been aware that there were as much as five grains of arsenic found in the body of the deceased after her death, he should have certainly come to a very different opinion with regard to the cause of death, and he should not have given the certificate he did.

Mr. Frederick Norman, a farmer, residing at Somersham, in Suffolk, proved that the prisoner was distantly related to him, and she was in the habit of visiting him occasionally. She had been at his house to take charge of the place during his wife's confinement, and when she was going away she asked him to give her some poison that he had promised her mother. He had promised her mother some poison to kill vermin. He went home with the prisoner, and took some arsenic in a bottle. The arsenic was mixed with grease, and it was of a brown colour. He had got the poison from a person named Vincent. It was not mixed at that time, and witness mixed it with grease. It was not the same colour as the ingredient that was in the bottle now produced. Witness subsequently gave Fuller, a police-constable, some arsenic that he had purchased of a person named Wiggins, and he also gave him some grease.

Cross-examined — He used the poison for washing sheep. The prisoner usually came to visit him with her mother in the spring of every year, and upon one occasion the mother said they were very much troubled with mice, and she should like to have some poison. He volunteered to make her up some, and did so, but she went away without it. The prisoner told him that her mother wished particularly to have the poison for the mice, but he did not give it to her, but took it to the house of the prisoner's father. There was arsenic in the stuff he took to them. It was mixed with rough dripping or ham fat, and the jar was labelled "Poison" by himself. He took no arsenic in powder to the prisoner's house; it was all mixed with grease. It was a very nasty, offensive mixture. He should not like to have used it for cart wheels.

Mr. Vincent was then called, and he proved that he had supplied some arsenic to the last witness; but when he did so it was mixed with verdigris. The arsenic was supplied by him in the spring of 1871.

Dr. Nunn, surgeon, of Colchester, proved that when the body was exhumed he made a *post-mortem* examination, and he discovered traces of arsenical poisoning.

The effect of arsenic in the human body was to preserve the viscera in a very extraordinary manner, and this appeared to be the case in the body of the deceased.

Dr. Thomas Stephenson, of Guy's Hospital, said he examined and tested the contents of the stomach and other portions of a human body that were brought to him by Dr. Cook on the 4th of April. The effect of the analysis to which he subjected these matters was to produce a portion of white arsenic. The stomach was washed with pure water, and that water subsequently yielded nearly half a grain of arsenic. He also picked off the stomach nearly two and a half grains of almost pure arsenic. The total quantity of arsenic he discovered altogether in the stomach and the other portions of the body that were brought to him, was about five grains, which was quite sufficient to destroy life. The brilliant yellow colour, and the state of preservation of the stomach, at once excited his suspicions as to the presence of arsenic. Some particles of arsenic were imbedded on the coats of the stomach, and very extensive inflammation had been thus created; and he was of opinion, from all the appearances he observed, that some of the arsenic must have been administered within twenty-four hours of death. The conclusion arrived at by him, from all the appearances that presented themselves, was that the death was caused by white arsenic, and that some portion of the poison must have been administered within twenty-four hours of death. Where one fatal dose of arsenic was administered, death generally ensued from twelve to eighteen hours, but in this case the quantity of arsenic amounted to several fatal doses, and in his opinion it was impossible for the deceased to have lived for more than a few hours after such a quantity of arsenic had been administered. He could not discover in the body any other cause of death than the administration of arsenic. Dr. Stephenson then went on to say that the arsenic supplied by the witness Vincent to Norman was of the same description as a portion of the arsenic found in the stomach of the deceased. There was a trace of copper in the stomach, copper being an ingredient of verdigris.

Serjeant Parry called for the production of the portions of arsenic found in the body of the deceased and those supplied by Vincent to Norman, and he asked that they might be shown to the jury, and said it appeared to him that they were as dissimilar as two things possibly could be.

In further cross-examination Dr. Stephenson said that arsenic mixed with verdigris would have a very nauseous and unpleasant taste. Arsenic by itself would not. It would have rather a sweet taste.

The trial was then adjourned until the next day, but upon the reassembling of the Court it was announced that the prisoner had been delivered of a child, and the trial was, therefore, adjourned until the 24th of October and the jury was discharged.

Obituary.

HENRY ARGLES.

It is with much regret we announce the death of Mr. Argles, of Maidstone, which took place somewhat suddenly at his residence on the Ashford Road, Maidstone, on Saturday, the 6th inst., at the age of seventy-two. The deceased gentleman was held in high esteem amongst his fellow-townsmen, both for his public and private virtues. Mr. Argles was a Justice of the Peace, and had twice filled the office of mayor. He was one of the founders of the Pharmaceutical Society, having joined it in 1841, and continued his connection with it up to the time of his death.

Correspondence.

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

Provincial Education.

Sir,—One of Mr. Schacht's "principles" is, that the distribution of the Society's aid shall be "as far as possible just and universal," and I believe his scheme, as a whole, admits of as wide an application as is practicable. But, as it still falls short of being quite universal in its application, it is regarded by some as unsatisfactory and unfair.

The greatest conceivable good is undoubtedly the bringing of means of systematic pharmaceutical education within reach of every apprentice and assistant; this we all know to be impossible. The next best thing is to bring it within reach of as many as we can. Are we not justified in hoping that this result will be attained by the new scheme?

If I understand rightly, the object in view is less to reduce the cost of pharmaceutical education to the student, than to increase and improve the means of which he can avail himself, though some of your correspondents appear to think differently. The last clause of Mr. Schacht's document affords a wide field of action which I trust may not be curtailed. Beyond making grants to associations (however small those associations may be) there is but one step to granting aid to individuals; such grants would necessarily be so small as to be practically useless. It would be absurd for the Council to receive applications from apprentices for "5*s.* towards an Attfield's 'Chemistry,' or a Bentley's 'Botany.'"

I apprehend that the pecuniary value of the prizes intended to be given to students themselves will be but nominal. It certainly does not seem to me desirable to foster the idea that young men are to be paid for doing their duty, to be enticed by promises of prizes and reimbursements to gain knowledge, which is its own reward; or the whole matter might be simplified by giving £5 to every man when he passes his Minor, and £10 for his Major. We must hope for a healthier and more independent spirit.

A strong point in the proposed scheme is the encouragement it gives to the formation of Provincial Pharmaceutical Associations. There is nothing, I believe, more likely to elevate the whole trade than this combination for educational purposes. There are few towns of 10,000 or 15,000 inhabitants in which such might not exist, and though these cannot include the whole trade, they may a very large proportion. Assistants now migrate so frequently from one town to another, that there will be no great difficulty in every one bringing himself under the influence of one of these associations, the least of which may establish a small library. I am glad to see that Mr. Hills advocates a proposition I recently made in your columns, that the grants towards furnishing libraries, museums, etc., should bear some proportion to the sum actually collected locally, and with characteristic openheartedness he suggests "half or one-third." This, I believe, will be better than making the sum granted dependent on the "required expenditure" only; at all events, the amount should not only be "required," but the association's share raised before the grant is made.

I do not doubt but the country will appreciate the liberality of the new scheme, and that one of the results of its adoption will be a large addition to the membership roll of the Pharmaceutical Society. There are many who will hail this movement as a return of the Society to its first love—the educational advancement of the whole body of chemists and druggists, and will feel ashamed not to contribute something to that by which they will now be great gainers.

F. Baden Benger.

1, *Market Place, Manchester,*
July 15th, 1872.

Sir,—Though I have not hitherto taken any conspicuous part in the discussion of how to aid pharmaceutical education in the provinces, I think I may still be considered to have shown a practical interest in this subject, having delivered three courses, each consisting of twenty-four lectures, on pharmacy; and having been thus engaged six months in the year for the last three years, the subject has naturally come before me in various different phases.

I confess I have felt no inclination to join in the clamour for help which has been raised by or on behalf of those who are called (I fear too often unworthily called) the students of the present day; and I must say I feel a great contempt for those who, having passed their examinations, are jealous of there being advantages provided for others which they did not enjoy, or enjoyed only at a much greater cost.

We can only hope to come to a satisfactory conclusion when these petty considerations give way to a broad and liberal spirit, and when students evince that earnest and independent manliness which would be ashamed to complain of difficulties which are not now anything like so great as those which have been passed through by the better part of the pharmacists of the present day.

The report on provincial education which appears in the Journal for November, 1870, page 389, has certainly not been equalled for wisdom, justice, and breadth of view by anything you have published since, unless I make exception in favour of Mr. Reynolds' remarks at the meeting in Leeds, reported in the Journal for March, 1872, page 751. It appears to me that an impartial critic could scarcely examine the former with subsequent proposals and not come to the conclusion that the project as developed by Mr. Reynolds was the most statesmanlike, and was well worthy of a fair trial. It can scarcely be urged with any fairness that the Act making examinations compulsory has taken by surprise any engaged in pharmacy, seeing that it was only the consummation of the struggle carried on by our Society for nearly thirty years, and latterly very freely discussed by outsiders as well as members of the Society. But, even if this is to be granted, it is only those who have been so blind, and now find that they must pass the Minor examination, who have the faintest claim upon the Society to lighten their burden; and as they will naturally cease to exist in the course of a few years, the Society should not be expected to promote education at less than its legitimate cost for more than a brief period. To provide the student with lectures or instruction of any kind for a payment which is not remunerative to the teacher is to pauperize the student and retard the advancement which should take place in the status of the pharmacist.

Now that the qualification is fixed, the next thing should be to experience such a demand for education in pharmacy as would naturally lead to the supply being provided by those who are competent and willing to sell their services. No school can be considered satisfactory which is not self-supporting, and on this point only have provincials a ground of complaint againt the central institution,—the lectures, costing £600, are only met by fees amounting to £200.

The lecture fees at Bloomsbury Square ought to be raised till they cover the stipends paid to the lecturers. I think 1*s.* per lecture could not be regarded as too much for students to pay, and if the instruction they require cannot be purchased for that, it only remains for them to pay so much more. And, on the other hand, if the lectures are not worth as much as they cost, why continue them? That students are prepared to pay liberally for instruction which they can appreciate, is evident from the fees paid in the laboratory. I believe it only requires a trial to prove that the students would willingly pay such fees as would make the lectures self-supporting in London. And as to lectures in the provinces, I think it would require much discrimination and judgment, and a careful examination of the merits of each provincial institution, to know which were worthy of the support which it would be creditable and judicious of the parent body to give. A clear prospect of permanence and efficiency should be the first consideration, and the next should be a class of students each paying at least 1*s.* per lecture. If these fees did not provide remuneration to the lecturer to the extent of 21*s.* per lecture free of necessary expenses, I think the Society would do wisely in making up the deficiency.

In the report presented by Mr. Schacht, the third of his "principles" appears to contain some ambiguity and the root of discord. It appears to me that justice is to an exceedingly small extent involved in the question. The student class have contributed little or nothing to the surplus £2000, and cannot be said to have any claim upon it. If the Council were to pay handsomely to Durham in support of education there, that would not involve any injustice towards the students in Newcastle; they would still get all they pay for, and would be at liberty to buy their instruction in the best market. If it involved injustice at all, it would be towards those who, having contributed considerably towards the Society on the understanding that its object was "to advance chemistry and pharmacy and promote a uniform education among those practising the same," and who might consider that this object was not best carried out by establishing a school in Durham. It is not justice so much as policy which demands our consideration, and the question is simply, taking a comprehensive view of the matter, what is best to be done with the surplus income of the Society?

I also must protest against the attempt at anything like an approach to universality. I think nothing is so far removed from wisdom as thus scattering our efforts. I would rather that Newcastle should be excluded from the operations of this scheme, on the ground of its being insufficiently important, than that its school should trail out a languid and unhealthy existence, kept alive by sucking its parent's milk, when it ought to be living on the healthy food of earnest and numerous students. I think there is more fear of injustice being done to those who are wishful to establish schools upon the only permanently satisfactory basis, that of being self-supporting, than to any others connected with the question, and that injustice will arise, first, out of the competition with those who give gratuitous lectures,—a class which I am happy to think will not long come in competition with those who look for and work for remuneration,—and it will arise, secondly, out of the idea which students are likely to imbibe, from the recent tone of the discussion, that they cannot be expected to pay a fair price for their instruction.

The objectionable features of Mr. Schacht's scheme all appear to result from his endeavour to be "just and universal;" and I do not feel it necessary either to criticize it in detail or to attempt suggesting a better, so long as the scheme advocated by Mr. Reynolds two years ago, and which I consider so much superior, yet remains untried.

BARNARD S. PROCTOR.

11, *Grey Street, Newcastle,*
July 16th, 1872.

Sir,—The subject of provincial pharmaceutical education has for many years occupied the attention of our leading men. Long before the Minor and Major examinations became the legal tests of qualification for occupying the position of Chemist or Druggist and Pharmaceutist, efforts were made by various associations of chemists and druggists in our large towns to provide means by which apprentices and assistants might raise themselves to the standard required for the efficient discharge of the duties devolving upon them, and for afterwards occupying a much higher position as pharmaceutists than their predecessors had done. These efforts took the direction, in the first place, of meetings for the discussion of subjects connected with pharmacy. Afterwards they extended to courses of lectures on chemistry, botany, materia medica, or pharmacy, the formation of libraries, collection of museums, and other means. The results, however, as regards lectures, were discouraging; few availed themselves of the opportunity afforded (sometimes at a nominal cost); and pecuniary loss was the almost invariable conclusion of each attempt.

When, however, the attainment of such a standard became compulsory before commencing business, it might have been expected that young men would have gladly made use of every means at their disposal for the acquisition of knowledge, and that whenever provincial associations in large towns made arrangements for the delivery of lectures by thoroughly qualified gentlemen, on such subjects as chemistry, botany, materia medica and pharmacy, the classes would have been well attended, the students eagerly in earnest in mastering the subjects brought before them, and the results satisfactory and encouraging to the managers. Has this been the case? Let those who have been connected with such movements and the reports, which, from time to time, appear in the Journal of their proceedings return the answer, which will, I believe, be in almost, if not quite, every case,—No. This being so, and there being no other school of pharmacy worthy of the name in this country than the one in London, the want of such schools being on all hands admitted, and the necessity for them becoming daily more urgent, the question presents itself, what is to be done? Many crude suggestions have been made on this point, most of which seem to take it for granted that a sufficient expenditure of money will secure the end in view.

Even in London, however, young men seem to avail themselves very sparingly of the splendid opportunities at their disposal. Supposing that every London candidate who passed the Minor and Major examinations between July 1, 1871, and June 30, 1872, had been a student at Bloomsbury Square, the number would only have been 43 (36 Minor and 7 Major), against 242 from the country (201 Minor and 41 Major), of whom I think I may assume two-thirds have benefited by the lectures or laboratory, either in this or previous sessions; so that even if the country finds most of the money, it gets most of the benefit.

To return to the question: How are the means of systematic pharmaceutical education (beyond what is generally attainable in the ordinary routine of business) to be brought within the reach and means of provincial students? and how are the largest and most satisfactory results to be attained with the least expenditure of money.

I think Mr. Schacht has solved the problem, or at least, laid down correct principles for its solution, in his scheme before the Council, its chief feature being payment on results. In my opinion, this plan, in its main features, and so far as it goes, is unobjectionable, and I also think more feasible than any other yet brought forward. The plan of giving a money grant to any local association applying for it, without any control over its expenditure, or complete account of the results of that expenditure, is impracticable. Where is the local association, a majority of whose committee is known to the Council? According to Mr. Hills' suggestion, this would be required, as the "certain number" who are to give a guarantee that the money shall be properly expended are to be known to the Council, and in order to carry out the guarantee, they must constitute a majority of the managing body. The Council ought to have some control over the manner and as to the objects for which their grants are laid out; and the difficulty of securing this control in any other way than as proposed by Mr. Schacht, seems insuperable. If this plan is carried out, applications for assistance will only be received from large towns, such as those named above. In all such towns there is the requisite machinery for carrying on the work; and it is only there that anything like "systematic and persistent teaching" by means of lectures can be successfully carried on. Courses of lectures, delivered and illustrated by competent teachers, are generally very expensive, and the expense would be almost the same for 10 students as for 50, although the amount received for fees, and grant earned, would probably only amount to one-fifth. In short, a few good schools of pharmacy spread over the country under efficient management, and with first-rate teachers, are more to be desired and will yield far better results than schools in every small town where a dozen chemists can agree to form an association and apply for a grant expended at random upon incompetent teachers, and with very little good results.

There are one or two points on which Mr. Schacht's scheme may, in my opinion, be amended and extended. For instance, I should strongly object to any one on the register of chemists and druggists or pharmaceutical chemists being allowed to earn payments for results, and still more strongly to their being allowed to compete with assistants and apprentices for prizes. Chemists and druggists who have earned their title by passing the Minor examination, ought not to be placed in a worse position than those who are such, simply because they happened to be in business before 1868. Both should be excluded from earning either prize or grant.

What I look upon as the greatest defect in the scheme is, the exclusion from competition of all young men who do not, from any cause, attend the required lectures. These will, I think, be not less than one half of the entire number of assistants and apprentices in the kingdom. Even supposing that lectures were delivered in every little town mustering half-a-dozen chemists' assistants and apprentices, still a very large number would be left unprovided for. It is only fair to suppose that many of these are making good use of the limited means available, and using every exertion, to raise themselves to the required standard. Again, large numbers in towns would not be able, from a variety of causes, to attend lectures, and yet, many of these may be constantly and earnestly engaged in learning what it is requisite for them to know. I am supposing in these two cases, that the young man is struggling against difficulties, including indifference or even opposition on the part of his employer, who may be unable or unwilling to render any assistance. There are besides these, a large number under the care of masters in town and country, who endeavour to discharge the duty they have undertaken by imparting "systematic and persistent teaching" to their pupils, in other ways than lectures, and far more efficiently, too; for the chief use of lectures to the student is to mark out the path to be pursued along which he is himself to travel, and not to be carried by his guide. This guidance, direction, as well as assistance, can be given better by a competent master, who does not wish to shirk his duty, but whose desire and pride it is to thoroughly prepare his pupil, so that at the conclusion of his apprenticeship he may at once pass, at least, the Minor examination. Now, why are young men like these to be altogether shut out from the same examination as the lecture attenders are admitted to? and why are their masters to be deprived of the credit which is justly their due, for the honest discharge of their duty, and the successful results following therefrom? The former ought to be admitted to examination for prizes; and if no grant can be made to the employer in case of success, his name ought at least to be published in the pages of the Journal.

I agree with a suggestion made by one of the Council, that in the case of unsuccessful candidates, a small capitation grant might be made to the local association, say 5*s.* for each one who obtained under 50 and not less than 30 per cent. of marks. The requirements in Mr. Frazer's amendment are, it seems to me, fully provided for by Mr. Schacht's scheme in its last clause; and in every case, great care should be taken that each grant made is faithfully expended on the object for which it is given. In most of the large towns, great progress has been made in providing libraries and museums, so that grants for these objects will be chiefly required by the smaller associations where there is not a sufficient number of young men to warrant the cost of lectures, but where small classes for mutual study and assistance, would derive great benefit from a little help in this direction, which the local association, from the smallness of its numbers, may be unable fully to supply.

I would suggest that the Council collect and publish statistics respecting local associations now in existence; such as the number of chemists in business in their respective districts, and of assistants and apprentices, the number of members and associates, amount of subscription, what attempts have been made in the direction of establishing lectures or classes, and by what success attended. What educational appliances are already available, such as libraries, museums, apparatus, rooms for lectures, etc. These statistics would be of great utility in discussing the great question in hand.

THOS. D. WALKER.

Dresden, Staffordshire.

Sir,—As every one with a thought upon pharmaceutical education is now directly appealed to, I have resolved to give you mine, which do not seem to have occurred to any of the numerous and able speakers at the late Annual Meeting.

The question appears to be, how to give our young men the best education at the least cost. Under existing circumstances, the scheme of most intelligent country apprentices appears to be to pick up what they can during their apprenticeship, and then, if possible, to procure a situation in London, where, by giving the larger portion of their time to business, they may secure enough to provide for board, lodging, and other expenses, while they can at the same time attend a portion of the lectures, and occasionally the laboratory, at Bloomsbury Square. Practically, perhaps, no better or more economical plan for securing a succession of average competent chemists could be devised; but, unfortunately, London itself will not afford sufficient area for all the improvers to secure the required position; hence the agitation for provincial schools.

But are things taking the right course? Is there not a tendency to spread over too much ground?—and will not the end be best attained by giving up any attempt to provide general and organized instruction during apprenticeship, and to confine our attempts to enlarge the means, to make it more attainable for two or three years afterwards?

I would suggest that no attempt be encouraged to organize provincial instruction in any town with a population of less than 80,000 or 100,000 inhabitants. We may then have several really efficient centres, where young men, after their apprenticeship, might secure an efficient and thorough education; and the area would be considerably extended in which they might seek partial employment, and thereby practical improvement in the trade.

By this means, instead of having a mere form of education in doses of science and water, with a little of the sugar of experiment to make it palatable, administered to a class just able to keep itself alive, by an amateur professor, who could only snatch the fag ends of his days from business to devote to such an object, there would be distributed through the country centres of efficient education where the entire services of competent men might be secured. Over this extended area, young men just out of their time would surely be able to secure situations as student assistants, while the opportunity of securing the services of a cheap yet efficient class of assistants ought to induce the resident chemists in such towns to subscribe liberally at first to start these provincial colleges of pharmacy in a really efficient manner.

The Society could also afford to be more liberal in its grants than if every town of twenty thousand or so makes an attempt to start a small school of its own. These grants, too, could be better made in apparatus than money if judiciously done. For this purpose it would be then worth while for the Bloomsbury staff to include a man who knew how to get to the inside of the London apparatus trade, as most apparatus may be secured at about half the price that country chemists could purchase it for.

There is another consideration: such efficient schools as I suggest could certainly secure men as teachers, who could command South Kensington certificates, and thus the prizes, etc., given by that body would be available. Such institutions, without losing an atom of their special pharmaceutical efficiency, may become the centres of scientific instruction to the public generally.

W. Symons.

Sir,—In this scheme for "Provincial Education," based upon the principle of "aid for result," what are "results?" and what are the "provinces?" The answers gathered from the "details" are that the provinces are the large towns, and the results are, first, the formation of local pharmaceutical associations, and secondly, the passing of examinations. The title of the scheme should include as its main object the formation of local associations; and this object practically restricts the operation of the scheme to large towns; for in such only are associations, on the stringest conditions of the proposal, feasible. Experience in the effort to form associations in smaller towns is not calculated to stimulate to more of the toil of Sisyphus. Entire counties might be instanced where one or two associations at the utmost could be formed. Whence are lecturers to come? and who are "competent teachers"? Is the number of the letters of the alphabet appended to a name the guarantee? and why should the value of lectures be measured by a chronometer? Men of "degrees" can sometimes "talk" for an hour "and say nothing" (as a Midland phrase has it), while men of far less note, but more "apt to teach," might convey more information to the student in half an hour. Supposing students are only twelve miles distant from the favoured association (and this is far below the mark of many localities), how can more than one be spared from the same establishment for twenty lectures? and "cui bono"? If half the lectures are sufficient for one pupil, why should he suffer penalties for his clearer intellect, or more careful study, and perhaps his more slender means, provided he can come up to the standard of examination? Ought not the much-vaunted "results" to be sufficient evidence of competence on the part of the teacher, and of "systematic and persistent" study on the part of the pupil? unless, indeed, the number of hours is to be a pledge that the drones of the class have had adequate opportunities. If such be the case, where is the security for their attendance?

The scheme seems inconsistent with its third principle of generality, since its benefits will be confined to the large towns unless the smaller ones clamour for doubtful aid, in *formâ pauperis*, under the indefinite "last sentence of the scheme." And it is the old question, how far it would be "just" to apply funds derived from the country at large to the favoured towns? Aid associations by all means, but add a capitation grant—not as payment, but as an honorarium or "stimulus" for *all* successful candidates. Let there be room in the scheme for the words so often seen in the reports of the London University examination "private study." Or, perhaps better still, as the Pharmaceutical Society has attained the goal of its ambition in compulsory examinations, let it prepare to relinquish its educational functions, and confining itself to examination, let it leave education to the law of supply and demand, and reduce subscriptions in proportion to its saving in consequence.

So far as the scheme is yet developed, it does not contain promise enough to beget in a country chemist very profound gratitude, which is said to be "a lively sense of favours to come." These first and hurried thoughts, Mr. Editor, in response to your earnest invitation for expressions of opinion may assume better form and tone on a future occasion.

Henry H. Pollard.

Ryde, July 15th, 1872.

Sir,—I am induced by Mr. Schacht's request to the members of the Pharmaceutical Society to express my opinions upon the scheme propounded for the education of our young men in your Journal of the 6th inst.

As the representative of a business of about fifty-four years' standing, I beg to offer mine, as one whose wish is that all members of the pharmaceutical body may occupy a better position in the estimation of the medical profession and the public than they do at present.

The able and comprehensive manner in which Mr. Schacht has delineated his scheme does him very great credit; but I must express my strong disapprobation of his plan for disposing of the funds of the Society.

Our subscriptions are intended for imperial, and not local objects,—that is, to keep a Council of our most able and experienced members in London, who can confer with the Government on any legislative measures which may affect us as a body; to keep up a school of pharmacy worthy of the nation, and a laboratory second to none, for the benefit of the United Kingdom and the Colonies, but not for any local district. We should keep up an institution in London which, with its museum, library, etc., will stand comparison with those of the Colleges of Physicians and Surgeons, and with whose members our Council could meet on equal terms with regard to their scientific knowledge and acquirements. If our funds be devoted to teach elementary knowledge, the great object of our Society will be ignored, and we shall raise up a body of chemists with mediocre abilities, pretty much the same as the International Society is now endeavouring to reduce the working men of Europe to one dead level.

Presuming that Bristol will have the benefit of pecuniary aid from the parent Society, what advantage will it be to Cornwall, Devonshire, Dorset, East Somerset, or the six counties of South Wales? It will give immense advantage to the young men of Bristol, at the expense of the general body, to have lectures on botany, chemistry, and pharmacy, by competent teachers, which will be denied to all who live beyond ten miles of that city.

It is with regret I observe the paucity of young men who pass the Major examination of the Society, which is very detrimental to its interest, as the Minor certificate has not so much influence with the medical profession or the educated part of the public as a three years' recommendation from the well-known dispensing establishments of Corbyn's, Bell's, Allen and Hanburys', Squire's, Godfrey and Cooke's, etc., whose names are household words throughout the land; and unless the Council offer powerful inducements to young men to study the higher branches of the pharmaceutical sciences thoroughly the position of our craft will not be improved.

To accomplish this object, let us say twenty scholarships be annually given, by examination in London, to registered apprentices throughout the kingdom, and a sufficient sum of money be granted to cover their board, lodging, and instruction during the session or two they are required to study; and let twenty more be given to those who have passed the Minor examination with the greatest credit, on the same terms. We shall then have healthy competition among the young men, when they know there is equal fair play to all alike.

If this plan could be carried out by the Council, in a few years the kingdom would be illumined by a race of Schachts, who would be an honour to their Alma Mater, and who would command the respect of the medical profession and the public by their knowledge and scientific acquirements.

Thomas Hughes.

Llandilo, South Wales, July 16th, 1872.

When Ought a Grain Dose of Morphia to be Dispensed?

Referring to the Morecambe poisoning case, and your leader of last week, I cannot but think, looking at the matter from a dispenser's point of view, that there was at the inquest, as there often is in these cases, an inclination to saddle the wrong horse. Since the publication of the prescription we can judge the case more clearly. According to its strict grammatical construction, it is ambiguous. Anglicized, it reads thus: "Take of acetate of morphia, one grain. Let six pills be made;" not necessarily *of it*, but it may be read *like it*. Edmondson, who knew the dose well enough it appears, would never have read the latter but for the confusing—to him corroborating—verbal instructions.

In my own experience, the following case occurred. A lady, whom we were well acquainted with as a customer, brought a prescription which was handed to me to dispense. On it were a bromide of potassium mixture, and the following formula for pills:—

"℞. Morphiæ Muriat. . . . . gr. j
Cons. Rosæ q. s.
M. ft. pil. Mitte iv.
One to be taken at any time if in much pain."

This was quite explicit; but as the dose was unusual, I hesitated and consulted my *confrère*, and also our employer. The lady had been taking a "sedative mixture" occasionally containing liquor opii sedativus, in ordinary doses. She had brought the prescription herself, and did not appear to be suffering at the time. We knew the prescriber, who was always most accurate in his prescriptions; but on that occasion I was under the impression he intended to have ordered the pills to contain a quarter of a grain of the morphia salt. However, it was ruled otherwise, and I dispensed it, having a witness to the weighing and division of the pills. I felt a little anxious about them till the next morning, when the lady came again and said she had taken one of the pills on retiring to rest, but it had not relieved her. I may state I was then in the habit of preparing weekly six dozen powders, each containing two grains of acetate of morphia, for a patient, who continued to take this quantity for years. The moral I draw from the case is not so much against *verbal* instructions as for *explicit written* ones.

Wm. Martindale.

University College Hospital, W.C.,
July 17th, 1872.

Dr. Mackenzie's Throat Hospital Pharmacopœia.

Sir,—I notice that, in your review (in to-day's Journal) of Dr. Morell Mackenzie's valuable Throat Hospital Pharmacopœia, you take exception to the use of magnesia in the composition of the concentrated preparations of essential oils, a teaspoonful of which is directed to be used (in a pint of water) for an inhalation.

You say, "The magnesia is added to keep the oil mechanically subdivided, but we think its use is chemically objectionable. Most volatile oils have an acid reaction, and therefore form compounds which are not volatile."

Permit me, therefore, to suggest a method of preparation which will obviate this inconvenience: although the method is incompatible with the advantages of the concentrated method of dispensing described in the Throat Pharmacopœia.

I notice in this Pharmacopœia, a copy of which I have before me, that the solutions of the essential oils when prepared for actual use by the admixture of a drachm of concentrated liquid with a pint of water are, at least in most, and possibly in all, of the examples given, not too strong for the method I propose, which is simply this:—

Put the quantity of oil directed for the inhalation into the pint of water, shake it up for a minute and repeat the shaking three or four times at intervals of half an hour. Then filter.

This is a method which I have long had in use at the British Hospital for Diseases of the Skin, as an economical and effective mode of preparing Aqua Menth. Pip. and other similar preparations. Previous to its introduction we had been in the habit of purchasing the various aromatic waters ready-made; and I find that it is the usual practice of pharmaceutical chemists either to purchase such articles of the wholesale chemist at a very unnecessary expense, or to prepare them themselves by the equally unnecessary and troublesome process of distillation directed by the British Pharmacopœia. Such preparations are so largely used, and if bought are so bulky in proportion to their value, and rendered so additionally expensive by the item of carriage, that a process by which they may be by far more economically prepared than by the usual way, cannot, I think, but prove of some interest to your readers.

Balmanno-Squire.

July 6th, 1872.

[**** This plan might be convenient in the preparation of waters for hospital use; but when they are required for the public, a far more pleasant and satisfactory article is produced by distillation.—Ed. Pharm. Journ.]

Pharmaceutical Curiosities of Medical Practitioners.

Sir,—I am heartily glad your correspondent from 'the vicinity of the Valley of the Clyde' ventilates some of the grievances we have to contend with in this part of the country; but I am sorry he did not say a few words about another matter which is in much need of reform, viz., prices. For the benefit of my Southern brethren I will give a few of the prices charged at one of the principal establishments in Glasgow:—a 12 oz. bottle of Genuine Newfoundland Cod-liver Oil, 1*s.*; 1 oz. Ponderous Calcined Magnesia, 4*d.*; 1 lb. Bishop's Citrate of Magnesia, 3*s.*; 1 doz. Compound Rhubarb Pills, 2*d.*, and so on at corresponding rates.

But, my inducement to write to you at present was because a prescription I have just received corroborates some of the statements made by your correspondent. The following is a copy of the prescription:—

℞. Acid Tonic No. 1.

and on the back of the prescription is lithographed the name and address of a firm having retail shops, but also doing a large wholesale business. "Ægis" remarks that "I have long since come to the conclusion that the medical profession are not so much to blame in this matter as a certain unprincipled class of our own brethren in the trade." I believe this to be true; but to me the curiosity has always been not so much why certain firms openly practise this mode of doing business, as that the retail chemists by patronizing such firms give a tacit support to the principle.

The only solution I can find is that pease meal, brose, and porridge are articles of diet in common use, can be got cheap, and in this climate are sufficient to keep soul and body together.

Glasguensis.

W.B.—We do not know of any law prohibiting such a proceeding, but recommend you to apply to the Secretary of the College of Surgeons.

"*A Registered Apprentice.*"—We are not prepared to say that the present practice of allowing registered apprentices to attend the Lectures at half fees is one that will be long continued. It was established for the special benefit of apprentices, but has not been so extensively taken advantage of as might have been expected.

"*Chemicus.*"—There have been numerous articles on the subject in the present series of this Journal. (2) We are not aware of the existence of such a patent.

"*Alpha*" is recommended to apply to the Editor of the 'Journal of Gas Lighting,' Bolt Court, E.C.

"*Senex.*"—(1) Apply to the Board of Examiners. (2) Apply to the Secretary.

"*Alpha.*"—The information could be best obtained from the Secretary of the Linnean Society.

E. Widdowson.—The terms of the additions to Schedule A, as published in the 'London Gazette,' which we think admit of no misinterpretation, are that, among other articles, "every compound containing any poison within the meaning of the Pharmacy Act, 1868, when prepared or sold for the destruction of vermin," ought to be deemed a poison within the meaning of that Act, and that, "of the same," preparations of strychnia "ought to be deemed a poison in the first part of the Schedule A to the said Pharmacy Act, 1868."

Communications, Letters, etc., have been received from Mr. W. D. Savage, Mr. S. W. Cleaver (Shanghai), Mr. W. Tearle, Mr. R. W. Protheroe, Mr. R. W. Giles, Mr. H. Recks, Mr. S. Willson, Mr. Barnard, Mr. J. R. Jackson, Mr. A. H. Mason, Mr. J. Davidson.

THE DUBLIN EXHIBITION.

The usefulness of exhibitions to manufacturers is somewhat doubtful. It is evident that to be of much value they should not be too frequent, and should at least be international. The Dublin Exhibition of 1872 is too soon after the excellent one of 1865, therefore there is very little novelty in the manufacturing portion, whilst the foreigner is unrepresented.

In spite of this, however, it will probably be a success, owing to the great attraction of the Loan Museum and the Fine Arts collection. Although there is very little that is new in the chemical and allied branches of manufactures, still some products of interest present themselves; and it is time well spent to watch the slow changes observable even in the fashions of chemical and pharmaceutical products. As we enter the west gallery from the southern stairs, almost the first thing the visitor stumbles across is a little case of some interest to the pharmaceutical chemist. It is in the form of wire-weaving contained in the case of Messrs. Bryan, Corcoran, Witt and Company, Mark Lane, London. Brass wire for sieves is shown containing 150 holes in the square inch; but this is greatly exceeded in fineness by the iron wire. Gauze made with this wire is shown containing 10,000 holes to the inch; although used for flour dressing, it might be applicable to special pharmaceutical purposes.

Messrs. Boileau and Boyd, Dublin, exhibit a pretty case of chemical and pharmaceutical products, the most striking of which is a sample of theine made from damaged tea. It is an extremely pretty specimen made by crystallization, not sublimation. Theine, or caffeine, as it is often called, has been frequently suggested as a valuable medicine; but whether our familiarity with it in the form of infusion has bred contempt or not, certain it is that it does not enter into the ordinary practitioner's materia medica. Although theine acts on the ganglionic nervous system, it has no action on the brain. It is used in doses of 1 to 4 grains as a tonic stimulant.

Mining Company of Ireland, Dublin.—We cannot pass without noticing the magnificent case of the Mining Company of Ireland, the chief attraction of which is the lead and silver in all its stages, from the undressed ore until we get the finished articles in the form of a massive block of silver-lead, in the form of shoot, pipe, and sheet; but this company are also of interest to the chemist from being large manufacturers of litharge and red lead. The first of these is procured during the refining of silver-lead—the silver in which is concentrated to its highest point by Pattinson's patent. The litharge, got by this process, at the Ballycorus Works, is particularly pure and valuable for plaster making.

A. Jellet's Saccharometer is exhibited, but the price is restrictive, viz., £29. We want to see some enterprising manufacturer bring out this instrument in a form in which it can be sold for £5 or £6. It is the best of all saccharometers. The only restriction to the more general use of this instrument is its price; its applications to technical chemistry and pharmacy are not confined to mere estimation of sugars, but it can be used to determine the admixture of turpentine and other hydrocarbons of this class, and the estimation of some of the alkaloids.

Messrs. Holt, Nerwich and Co., Vauxhall, London, exhibit a pure oil soap which is not made for pharmaceutical purposes, it being prepared for the use of dyers in dyeing silk or wool. Why not use such a soap, however, for linimentum saponis of the pharmacopœia?

Mr. E. Stanford, Edinbarnet.—It would be superfluous to dwell upon the *Nitro-carbon Manure Company's* case. As under that name we find Mr. Stanford exhibiting his ingenious and valuable process for the manufacturing of the products procured from seaweed. Mr. Stanford's process, as our readers are no doubt aware, is essentially this: Instead of burning the seaweed on the shore, and producing the well-known kelp, the weed is burned in closed retorts, by which means all the by-products or products of destructive distillation are saved—these are naphtha, ammonia, charcoal, etc. One important point in connection with this process is the fact that iodide of potassium is volatile at a bright red heat, and that therefore a considerable loss of iodine is prevented. Such a loss arises from the ordinary method of burning kelp. Such a saving must be doubly important at the now very high price of iodine and the iodides. One of the most valuable by-products seems to be the charcoal, which possesses most extraordinary decolorizing properties. The charcoal procured approaches animal charcoals in this respect, and does not seem to resemble the ordinary vegetable carbons.

Marine Salts Company of Ireland, Dublin and Galway.—We have a second exhibitor of iodine and bromine in the Marine Salts Company of Ireland. This company procures its kelp from the west coast of Ireland. Besides showing all the potash and other salts derived from the kelp, they have specimens of the different weeds arranged according to their iodine value; thus *Laminaria digitata*, and *Laminaria saccharina* "rich in iodine;" *Fucus serratus* "poor in iodine," etc.

Mr. John Somerville exhibits a case of the products from the destructive distillation of coal, including the anthracine products and the ammonium salts, including the nitrate now used for the making of nitrous oxide.

Messrs. Berger, Spense and Co., Manchester, exhibit a magnificent crystal of alum of gigantic proportions, but it is really curious to observe that it has a decided amethystic tinge, due probably to the presence of a trace of iron, which produces the well-known appearance of iron alum.

Some handsome specimens of crystallized salt are exhibited by the Newry Salt Company, including specimens of the rocksalt, which are beautifully free oxide of iron. So pure are these natural specimens that if they were simply ground, they would form a white and first-class table salt. The crystals shown are hopper-shaped, cubical, and the ordinary granulated table form.

Messrs. Bewley and Draper, Dublin. — Mr. Draper, of the firm of Bewley and Draper, is here with his "dichroic ink," which is certainly a novelty in its way, and quite unlike the ordinary inks. If he can surprise the Yankees, as he seems to have done, it really must be out of the common.

Price's Patent Candle Company, London.—The above firm is here in all its glory,—that is to say, besides this company's candles, they exhibit glycerine, the article of all others to which they owe their fame. The process which gave to the world pure glycerine, also produced a revolution in the manufacture of soaps and candles. By one process they split up the saponifiable fats in the fatty acids and glycerine. The first are in the most perfect state for producing soaps and candles, whilst the possibility of distilling glycerine was first chemically demonstrated by this patent. Their patent is now out, but very few glycerines can compete with the article made by this firm. Glycerine can be redistilled by superheated steam, and is generally so treated for the better qualities.

(*To be continued.*)

NOTE ON PILL EXCIPIENTS.

BY WALTER TEARLE.

At the last November meeting, Mr. J. B. Barnes read a paper on a new pill excipient—boro-potassium-tartrate, or soluble tartar. When carefully evaporated to a mucilaginous consistence, a solution of this salt possesses that weight and plasticity which are necessary to form certain untractable bodies into pills. Yet it presents an objectionable feature, for pills made up with it soon acquire that flinty hardness, which, in a medical sense, at least, is prejudicial.

While looking for some such thick heavy substance as this, but which would not so readily solidify and get hard, I was led to try a neutral solution of citrate of potassium in syrup and glycerine; this solution was very heavy and of the consistence of treacle, and possessed sufficient adhesiveness to form nitre and chlorate of potassium into pills without the aid of tragacanth; but from the deliquescent nature of this excipient, the pills could not be kept for any time without getting moist. A solution of soluble cream of tartar was next prepared and evaporated to a thick consistence, and then rediluted with syrup and a small proportion of glycerine till sp. gr. was about 1·420. One ounce of this was then mixed with half an ounce of the above citrate of potassium solution, and dilution with syrup continued till the sp. gr. of the mixture was 1·400, and a liquid of the consistence of mucilage was obtained. This liquid possessed sufficient adhesiveness to form sulphur, antimonial powder, bismuth, gallic acid, benzoic acid, rhubarb, Dover's powder, etc., into pills without the aid of tragacanth, the pills being very small compared with the amount of drug present:—thus 7 grains of sulphur, 6 grains of rhubarb, 5 grains of gallic acid, 5 grains benzoic acid, and 8 grains saccharated carbonate of iron were all formed into pills no larger than the ordinary 5-grain size. These all present a handsome appearance, keep well in boxes in contact with lycopodium, and without being hard retain their shape admirably.

For forming chloral, nitre, and other soluble salts into pills, this solution will not take the place of simple soluble tartar, but for substances not readily soluble, and of which it is required to get as much as possible in an ordinary sized pill, it possesses some advantages over the tartar, one very important one being its ready solubility in cold water.

There is no advantage in having the excipient thicker than mucilage as the drops would not flow freely from the bottle, and would be inconveniently large for most purposes; in fact the value of these solutions, as pill excipients, obviously depends upon their being equal in thickness with those in common use, such as glycerine, syrup, and mucilage.

THE MICROSCOPE IN PHARMACY.

BY HENRY POCKLINGTON.

(*Continued from page 43.*)

Colchichi cormus.—The fresh corm of *Colchichum autumnale* stripped of its coats, sliced transversely and dried at a temperature not exceeding 150° F. These particulars must be borne in mind when examining commercial specimens of Colchichum root in comparison with freshly gathered specimens, as the starch granules are subject to great modifications as to shape, size, and form of hilum when subjected to desiccation. The structure of the sliced corm is simple; thin walled, somewhat large parenchyma cells, containing starch and raphides in abundance, make up nearly the whole substance of the corm. The starch granules are compound, two, four and more, easily separable and with "a large and beautiful" central cavity and radiate hilum, somewhat exaggerated in the drawing in the English translation of Schleiden's 'First Principles.' Single granules are nearly round; the shapes of the component granules of the compound granules are modified by the ultimate shape of the combination too variously to be grouped under any two or three formulæ. The type of the separate granules, as Schleiden has remarked, is quite similar to that of the starch of most Leguminosæ, but differs in having the very "beautifully radiated opened central cavities." In this respect the starch of Colchichum is quite characteristic. A black cross is given by polarized light, the hilum forming the point of intersection of the arms of the cross.

Hemidesmi Radix.—The natural order of the Asclepiadaceæ is as interesting to the structural botanist as almost any other half-dozen natural orders taken together, and will furnish him with as many enigmas towards the solution of which he may profitably devote the best years of his life. The small portion of the plant belonging to this Order now under notice is rather more free from these unsolved enigmas than most other portions, but there are points of interest.

Medulla.—Obsolete or reduced to one or two cells.

Wood Zone.—The wood zone consists of large pitted vessels, wood cells principally pitted, and a few medullary rays and unpitted vessels containing a yellow colouring matter which is probably milky in its nature during the life of the plant. Each of these component structures requires more discussion than limited space will permit. I will briefly point out their more salient features, beginning with the pitted wood cells. These are many times longer than broad, with rounded-off ends, are much thickened and are minutely pitted. Very delicate spiral threads which intersect each other traverse the walls of these cells, but require great delicacy of manipulation and observing skill to detect their presence satisfactorily. The pitting is in the centre of an indistinct disc and is regularly arranged. The unpitted wood cells have spiral fibres which are more easily discernible. The large vessels are much pitted with somewhat minute, slightly oval pits in the centre of a raised disc, are frequently septate, and are not usually of great length, the distance between each septa being frequently little more than the diameter of the vessel. In cross-section the vessels and wood cells are nearly circular, rarely more than slightly oval, and their walls are of considerable thickness, rarely perforate. The direction of the axis of the pits is transverse to the length of the vessel or cell, and is little affected by the septa or the occasional spiral fibre. Many of the vessels are much stained with yellowish-brown colouring matter, and a few contain a minutely granular matter of an apparently semi-albuminous nature. The cells of the medullary rays possess somewhat novel features. They are nearly square with rounded off corners, have thick walls and are closely but minutely pitted. The pitting is indeed excessively minute, and in the centre of a relatively very large disc. The rays are incomplete and rarely do more than extend from the bark partly across the wood zone. The existence of a spiral thread in these cells is probable, but I have not been able to satisfactorily settle the matter. Considerable quantities of starch, sometimes compound granules of small size, compounded regularly according to the simple type we are already familiar with, frequently separate granules, and all possessing a distinct hilum, but apparently no central cavity. The doubtfully branched semi-liber semi-laticiferous vessels which contain the colouring matter may profitably occupy the student, but would lead me too far afield were I to enter upon their discussion here.

Cortical Layers.—The cells of the cortical layers are very varied. Those near the wood zone are angular, somewhat thick-walled and contain starch in considerable quantities. Nearer the bark these cells become smaller and sometimes contain yellow colouring matter. In some a spiral thread is doubtfully visible. The cells of the outer layers afford the student an excellent opportunity for studying the effect produced by an unequal deposition of secondary deposits, and will remind him of the well-known drawing of the bark cells of Viscum in Mohl's 'Vegetable Cell.' Hemidesmus is much more interesting to the micro-botanist than to the micro-pharmacist.

(*To be continued.*)

THE PREPARATION OF ATROPINE FROM THE LEAVES OF THE BELLADONNA.

BY M. J. LEFORT.

The employment of belladonna in therapeutics has long shown that all the parts of the plant contain atropine; but the authors who have indicated particular processes for the preparation of this organic base, have hitherto given the preference to the root as being more convenient than the leaves for chemical manipulation. The root, in fact, requires less alcohol than the leaf for the separation of the natural salt of atropine; moreover, the presence of chlorophyll in the alcoholic tincture of the leaf is a real hindrance to the decoloration of the product obtained, and finally it has always been supposed by them that the root was more rich in the alkaloid than the leaves.

The numerous analyses which the author undertook for the purpose of his former memoir on the distribution of atropine in the leaf and root of the belladonna,* showed that the leaf, which is fairly constant in composition, contained an average of 4·50 grams of atropine per kilogram of dried leaf, whilst the root contained quantities varying from two to five grams, according to the age of the plant.

This last fact was already known to manufacturers preparing atropine on a large scale, and they had also remarked that the root coming from Germany or Switzerland, was richer in atropine than the root collected in France, but this the author ascertained to be due to the greater care taken in the collection and selection of the roots. The collection of the leaf being in France much more easy and productive than that of the root, and as the former contains nearly as much atropine as the latter, M. Lefort sought by following the indications of MM. Stas, Vée and Duquesnel for the separation of alkaloids by means of tartaric acid, alkaline carbonates and ether, to devise a method for using the leaves in the preparation of atropine on the large scale. The following is the result of his investigation.

The dried leaves, coarsely bruised, are exhausted of all their soluble principles by boiling water containing ten grains of tartaric acid per kilogram of leaves. This addition of acid assists considerably the solution of the atropine existing in a state of combination in the vegetable cells. After straining, the decoction is evaporated to the consistence of a soft extract, the product averaging about 200 grams of aqueous extract from a kilogram of leaves. This is treated with concentrated alcohol and heated in a water-bath to about 50° C., to dissolve all the tartrate of atropine. The 200 grams of aqueous extract requires only one litre of alcohol, which is added in three or four separate portions; the strongly coloured brown tincture which results is then placed in a distillatory apparatus and the menstruum recovered.

The alcoholic extract so obtained is reduced to the consistence of syrup, which then weighs about 50 grams. It is next put into a well-stoppered bottle with a quantity of ether, and agitated from time to time. The ether quickly becomes slightly greenish-yellow coloured, from the presence of a small quantity of resin and chlorophyll dissolved in the original decoction, whilst the tartrate of atropine not being soluble in ether remains in the extract. Usually a single treatment by ether is sufficient to purify the alcoholic extract from these substances. Eight grams of caustic potash dissolved in half its weight of water, so as to make a concentrated alkaline solution, is then added with a fresh quantity of ether. As the organic alkali is displaced by the mineral alkali, it dissolves in the ether if the mixture be shaken.* The extract is repeatedly exhausted by successive quantities of ether, and the ethereal tinctures are united, and the ether distilled off. The residue left in the retort is a semi-solid, yellow-brown, transparent extract, which is dissolved in water acidulated by sulphuric acid. A small quantity of resin, which gives to the crude atropine an opalescent appearance, is thus separated. This solution of sulphate of atropine is concentrated, and bicarbonate of soda is added till effervescence ceases. Ether then dissolves all the atropine set free, and the spontaneous evaporation of the ether yields the crystallized atropine.

The author states that, notwithstanding these

* See PHARM. JOURN., Series 3, Vol. II. p. 1029.

* There is a perceptible odour of ammonia given off upon the addition of the caustic potash to the extract, due to the presence in the extract of an ammoniacal salt contained normally in the plant.

numerous details, the preparation of atropine from the aqueous extract of the leaves is as quickly and easily performed as when the root is used. It is necessary, however, in order to facilitate the solution by the ether of the atropine set free by the caustic potash, that the extract should be of the consistence of syrup, that is, sufficiently concentrated to run slowly. If there be too much water present, although the ether will dissolve the atropine which is undissolved, yet since that organic base is soluble also in water, there will arrive a time when placed between two liquids, having over it the same solvent power, it will resist them equally, and a much larger quantity of ether will be required to remove it from its aqueous solution. For this reason caustic potash is employed, since, neither the neutral carbonate or the bicarbonate of potash would decompose all the tartrate of atropine if the extract were too concentrated.

Alcohol is doubtless the best solvent of all the salts of organic alkalis contained in plants, since it has no action upon the starch, albumen, gum, sugar, etc., while water to a certain extent dissolves them. But the author thinks that the substitution of the aqueous decoction for the alcoholic maceration, will allow of a much more economical manufacture of atropine, from the smaller quantity of spirit used; only about a litre being required for a kilogram of leaves, the whole of which is recovered by distillation, as also is the ether used for washing the alcoholic extract. — *Journal de Pharmacie et de Chimie*, [4] vol. xv. p. 417.

COTTON ROOT.

BY PROFESSOR E. S. WAYNE.

The root of the cotton plant (*Gossypium herbaceum*) has for some time past been accredited with possessing the properties of an emmenagogue, parturient and abortive, and said to promote uterine contractions with as much efficiency and more safety than ergot.

As yet no analysis has been made of the root to determine its proximate principles, and to ascertain whether it contains any of the principles found in ergot, such as propylamin, or alkaloids such as ergotina and ecbolia, found in that substance by Wenzell.

The fluid extract of cotton root is a preparation largely used in the Western States of America, and highly spoken of as above by some practitioners. It is very prone to deposit a peculiar red precipitate a short time after it is made; and the frequent complaints made respecting this has induced me to make some investigations as to the cause and nature of the deposit, and, at the same time, of some of the proximate principles existing in the root, or, more properly speaking, of the bark of the root.

For this purpose one pound of the root bark, in suitable powder, was exhausted with alcohol of 76°; the resulting percolate was of a pale amber colour. This was distilled to separate any resin present in it. After distilling off the alcohol, there was left in the still a dark red aqueous solution of extractive, etc., and a dark red resinous mass.

The resinous mass was removed and reduced to a coarse powder, and washed with water as long as anything was taken up by it, then dried and reduced to a powder. It then resembled very much in appearance powdered cochineal.

The change that had taken place in the colour of the original percolate by the action of heat during the distillation, was a matter of much surprise to me; the resulting aqueous solution and separated resin being so different in colour to that of the original percolate, from a pale amber colour to a dark red, resembling in appearance that of a solution of kino.

The red resin obtained from one pound avoirdupois of bark weighed 210 grains.

Upon examination of the dark resinous mass, it was found to be insoluble in the following menstrua: alcohol, chloroform, ether, aqua ammoniæ. It was soluble in solutions of caustic potassa and soda; the solution, a dark purplish-red colour being precipitated unchanged on the neutralization of the alkali by acids.

A portion of the precipitate that deposited by standing in the fluid extract of cotton root was filtered off, washed and dried, and submitted to the action of the same solvents as the resin mentioned, and with like results.

The watery solution left in the still was, as mentioned, also of a dark red colour, and gave the following precipitates with solutions of metallic salts. With mercuric chloride, red; with argentic nitrate, purplish red; with plumbic acetate, purplish-red, and with ferric sulphate, purplish-black.

The remaining portion, after making the above tests, was precipitated with plumbic acetate, which precipitated the red colouring matter, and left it of a light yellow colour; then treated with sulphydric acid to remove excess of lead, and, after filtration to remove the sulphide of lead, was evaporated to dryness in a water bath. The extract mass left was of a light yellow colour, and exceedingly hygroscopic. A portion of it was dissolved in water, and tested for the presence of an alkaloid with solution of iodohydrargyrate of potassium, but gave no indications of the presence of any.

With Trommer's copper test, it gave an abundant precipitate of cuprous oxide, indicating the presence of sugar.

A portion was also agitated with ether, and another with chloroform, and, after separation had taken place, the ethereal and chloroform solutions separated and left to spontaneous evaporation, no crystallizable proximate principles were separated. To a quantity of the powdered bark was added a solution of caustic potassa; there was no development of propylamin, as with ergot.

From the above experiments, it would seem that cotton root bark contains no substances similar to those of ergot, upon which its therapeutic value rests, nor any other peculiar alkaloid or proximate principle except the red resinous mass spoken of, or a substance colourless as in the original percolate, and by oxidation changing to this red substance. This red matter seems to be a peculiar one—an acid resin, insoluble in alcohol, chloroform and ether, forming coloured precipitates with metallic salts, and soluble in solutions of caustic potassa and soda.

The red colour of the watery solution described is also due to this, being held in solution through the solvent action of organic matter present, as is often the case in such solutions, and sometimes with difficulty got rid of.

The substance that produces this red-coloured acid resin, seems to exist in all parts of the plant—in the flowers and in the seeds—the purplish tint at the base of the petals is due to it, and in the seeds the dark red spots there found. It is this which gives to crude cotton-seed oil its dark colour, and it is removed in the process of refining the oil by the solvent action of caustic alkalies. From the solubility of this substance in alkalies, and forming well-marked and characteristic precipitates with metallic solutions, it has claims to be classed an acid, and I would propose for it the name of gossypic acid.

Having satisfied myself as to the nature of the substance that composes the precipitate in the fluid extract of cotton root, and the identity of the precipitate with the resinous mass that was left in the still, as mentioned, I would say that it is impossible to prevent the same from forming in it, as it is caused by a chemical change taking place in a peculiar proximate principle in the plant, insoluble in the alcoholic menstruum.

Whether the addition of glycerine or sugar would prevent this, I have not determined, and will report experiment at some future time.

Query: Is this acid or the substance from which it is produced the active principle of cotton root?

The cotton-seed cake (the mass left after pressing out the oil) contains more or less of it, and I am informed by Dr. John A. Warder that cows fed upon it will abort, otherwise it is a nutritious food for cattle. Some of the substance I have placed in the hands of practitioners for practical test, but as yet have had no report concerning it.—*American Journal of Pharmacy.*

THE LAST NEW METAL, INDIUM.*

BY WILLIAM ODLING, ESQ., M.B., F.R.S.

(*Continued from page* 48.)

Now the salts of the alkali-metals, lithium, sodium and potassium, and certain of the salts of the alkaline-earth metals, calcium, strontium and barium, being very readily volatile, upon heating these salts, in the non-luminous flame of a Bunsen gas-burner for example, they undergo vaporization, and their vapours become incandescent and capable of yielding the characteristic emission spectra of the particular metals. In examining in this way the alkali-salt residue of a mineral water from Durkheim, Bunsen observed in the spectrum before him certain coloured lines not belonging to any one of the then known alkalies, potash, soda or lithia; and yet necessarily belonging to some substance having the general characters of an alkali, since all other bodies than alkalies had been previously removed from the residue under examination. In full reliance upon the certainty of this conclusion, Bunsen evaporated some forty tons of the water in question; and from the alkali-salt residue succeeded in extracting and separating salts of two new alkali-metals, each characterized by a well-marked pair of lines in the blue or indigo, and one of them having in addition a pair of well-marked lines of extremely small refrangibility in the red of the spectrum. From its yielding those red lines one metal was named rubidium; the other, of which the bright blue lines were especially characteristic, being called cæsium.

The very general distribution in nature of these two elements was speedily established, and salts of each of them were with much labour eventually prepared in a state of purity and in reasonable quantity. From certain of their respective salts the metals themselves were obtained by the usual processes, and together with their salts, were submitted to detailed chemical examination. And no sooner was this examination made, than the position of the newly discovered elements, as members of the alkali-metal family, at once became apparent. Rubidium and cæsium were found in all their properties to present the most striking analogy to potassium, and evidently to stand to this metal in the same relation that strontium and barium respectively stand to calcium; while they differ from sodium, much as strontium and barium respectively differ from magnesium. This relationship in obvious properties was further borne out by the relationship of their atomic weights, thus:—

Mg 24	Na 23	F 19	O 16
Ca 40	K 39	Cl 35·5. . . .	S 32
Sr. 87	Rb 85	Br 80	Se 79
Ba 137	Cs 133	I 127	Te 129

It is observable that the sequence of atomic weight in the thus completed alkali-metal family, is strictly parallel to the previously well-known sequences in the alkali-earth metal family, and in the halogen and oxygen families respectively. Moreover, just as the basylity of the alkaline-earth metals increases in the order of their several atomic weights—calcium being less basylous than strontium, and far less basylous than barium—so also is the basylity of potassium inferior to that of rubidium, and the basylity of rubidium inferior to that of cæsium, which is indeed the most powerfully basylous, or oxidizable, or electro-positive element known.

Since 1860, both rubidium and cæsium have been recognized as minute constituents of a considerable number of minerals and mineral waters, rubidium having been met with for the most part in a larger proportion by weight than cæsium. Unlike potash, originally known as vegetable alkali, cæsium has not been recognized in the vegetable kingdom; but rubidium has been found as a very common minute constituent of vegetable ashes, as those of beetroot, oak-wood, tobacco, grapes, coffee, tea, etc. On the other hand, cæsium, free from rubidium, has been found in a tolerably well-known, though rare, mineral from the Island of Elba, to the extent of 32 per cent. by weight of the mineral. The history of this mineral is curious: from the circumstance of its always occurring in association with another mineral, a variety of petalite, the two were called Castor and Pollux. Castor was found to be substantially a silicate of alumina and lithia; pollux a silicate of aluminia, and, as it was thought, of potash. The constituents of pollux, namely, silica, alumina, and potash, with small proportions of ferric oxide, lime, soda and water were duly estimated; but the quantities of these constituents found in 100 parts of the mineral, instead of amounting to 100 parts or thereabouts, amounted only to 88 parts, there being somehow a loss of 12 per cent. in the analysis. After Bunsen's discovery of the new alkali-metals, pollux was analysed afresh by Pisani, who soon perceived that what had formerly been taken for potash, and estimated as potash, was not potash at all, but cæsia. Then calculating out his own analysis with cæsia instead of potash, substituting the one for the other in the proportion of of 133 + 8, or 141 parts of cæsia, for 39 + 8, or 47 parts of potash, he found that the quantities of the different constituents furnished by 100 parts of the mineral yielded by their addition the full sum of 100 parts required.

In submitting to spectroscopic examination a certain residue left by the distillation of some impure selenium, Mr. Crookes, early in 1861, recognized in the spectrum before him a brilliant green line, from which he inferred the presence in the above residue of a new element; and by the end of the same year, he had succeeded in establishing the tolerably wide distribution of this element, to which he gave the name of thallium; in procuring it, though but in small quantity, in a separate state; and in satisfying himself of its metallic character. Soon afterwards, and without knowledge of Mr. Crooke's later results, the metal was obtained by M. Lamy on a comparatively large scale, and was exhibited by him in the form of small ingots at the London exhibition of 1862. He procured it from the fine dust met with in some oil of vitriol factories, as a deposit in the flues leading from the pyrites burners to the leaden chambers. In these deposits, the minute proportion of thallium contained originally in the pyrites becomes concentrated, so as to form in some instances as much as 8 per cent. by weight of the dust. Independently, moreover, of its occurrence in iron pyrites, thallium, though never forming more than a minute constituent of the different minerals and mineral waters in which it occurs, is now known to be capable of extraction from a great number and variety of sources. But from no other source is it so advantageously procurable as from the above-mentioned flue deposit; and so early as the autumn of 1863, at the meeting of the British Association in Newcastle, the then mayor, Mr. J. Lowthian Bell, exhibited several pounds, and Mr. Crookes no less than a quarter of a hundredweight of thallium obtained from this comparatively prolific source. In one respect, the discovery of thallium presented even a greater degree of interest than attached to the discovery of cæsium and rubidium. For whereas these two elements were at once recognized as analogues of the well-

* Lecture delivered at the Royal Institution, Jan. 19, 1872.

known metal potassium, thallium can hardly be said even at the present time, to be definitely and generally recognized by chemists as the analogue of any particular metal, or as a member of any particular family of elements. With each of such differently characterized elements as potassium, lead, aluminum, silver and gold, it is associated by certain marked points of resemblance; while from each of them it is distinguished by equally well-marked points of difference. Hence the necessity for subjecting thallium and its salts to a thorough chemical examination, so as to accumulate a well ascertained store of facts with regard to it. And thanks to the careful labours of many chemists, more particularly of Mr. Crookes in London, and of Messrs. Lamy and Willm in Paris, our knowledge of the properties of thallium and of its salts may compare not unfavourably with our similar knowledge in relation to even the longest known of the metallic elements. Still it was not until our knowledge of indium had culminated in the determination of its specific heat only last year, that the position of thallium as an analogue of indium, and a member of the aluminum family of elements became unmistakably evident.

Indium was first recognized in 1863, by Drs. Reich and Richter, in the zinc blende of Freiberg in Saxony, and by reason of the very characteristic spectrum afforded,—consisting of two bright blue or indigo bands; the brightest of them somewhat more refrangible than the blue line of strontium, and the other of them somewhat less refrangible than the indigo line of potassium. Since its first discovery, indium has been recognized in one or two varieties of wolfram, and as a not unfrequent constituent of zinc ores, and of the metal obtained therefrom, but always in a very minute proportion. Indeed, indium would appear to be an exceedingly rare element, far more rare than its immediate predecessors in period of discovery. Its chief source is metallic zinc,—that of Freiberg, smelted from the ore in which indium was first discovered, containing very nearly one half part of indium per 1000 parts of zinc. A considerable quantity of indium extracted from this zinc, was shown in the Paris Exhibition of 1867; and an ingot from the Freiberg Museum, weighing 200 grammes, or over 7 ounces, has within the last few days been kindly forwarded by Dr. Richter himself, for inspection on the present occasion. To Dr. Schuchardt, of Goerlitz, also, the members of the Institution are indebted for his loan of nearly 60 grammes of metallic indium; and of fine specimens of other rare chemical products, prepared with his well-known skill, in a state of great purity and beauty.

When zinc containing indium is dissolved not quite completely in dilute sulphuric or muriatic acid, the whole of the indium originally present in the zinc is left in the black spongy or flocculent residue of undissolved metal, with which every one who has prepared hydrogen gas by means of zinc and acid is so well acquainted. Besides some zinc, this black residue is found to contain lead, cadmium, iron and arsenic, less frequently copper and thallium, and in some cases, as that of the Freiberg zinc, a small proportion of indium. From the solution of this residue in nitric acid, the indium is separated by ordinary analytical processes, based chiefly on the precipitability of its sulphide by sulphuretted hydrogen from solutions acidulated only with acetic acid; and on the precipitability of its hydrate both by ammonia and carbonate of barium. From its soluble salts, metallic indium is readily thrown down in the spongy state by means of zinc. The washed sponge of metal is then pressed together between filtering paper, by aid of a screw press, and finally melted under a flux of cyanide of potassium.

Thus obtained, indium is a metal of an almost silver-white colour, apt to become faintly bismuth-tinted. It tarnishes slowly on exposure to air, and thereby acquires very much the appearance of ordinary lead. Like lead, it is compact and seemingly devoid of crystalline structure. Moreover, like lead and thallium, it is exceedingly soft, and readily capable of furnishing wire, by the process of "squirting" or forcing. The specific gravity of indium, or 7·4, is very close to that of tin, or 7·2; and much above that of aluminum, 2·6, and below that of lead, 11·4, and that of thallium, 11·9. In the lowness of its melting-point, namely, 176° C., indium occupies an extreme position among the metals permanent in air; the next most fusible of these metals, namely tin and cadmium, melting at 228°; bismuth at 264°; thallium at 294°; and lead at 235°. Though so readily fusible, indium is not an especially volatile metal. It is appreciably less volatile than the zinc in which it occurs, and far less volatile than cadmium. Heated as far as practicable in a glass tube, it is incapable of being raised to a temperature sufficiently high to allow of its being vaporized, even in a current of hydrogen.

Indium resists oxidation up to a temperature somewhat beyond its melting-point, but at much higher temperature it oxidizes freely; and at a red heat it takes fire in the air, burning with a characteristic blue flame and abundant brownish smoke. It is readily attacked by nitric acid, and by strong sulphuric and muriatic acids. In diluted sulphuric and muriatic acids, however, it dissolves but slowly, with evolution of hydrogen. Oxide of indium is a pale yellow powder, becoming darker when heated, and dissolving in acids with evolution of heat. The hydrated oxide is thrown down from indium solutions by ammonia, as a white, gelatinous, alumina-like precipitate, drying up into a horny mass. The sulphide is thrown down by sulphuretted hydrogen as an orange-yellow precipitate, insoluble in acetic but soluble in mineral acids. The hydrate and sulphate of indium, in their relations to fixed alkali solutions more particularly, seemed to manifest a feebly-marked acidulous character. Chloride of indium, obtained by combustion of the metal in chlorine gas, occurs as a white micaceous sublimate; and is volatile at a red heat without previous fusion. The chloride itself undergoes decomposition when heated in free air, and the solution of the chloride upon brisk evaporation, with formation in both cases of an oxichloride.

But the chief point of chemical interest with regard to any newly discovered element, and consequently with regard to indium, is the establishment of its atomic weight; which, in the case of a metallic element, is based primarily upon the determination of the ratio in which it combines with oxygen and chlorine. Now the quantity of indium which unites with 8 parts by weight of oxygen and with 35·5 parts by weight of chlorine, has been found by Winkler to be 37·9, and by Bunsen to be 37·8 parts. But this determination of combining ratio falls far short of the definite establishment of the atomic weight of the metal. For example, the quantities of silver, mercury, bismuth, tin and tantalum, which exist in the best-known chlorides of these metals combined with 35·5 parts of chlorine, are 108, 100, 70, 29, and 37 parts respectively. Nevertheless, the atomic weights of these metals are taken to be not 108, 100, 70, 29 and 37, but 108, 200, 210, 118, and 184 respectively, the chlorides of the several metals being expressed by the formulæ $Ag\,Cl_1$, $Hg\,Cl_2$, $Bi\,Cl_3$, $Sn\,Cl_4$, and $Ta\,Cl_5$, respectively. Accordingly, in order to deduce the atomic weight of indium from the ascertained composition of its chloride, we require first to know whether its chloride is a mono-, di-, tri-, tetra- or penta-chloride. Now, in the case of a metal forming only one definite chloride, the constitution of the chloride as a mono- or poly-chloride, may frequently be determinated by a consideration of the analogies presented by the metal and its compounds to some other metal and its compounds, of which the atomic weight and molecular formulæ respectively are well established. But it is obvious that analogy can afford but little help in the case of a newly-discovered element, of which the analogies have still to be determined.

Failing analogy, a more sure guide to the establishment of the molecular formula of a metallic chloride is afforded in some instances by a determination of its vapour density,—tantamount to a determination of the quantity of chlorine by weight, contained in a given volume of the gas or vapour of the chloride experimented on. Thus, having estimated the quantity of chlorine contained in a given volume of heated muriatic acid gas, the quantities of chlorine contained in the same volume of the vaporized chlorides of mercury, bismuth, tin and tantalum, under the same circumstances of pressure and temperature, are found to be 2, 3, 4, and 5 times as great, whence the formulæ $H Cl_1$, $Hg Cl_2$, $Bi Cl_3$, $Sn Cl_4$, and $Ta Cl_5$, respectively. Now indium chloride being volatile at a red heat, there is no reason, save that resulting from the rarity and value of the body, why the density of its vapour should not be ascertained. As a matter of fact, however, no estimation of the vapour density of indium chloride has yet been made, and any evidence that might be deducible from it is consequently not forthcoming.

(*To be continued.*)

BULLOCK'S BLOOD—A NEW REMEDY.

In the practice of medicine, as in other worldly matters, certain things are in fashion for a certain time. Bleeding and mercury have had their day; cod-liver oil and chloral hydrate are already on the wane; alcohol and bullocks' blood are now in vogue among the Parisians,—the former for fevers and all inflammatory affections, and the latter for anæmia and pulmonary phthisis. It is a curious sight to see the number of patients of both sexes and of all ranks and ages who flock to the slaughter-house every morning to drink of the still fuming blood of the oxen slaughtered for the table. I was struck at the facility with which young ladies take to it, and I have heard many say that they prefer it to cod-liver oil. I shall not enter into any theoretical speculations as to its *modus operandi*, but what I can vouch for is, I know of several cases of anæmia that have been cured, and some of phthisis pulmonalis greatly benefited by the treatment,—at least, as much as they would be under cod-liver oil. For the more fastidious, however, a pharmacien has prepared an extract of blood, which is administered in the form of pills, each of which, weighing about three grains, is said to be equivalent to about half an ounce of pure blood.

M. Boussingault, a distinguished chemist, lately read a paper before the Academy of Sciences, giving an account of his researches on the composition of the blood, and expressed his surprise that, containing as it does all the constituents of a perfect aliment, it is not more generally employed as food. This is a subject worthy the consideration of philanthropists, especially in these days, when the price of meat is everywhere steadily increasing, —at least, among the meat-eating population; and it strikes me that the rivers of blood that are daily spilt on the ground in slaughter-houses might be utilized as food. In Europe, pigs' blood is the most generally consumed in the form of sausages; but that of all animals, without distinction, might in this way be more usefully employed. It is well known that in the steppes of South America the natives have for a long time used as food the blood of the animals they chased, which they previously coagulate and season with different condiments.

According to M. Boussingault, of all nutritive substances the blood of animals contains the greatest quantity of iron; and, although varying in different animals, it is in physiological conditions found in certain fixed proportions in the blood. In man, to 100 grammes of blood, M. Boussingault found 51 milligrammes of iron; in that of the ox, 55 milligrammes; of the pig, 59 milligrammes; and in that of the frog, 42 milligrammes. But it was not only in red blood that iron was found; the worthy *savant* detected it even in colourless blood; and after some experiments he found that the blood of snails contained as much iron as that of the ox or calf, and this he thought was sufficient to demonstrate that the red colour of the blood is not due, as is generally supposed, to the presence of iron in that liquid.—*Correspondent of Medical Times and Gazette.*

THE CHEMISTRY OF THE HYDROCARBONS.*

BY C. SCHORLEMMER, F.R.S.

(*Continued from page* 46.)

Hydrocarbons of the Acetylene Series.—By again abstracting from the olefines two other atoms of hydrogen, we obtain the third group of hydrocarbons, of which acetylene, C_2H_2, is the first member. This body is remarkable as being the only hydrocarbon which has been obtained by the direct union of its elements.

A general method of obtaining the hydrocarbons of this series is to abstract two molecules of hydrobromic acid from the bibromides of the olefines. As this mode of formation is quite analogous to that by which paraffins are converted into olefines, it appears most probable that the acetylene-hydrocarbons have a constitution similar to that of the olefines. In acetylene the two carbon atoms are linked together by three combining units of each atom—

$$CH \equiv CH,$$

and its homologues contain a monad alcohol-radical in place of one atom of hydrogen.

I have already mentioned that Butlerow has made some experiments for the purpose of proving the correctness of the theory which assumes that the non-saturated hydrocarbons contain carbon-atoms linked together by more than one unit of their combining capacity (Journ. Chem. Soc. [2], ix. 214). According to him, isobutylene, $(CH_3)_2C{=}CH_2$, could not, by the loss of two atoms of hydrogen, yield crotonylene, C_4H_6, but an isomeride with a closed group of three carbon atoms.

He found, however, that by the action of sodium ethylate upon monobrom-isobutylene, $(CH_3)_2C{=}CHBr$, no hydrocarbon is formed, but ethyl-isocrotyl, ether $\left.\begin{matrix}C_2H_5\\C_4H_5\end{matrix}\right\}O$. Instead of hydrobromic acid being taken out, bromine was replaced by oxethyl.

The number of isomeric hydrocarbons in this series is very small. They are hexoylene and diallyl, C_6H_{10}, and decenylene and rutylene, $C_{10}H_{18}$. Of these, hexoylene and decenylene are strictly homologous to acetylene—

$$\text{Hexoylene}\ \begin{matrix}C.C_4H_9\\|||\\CH\end{matrix} \qquad \text{Decenylene}\ \begin{matrix}C.C_8H_{17}\\|||\\CH.\end{matrix}$$

The constitution of diallyl is also known, as we know that of the allyl compounds—

$$CH_2{=}CH{-}CH_2{-}CH_2{-}CH{=}CH_2$$

Rutylene has been obtained from diamylene; its constitution is, therefore, probably similar to that of the latter hydrocarbon, which has already been fully discussed.

Hydrocarbons of the Series C_nH_{2n-4}.—Of this group only two have been artificially prepared, by abstracting hydrogen from the corresponding members of the preceding series. One of these, valylene, C_5H_6, has been studied very little; the other, $C_{10}H_{16}$, which has been obtained from rutylene, is isomeric with a large number

* A lecture delivered before the Chemical Society, April 4th, 1872. Reprinted from the 'Journal of the Chemical Society' for June, 1872.

of hydrocarbons, called the terpenes, existing in plants, chiefly in coniferæ and citrus species.

I need not here dwell upon the peculiar properties of this remarkable group of isomerides; I wish only to point out what we know of their chemical constitution, on which just lately a little light has been thrown.

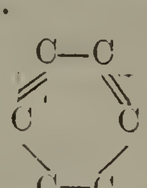
All terpenes possess the property of being easily converted by several chemical agents into new isomeric modifications, and these may be changed again into new isomerides, but all yield at the end one and the same product, called *terebene*, the most characteristic property of which is that it forms with hydrocloric acid a semi-hydrochloride, $(C_{10}H_{16})HCl$.

Now, according to Bauer and Verson ('Ann. Chem. Pharm.,' cli. 52), the hydrocarbon, $C_{10}H_{16}$, formed by heating rutylene dibromide with an alcoholic solution of potash, exhibits all the characteristic properties of terebene, and appears to be identical with it. As the constitution of amylene, from which rutylene is derived, is known, we are in a position to draw some conclusions as to the constitution of terebene, of which I have to say more further on.

On oxidizing terpenes, terephthalic acid is always formed, amongst other products. This compound is also a product of oxidation of several hydrocarbons of the aromatic group. This fact points out that the terpenes must be nearly related to the aromatic hydrocarbons, and this has been quite recently fully proved by Oppenheim, who has shown that, by abstracting two molecules of hydrobromic acid from the dibromide of turpentine, cymene is formed.

Aromatic Hydrocarbons.—These hydrocarbons, as well as their derivatives, have been very fully investigated during the last few years. We owe to Kekulé our present theory of the aromatic compounds; he first called attention to the following points:—

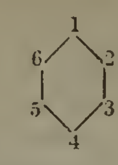
1. All aromatic compounds contain a common nucleus, consisting of six atoms of carbon.
2. These six atoms are linked together in such a way that six combining units remain unsaturated.
3. All aromatic compounds are formed by saturating these free units with other elements or radicals.
4. The differences observed in certain groups of isomeric aromatic compounds are caused by the different relative position of certain elements or radicals in the nucleus.
5. The carbon-atoms forming the aromatic nucleus are united together by one and two combining units alternately.



Although several chemists have proposed certain modifications of this hypothesis, all the facts with which we are as yet acquainted prove that Kekulé's view is the most simple and most probable.

The most simple aromatic hydrocarbon is benzene, C_6H_6; its homologues are derived from it by substitution of monad alcohol-radicals for hydrogen. The number of isomerides amongst these hydrocarbons is very considerable. Thus, the hydrocarbon C_8H_{10} exists in four different modifications, viz., ethyl-benzene, $C_6H_5.C_2H_5$, and three different dimethyl-benzendes, $C_6H_4\left\{\begin{matrix}CH_3\\CH_3\end{matrix}\right.$, the isomerism of the latter being caused by the different position of the two methyl-groups.

By representing benzene as a hexagon, and numbering the six corners, where the carbon-atoms are supposed to be, we can easily see the possibility of the existence of three dimethyl-benzenes—



The positions of the methyl groups being—

1 : 2; 1 : 3; 1 : 4.

No further different positions of the methyl groups are possible; for 1 : 5 = 1 : 3; and 1 : 6 = 1 : 2.

As the isomeric aromatic hydrocarbons have generally a great resemblance in their physical properties, it is of the highest importance to have means for distinguishing them from each other. This can be done by studying their products of oxidation.

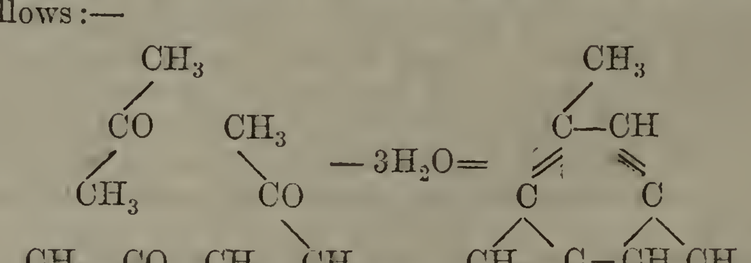
When an aromatic hydrocarbon is heated with very dilute nitric acid, one of the alcohol radicals is oxidized to carboxyl. Methyl-benzene, ethyl-benzene, amyl-benzene, and all other hydrocarbons containing only one alcohol-radical yield one and the same product, viz., benzoic acid, $C_6H_5.CO.OH$. The formation of this acid proves, therefore, the existence of only one alcohol-radical in a hydrocarbon. The three methyl-benzenes, as well as methyl-ethyl-benzene, yield isomeric methyl-benzoic acids, $C_6H_4\left\{\begin{matrix}CH_3\\CO.OH\end{matrix}\right.$, whilst diethyl-benzene gives ethyl-benzoic acid.

By acting on the hydrocarbons or their first oxidation products with stronger oxidizing agents, such as dilute chromic acid, every alcohol-radical is oxidized to carboxyl; the three dimethyl-benzenes, as well as methyl-ethyl benzene and diethyl-benzene, yielding bibasic acids, having the composition $C_6H_4\left\{\begin{matrix}CO.OH\\CO.OH\end{matrix}\right.$, etc.

But we are not only able to fix the number of alcohol radicals present in an aromatic hydrocarbon, but we can also determine their relative positions. Thus we know that in these dimethyl-benzenes the positions of the methyl-groups are—

Orthoxylene.	Isoxylene.	Methyltoluene.
1 : 2.	1 : 3.	1 : 4.

This has been proved in the following way:—Three bibasic acids are known, having the composition $C_6H_4\left\{\begin{matrix}CO.OH\\CO.OH\end{matrix}\right.$ viz., phthalic acid, isophthalic acid, and terephthalic acid. In phthalic acid the two carboxyls occupy the position 1 : 2; this we see from the fact that this acid is produced by oxidizing naphthalene, a hydrocarbon in which, as will be shown further on, two atoms of carbon are linked to two adjoining carbon-atoms of the aromatic nucleus. Isophthalic acid has been obtained by oxidizing isoxylene, and isoxylene has been derived from mesitylene, $C_6H_3(CH_3)$, a trimethyl-benzene in which, as Baeyer first pointed out, the three methyl-groups have the symmetrical position 1 : 3 : 5. This follows from the mode of formation of this hydrocarbon, which is obtained by heating acetone with sulphuric acid. Three molecules of acetone lose three molecules of water, and the residues join together as follows:—



By oxidizing mesitylene with weak nitric acid, we obtain monobasic mesitylenic acid, $C_6H_3\left\{\begin{matrix}CH_3\\CO.OH\\CH_3,\end{matrix}\right.$ which, when heated with lime, splits up into isoxylene and carbon dioxide. From this it follows that in isoxylene as well as in isophthalic acid, the two radicals occupy the positions 1 : 3 (or, which is the same, 1 : 5 or 3 : 5). As we now know the constitution of phthalic acid and isophthalic acid, we know also that of terephthalic acid, in which the two carboxyl groups must be in the positions 1 : 4; and the two methyl groups in methyl-toluene are in the same position, because it yields terephthalic acid on oxidation. Hence in the only remaining dimethyl-benzene, viz. orthotoluene, the methyl groups must occupy the only other remaining positions 1 : 2. Thus, although the direct proof of the oxidation of this hydrocarbon to phthalic acid is wanting, because this acid is easily further oxidized by chromic acid, we still are able to arrive at a conclusion respecting its constitution.

To illustrate by an example how we can ascertain the constitution of an aromatic hydrocarbon by means of the above facts, I choose the following. There exist three isomerides having the formula $C_{10}H_{14}$, which on oxidation yield terephthalic acid, and consequently contain alcohol-radicals occupying the positions 1 : 4.

Of these three hydrocarbons two have been obtained by synthesis, viz., diethyl-benzene and propyl-methyl-benzene; the third, called α-cymene, occurs ready-formed in Roman cumin-oil, and in the oil from the water-hemlock, and has also been produced by the action of phosphorus pentasulphide upon camphor. Now as α-cymene differs both from diethyl-benzene and propyl-methyl-benzene, it must be isopropyl-benzene, no other isomeric form being possible. This view is confirmed by several facts. 1. α-cymene boils at a lower temperature than propyl-methyl-benzene, and we always find that isopropyl compounds boil at a lower temperature than the corresponding normal-propyl compounds. 2. Isopropyl compounds readily yield propylene, and thymol, or the phenol of α-cymene (Journ. Pract. Chem. [2], iii. 50) is easily decomposed into propylene and γ-cresol, by heating it with phosphorus pentoxide (Zeitsch., 1869, 615). (3.) That α-cymene contains isopropyl appears also probable from the analogy of cumene (See Supplement of Watts's Dictionary, 295 and 302).

(To be continued.)

THE SALTPETRE DEPOSITS OF PERU.

In travelling eastward through Peru, from the sea to the Cordilleras, on the 20th parallel of south latitude, seven zones are crossed, the third of which, the Pampa of Tamarugal, and the fifth, Serrania Alta, or the inner chain (Upper Peru or Bolivia), are explored for saltpetre. The treeless Pampa, a plain somewhat depressed in the centre, has a very scanty vegetation, and the only thing which grows there is a single variety of lucerne grass (*Medicago*); the cultivation of even this is attended with difficulty, on account of the large proportion of common salt, borax and saltpetre in the soil. It serves in part for the support of the beasts of burden used for transporting to the coast the salts and metallic minerals found here. In the south of the Pampa is a large deposit of borax, pieces of which weigh on an average from 100 to 200 grammes; soda saltpetre is found on the borders of Pampa and Serrania, but too far distant from the sea. On the western slope of the Cordilleras, salt is only found in small quantities; but in Upper Peru, where frequent rains wash it together into great lakes, there are large quantities of it. The saltpetre mines consist of different strata. The surface of the ground is composed of silicates, sandstone and pieces of lime. At a depth of from 8 to 16 inches very regular prisms are usually found, which sparkle with a mass of very small microscopic crystals; the stratum below this, which is of rocky hardness, consists principally of common salt, with a little chloride of potassium and soda saltpetre, mixed with earth and pieces of silicates and carbonates, and has a thickness of 20 to 25 inches. Beneath this crust is the pure soda saltpetre, in more or less perfect crystals, from 20 to 40 inches long, and 3 to 7 feet in diameter. Guano is seldom found there, and only in small quantities; and it always occurs just below a stratum of salt. It is not in a powder, like that of the Chincha Islands, but adheres together, and is of a brown colour, containing the bones and remains of birds and insects, and has an ammoniacal smell.

The chloride of sodium and lime present furnish mineral constitutents required for the formation of the saltpetre. According to Thiercelin, the guano furnishes the nitrogen; but since the guano is always found below the salt crust, Kœnig is compelled to refer the nitrogen to some other nitrogenous organic bodies, from whose decomposition ammonia is formed, and this in turn is converted by the action of the air and organic bases into nitric acid. Besides the three substances named, all the conditions favourable to the formation of saltpetre are found in that neighbourhood, namely, a pure, dry atmosphere, absence of rain to wash away the saltpetre when formed, and the regular night fogs. The latter, leaving the salt undissolved, dissolve the saltpetre and filter it through this stratum, under which it crystallizes.

The search for saltpetre is conducted thus: The workman recognizes its presence by certain undulatory elevations of the ground, and numerous lumps of lime and disintegrated sandstone. He bores a hole some 12 to 18 inches in diameter, going down till the mineral is plainly visible. When the lowest layer is reached, the hole is widened to about three feet, filled with charcoal and sulphur and fired. The explosion breaks and tears up the ground for twice that distance around, and then properly begins the bringing up of saltpetre. The crude article varies considerable in compactness, colour and quality, and is named accordingly. The so-called sulphuret, which owes its name to its mode of manufacture, is the purest. The porous, earthy and the congealed are different in quality. If the raw product contains less than 50 per cent., the mine is abandoned as not worth working; a yield of 70 to 80 per cent. is exceptionally good. The raw material is transported on pack animals or waggons to the factory, where it is refined in two different ways. One method is to break it up in pieces and put it into an iron kettle half full of water, which is then heated over a fire for an hour, the insoluble matter removed and a fresh quantity of raw material added until the solution is saturated. The clear solution is run off into crystallizing vessels, the crystals collected when formed and allowed to dry in the sacks in which it is shipped. In the second method, steam heat is employed; the crude material is put into perforated iron baskets and suspended in boiling water, and the process repeated until the liqour is saturated. The saltpetre prepared in this way contains less than 1 per cent. of common salt, while that obtained by the former method contains upwards of 2 per cent. Large quantities of iodine are annually reclaimed from the mother liquors of the saltpetre works of South America. —*Scientific American.*

HEAT AND THIRST, AND SOME OF THEIR POPULAR ANTIDOTES.

By the Author of a "Report on Cheap Wines."

Heat and thirst have mighty effects on health and morals. Hot and thirsty people drink, and the effects of temperature on health are largely modified by the quality of the liquids consumed. So long as the choice lies between a gulp of lukewarm Thames water from the cistern of a lodging-house and a cool half-pint of beer, who can blame the man who has a penny in his pocket if he spend it on the beer? Thirst is overwhelming; and if it be a "vicious indulgence" to quench it with beer, we ought not to blame the thirsty man till we can show him the way to something better.

Thirst, as I showed the world when I wrote on cheap wines, is of three kinds. There is, first, the real thirst, from want of liquid, especially when a copious sweat exhales from the skin during honest labour in the heat; and this cannot be relieved without water in some shape. Then, secondly, there is that dreadfully painful clammy state of the tongue—the dry mouth caused by mental anguish, or bodily pain, as of wounds; that which occurs, too, in fevers and other diseases. This is not caused by mere lack of water, but by a defective or depraved and nauseous state of the secretions of the tongue and fauces under the influence of a worried nervous system. This is not relieved by water alone; on the contrary, water may excite loathing and disgust. This kind of thirst is relieved by those readily acting and and comforting varieties of food which are known as "stimulants" of various kinds. And inasmuch as there is seldom much thirst without some exhaustion, so the addition of some stimulant to common drink is expedient. The last kind of thirst is the craving for mental stimulation—the desire of a torpid brain to have its imagination roused, its feelings of benevolence, sociality, and self-esteem excited and gratified. This is what men drink for in company *in convivio*—at the times when each man shares with his neighbour the true delights of life; *convivium*—a word sacred by association, and immeasurably superior in moral force to the Greek *symposium;* a remark which, whether borrowed from Marcus Tullius Cicero, or from the judicious Hooker, slips my present memory.

A true "thirst extinguisher," then, as may we deduce from the foregoing principles, must be something more than the mere tepid water which is accessible to the population of our towns.

The most obvious "potential" stimulant is cold; "potential" because, whilst adding no material, it alters the distribution of the blood, and allays the restlessness arising from heat that cannot pass off. Whoever desires to convert our population to water-drinking should supplement those great boons, the street fountains, with some contrivance for cooling the water. A small glass of really *cold* water will quench thirst better than six times the quantity of lukewarm. But *iced* water and ice in its various forms sometimes create heat and dryness of the tongue.

With cold ranks carbonic acid as the most grateful and wholesome of stimulants—pungent to the tongue, grateful to the stomach, and felt with a grateful coolness as it escapes from every pore of the skin. How soon it was used in medicine I cannot tell; nor whether the delicious sparkle of natural aerated waters, or the briskness of a fermenting drink, or the effervescence with acids was in any degree known to the ancients. During the seventeenth and eighteenth centuries the effervescing draught was known by the name "cordial julep of Riverius," and, so far as I know, this great physician was the inventor of the draught, and the discoverer of its efficacy in allaying sickness. He thus describes it in one of his volumes of "Observations:—

"That excellent man, Laurence Bosch, apothecary, of Montpellier was ill with that epidemic which they call purple fever, in the month of December, 1622. Amongst other symptoms was obstinate sickness, so that he rejected water, wine, medicine, everything but weak broth; his inside was burnt up and his tongue dry. This so grave symptom was relieved by the following slight remedy:—℞. Of salt of wormwood a scruple; of fresh lemon-juice one tablespoonful. These were mixed at once in the spoon and administered. The vomiting at once ceased, and from that moment the patient took what he liked and kept it down.*

The draught of Riverius soon became, and has ever since continued, one of the most popular and useful of medicines. No matter whether soda be substituted for the "salt of wormwood," *alias* carbonate of potass; no matter whether citric or tartaric acid be substituted for the lime-juice, nor whether the nicety of modern pharmaceutists enables the ingredients to be mixed in a powder, or a granular salt, cheap, portable, and nicely flavoured—the principle is that of Riverius, and to him belongs the honour. About the time when our native Scottish royal family made their last desperate effort to eject the house of Hanover, Sir John Pringle, in his work on the 'Diseases of the Army,' speaks in high tones of the efficacy of the effervescing draught of Riverius, but regrets that it is too expensive for common soldiers. How he would bless modern applied chemistry if he saw the powder of soda, tartaric acid, and sugar, flavoured with essence of lemons, now sold in all the *low* neighbourhoods, and called Persian sherbet, one penny the glass!—*Medical Times and Gazette.*

* Lazari Riverii, 'Observationes Hagæ Comitum,' 1656.

COMPLIMENTARY DINNER TO DR. TILDEN.

The announcement of the retirement of Dr. Tilden from the office of Demonstrator in the Society's Laboratory, in Bloomsbury Square, was marked by an invitation from a few of his friends to a complimentary dinner, which took place on Thursday evening last. The occasion was taken advantage of by the officers and professors of the Society for the presentation of an Address, of which the following is a copy:—

"The undersigned officers and professors of the Pharmaceutical Society of Great Britain desire to offer to William Augustus Tilden, D.Sc., on his retirement from the office of Demonstrator in the Laboratory of the School of Pharmacy their hearty good wishes for his future welfare and happiness, accompanied by the expression of their high appreciation of his scientific attainments, and an acknowledgment of the success with which he has fulfilled the duties of his office, and also of his urbanity and kindness to all with whom he has been associated." The Address bore the signatures of the President, Vice-President, Treasurer, and the other officers of the Society, as also of all the Professors.

PHARMACEUTICAL EDUCATION.

A meeting of the chemists of Rochdale was held in the Committee-room of the Public Hall, on Wednesday evening, July 17th, 1872, to consider the scheme proposed by Mr. Schacht for promoting pharmaceutical education in the provinces, the report of the committee, and also the expediency of forming a chemists' association in Rochdale.

Mr. Councillor Booth occupied the chair.

After Mr. Schacht's scheme had been carefully gone through, clause by clause, it was moved and carried:—

"Whilst this meeting approves of the principles laid down by Mr. Schacht in his scheme for promoting pharmaceutical education in the provinces, it also considers that registered apprentices and assistants who, by reason of distance or other circumstances are unable to attend classes of any local association, should be eligible to be examined, and receive the grants of the Pharmaceutical Society."

"That in the opinion of this meeting, in order to give facilities for the increase of Class 1, the required agregate number of marks be reduced from 80 per cent. to 75 per cent."

The report of the committee appointed at a previous meeting to inquire into the best means of forwarding pharmaceutical education in Rochdale was next read. It recommended the formation of a chemists' association, the taking of a suitable room or rooms for the meetings of the members and classes, and advised the joining the chemists' classes to the Government Science Classes, so as to conduct them more economically. The report was approved of, and the committee was requested to prepare details of a scheme in accordance with its recommendations, and to report to a future meeting.

The Pharmaceutical Journal.

SATURDAY JULY 27, 1872.

Communications for this Journal, and books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Elias Bremridge, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

SECRET ALLIANCES.

The letter of our correspondent "Ægis" in the number for July 6th, has supplied materials for a leading article to our contemporary, 'The Medical Press and Circular,' under the appropriate heading, "Going Snacks." No title could be more fitting; it exactly conveys the idea of a partnership, of which the partners are ashamed, for the secret partition of contraband gains. We have already discussed the subject of secret alliances between medical practitioners and pharmaceutists from the pharmaceutical point of view, and have taken occasion to express our dislike to an arrangement which cheats pharmacy of its dues and provokes jealousies amongst pharmaceutists. We do not know that we have much to add to the opinions then expressed, though we might illustrate them afresh in as many forms as Proteus ever wore; but we hail with satisfaction any endeavour to bring further influence to bear in discrediting these equivocal combinations.

We need not now revive a discussion upon the equity of chemists' charges. At all proper times we are prepared to meet criticism upon that point, with confidence in the issue; but it is germane to the present question to say that, unless existing prices are unfair to the public, a system which gives a douceur often amounting to one third of the whole to the medical colleague cannot be profitable. It is therefore doubly incumbent upon the Pharmaceutical body to discourage these alliances, for they are injurious to the interests as well as to the reputation of their order. But there is even a stronger reason for condemning them than either of these, and it is to be found in the underhand manner in which they attack the business and the business character of brother pharmacists, and in the inevitable return of ill-will which such covert injuries excite. When it is disingenuously asserted by Mr. Plausible that his prescription cannot be dispensed by any other than the privileged Mr. Blank, and Mrs. Plastic is deterred from entrusting her mixture of Epsom salts and peppermint water, obscured under the cabalistic designation of Mist. Purg. Cardiac., to her accustomed chemist, it may be difficult to prove the corrupt nature of the transaction, but the secrecy observed does not diminish its immorality.

It is no justification for the depreciatory imputation that competent and upright pharmaceutists can not be trusted to compound medicines from *any prescription*, that the writer has purposely disguised its meaning with the object of making it unintelligible. It is as though the Board of Examiners should compile a secret Pharmacopœia and pluck the candidates who fail to describe its formulæ.

The editor of the 'Medical Press' feels a natural reluctance in believing that members of an honourable profession will so far lower themselves as to enter into these compacts for a direct money payment. We agree with him in thinking that it is of little consequence whether the *quid pro quo* is paid in malt or meal, and it seems like splitting hairs to question where the restraints of professional decorum will arrest the man who is at all events guilty of the gravamen of the accusation. We fear that the experience of Chemists will not permit them to entertain any doubts upon the subject, nor is the secret so well preserved as to escape the knowledge of the medical profession.

The existence and extent of the abuse is really not a matter of dispute; the practical question is how best to put a stop to it. And here our advice to our readers would be in accordance with the fable of the young larks nested in the ripening corn. If you want a thing done, do it yourself. It is in your own hands, and you need neither the help of Jupiter nor of the medical profession to enable you to accomplish it. Medical ethics provide for the good manners of the profession *inter se;* we can scarcely expect them to take cognizance of pharmaceutical etiquette, which is as yet governed by no laws, and has no claim to propose rules to the medical profession. Mutual respect and mutual forbearance will do more to preserve good relations than any amount of well-intended interference. We may, however, hope that the sensible suggestions of the 'The Medical Press' will receive attention, and that "going snacks" will be included in the catalogue of misfeasances unbecoming a professional man and a gentleman. It remains for us to consider whether it should be permitted in a liberal trade; and we hope that those who occupy honoured positions in our ranks will set the example of discountenancing this and every other form of ungenerous competition.

We advocate no unreasonable interference with the freedom of medical men honestly used for the good of their patients; we make no fantastic appeal to manufacturers to make public property of their secret formulæ. Neither patient nor dispenser is hurt by the prescribing of secret preparations which it is open to the whole world to procure, *e. g.*, Battley's Solution or Brown's Chlorodyne; but when such empiricisms as Pilula Asiatica are prescribed, and the formula is withheld by the prescriber, the practice of medicine is degraded, and the fetish of charlatanry installed in its place. To such false gods it becomes not true men to do homage; and we seriously offer a suggestion by which unwilling accomplices may honourably escape from the dilemma. Let them endorse upon the prescription the formula of whatever occult ingredient they may have been instructed to prepare, and the prescription will then become what it ought to have been from the first, viz. an intelligible exposition of the prescriber's intention.

THE BRIGHTON ARRANGEMENTS.

As each week passes and brings nearer the time fixed for the scientific festival of 1872, evidences multiply that the people of Brighton intend to do all they can to secure the comfort of their numerous expected visitors. Not a little of the pleasure to be obtained at such a gathering depends upon the accommodation which each person secures in the way of board and lodging, and the price he has to pay for it. This has not been lost sight of by the Town Committee, and they have issued a list of hotels and boarding houses, and the average rate of charges, which gives a choice of—

> "Houses of all architectures you please,
> From the Greek and the Gothic, Sir, down by degrees,
> To the pure Hottentot, or the Brighton Chinese."

Any information or assistance in respect to this matter may be obtained of the Agent, Mr. J. W. Hemmings, 4, Duke Street, Brighton.

Another phase of the subject of accommodation bears scarcely so promising an aspect. Although the dignitaries of the town appear to be anxious to keep up its reputation for hospitality by inviting the more notable visitors to become their guests, there appears to be a desire in some quarters to go beyond this, and at a recent meeting of the town council the sub-Committee on the reception of visitors, in their report, spoke of the few offers of hospitality to "unknown visitors" that had reached them. In the discussion which followed, one of the speakers evidently referred to the apostolic injunction as to the entertainment of strangers and its possible reward. But there appears to be a feeling that even scientific angels would be all the more welcome if they came properly labelled. Nor is this unreasonable, and if the reception committee will assist visitors in finding places where they may have what they want upon payment, and will take every possible precaution against extortionate charges, we feel certain that no more will be expected or desirable. All offers of hospitality should be spontaneous and every appearance of touting or compulsion should be carefully avoided.

An announcement has been made that the 'Brighton Daily News' will contain full and accurate reports of the proceedings from day to day, and that a special edition for the twelve days will be supplied daily, by post, for 2*s*. 6*d*.

The special railway arrangements will affect principally those who wish to attend the whole of the meetings of the British Association throughout the fortnight, and first class tickets will be issued to members of the Association, and other learned societies, upon presenting their card of membership at the London Bridge or Victoria Stations, entitling the holder to travel by all trains between London and Brighton, for two weeks £2. 10*s*., for one month, £4. In reference more especially to the Conference Meeting we are informed by Mr. W. D. Savage that the time for ordinary return or excursion tickets will be extended from two days to three weeks. Upon the same authority we are also able to state that a private room for the use of members of the Pharmaceutical Conference will be provided at the Clarendon Hotel.

NEWSPAPER SCIENCE.

The picturesqueness and force with which the progress of armies in the field or the details of state ceremonies are now described in our first-class newspapers, require such varied knowledge and such power of using it correctly that there need be little wonder if now and then there should be a trip. We might instance the description in the editorial columns of the *Times* of the recent visit of the Prince of Wales to Bethnal Green Museum, where the writer, evidently referring to the irruption of fashionable visitors into Bishopsgate Street, speaks of people who had never heard of Crosby Hall, apparently forgetting a passage in a certain author named Shakspeare with which probably most people are acquainted. Another style of error more frequently met with, is where the penny-a-liner affects the scientific style, instances of which we have in the various accounts of the case of poisoning recorded at p. 14, in which different reporters have attributed the death to the effects of "potash and sulphuric acid," "oxalic acid," and "cyanide of potassium." But a more ludicrous class of errors arise when the penny-a-liner is developed into what a contemporary has facetiously called a "young lion of the press," and in a gushing leader proves that a little knowledge is a dangerous thing. The following, from the 'Gardeners' Chronicle,' refers to an article of this nature which possibly caused surprise to many of its readers, but which is referred to as "at once interesting and sensible" by a contemporary which has an amiable weakness for considering itself one of the pioneers of pharmaceutical education:—

"Our excellent contemporary, the *Daily Telegraph* has a reputation for fine writing, and, to use an Americanism, 'slops over' on occasions. Quite lately the readers of that journal have been treated to a lecture on the advantages to be derived from a knowledge of botany —the occasion being the sad fate of two lads at Chester, who died in consequence of eating the roots, as we suppose, of Water Hemlock—*Cicuta virosa*, or perhaps of

Œnanthe crocata. Our contemporary, however, speaks of the poison as having been afforded by the roots of the common Hemlock, Conium maculatum.' 'Those who have seen a Celery bed in full seed,' says the *Telegraph*, will know how difficult it is for any but a practised botanist to distinguish the deadly *Conium maculatum* from its harmless [?] sister Umbellifer, *Apium graveolens*.' There is a little mistake here, as the writer would find if he indulged too freely in the 'sister Umbellifer' in its wild state. A parallel is then drawn between the case of these poor boys and that of Socrates, the symptoms are agonizingly detailed, and their severity explained by the fact, that 'Hemlock, with scarce an exception, is the most deadly plant in our English flora' [?]—an opinion backed up by a quotation from Gerarde's 'Herbal.' Our contemporary probably means Water Hemlock, though he distinctly says *Conium maculatum*, which is poisonous no doubt, but not nearly so much so as the *Cicuta* or the *Œnanthe*. To give further point to his remarks the leader writer in the *Telegraph* goes on to tell us of ladies mistaking wild Garlic for Lily of the Valley! and has a hit at 'crass gardeners' for mistaking the root of 'deadly Monkshood' [Aconite] for Horse Radish, a mistake that has unfortunately too often been made, but not, we venture to assert, by any 'gardener,' for, contrary to our contemporary's assertion that it would puzzle Gerarde himself to distinguish the two roots [! !], we venture to think that to any one at all accustomed to look at plants no two things can well be more dissimilar than the root of Aconite and the root-stock of Horse Radish. Certainly no gardener properly so called would ever make so terrible a blunder. In the same strain our contemporary descants on other poisonous British plants, including the wood Hellebore, 'Spring's White Rose' [! !], 'the sweet viscid pericarps of the Yew, and the black deadly wild cherries of the *Atropos belladonna*' [! !], etc. A disquisition on the origin of evil follows, and the article ends with a passage with the spirit of which we thoroughly sympathize:—

"'Surely, then, in addition to the sage old rule, which warns us to let all strange plants alone, we should do well to impress upon children, and especially upon schoolboys, a little—a few simple truths—of the natural history of our indigenous plants. No pursuit is more fascinating than is botany, in spite of the hideous phraseology with which it is encumbered. We do not speak here of the botany which is to be learnt from books, and the chief use of which is to enable a candidate to gain a certain number of marks in an examination for the Indian Civil Service, but of that botany which is acquired face to face with Nature, and under the broad canopy of heaven. It needs no tall talk in barbarous dog-Latin to show a lad the umbrella-like structure of the Umbellifers, and to teach him the simple and practically true generalization that all Umbellifers are deadly [?]. It was for want of some such simple wisdom that George Dobson and Albert Kinsey perished. How long will it be before we recognize that a little knowledge of Nature and her ways is worth all the idle lore with which pedants, learned and unlearned, have encumbered the history of the Heptarchy and of the early Roman Kings?'

"We have only further to remark, for the consolation of our contemporary, that he may safely eat Carrots and Parsnips, Carraway, Coriander, Aniseed, Fennel, Angelica, Chervil, Samphire, Umbellifers though they be; and to express a hope that before our contemporary parades his botanical lore again he may take the precaution of studying the books he affects to despise, and so save himself from falling into a tissue of blunders, the like of which we have rarely met with, even in 'newspaper science.'"

Perhaps after this our readers will not be surprised to learn that the plant was neither the *Cicuta virosa* nor *Conium maculatum* but the *Œnanthe crocata*.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

July 17th, 19th and 22nd, 1872.

Major.

Seventeen candidates were examined; of these, *eight* failed. The following *nine* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

*Tilden, William Augustus	Barnsbury.
*Hick, George	Bradford.
*Parson, Henry James	Birmingham.
Walker, Joseph	Dresden.
Mills, Robert	London.
Badcock, Daniel	Barnard Castle.
Powell, Thomas Henry	Hornsey Rise.
Ashworth, Amos	London.
Young, John Rymer	Warrington.

Minor.

Seventy-eight candidates were examined; of these, *thirty-eight* failed. The following *forty* passed, and were declared qualified to be registed as Chemists and Druggists:—

	*Pickard, William	Yeovil.
Equal.	*Baynes, James, jun.	Sheffield.
	*Edwards, David	London.
	*Ekins, Arthur Edward	Cambridge.
	*McJannet, James	North Walsham.
	*Oxley, Herbert Lister	Leeds.
	*Russell, Charles Harridge	Blackheath.
	Cooper, Herbert Hudson	Birmingham.
	Margetts, Usher	Eastwood.
Equal.	Frowd, Edward Francis	London.
	Outred, Thomas Benjamin	Colchester.
Equal.	Hart, Thomas	Manchester.
	Minett, Thomas Samuel	East Grinstead.
	Sykes, Joseph Spencer	Sheffield.
Equal.	Ellison, John Clement	Ashton-under-Lyne.
	Shapley, Charles	Torquay.
Equal.	Rimmington, George	Bradford.
	Williams, William	Merthyr Tydvil.
	Daves, William	Torquay.
Equal.	Harrison, John	Sheffield.
	Pearse, William Francis	Great Yarmouth.
Equal.	Jackson, Alfred Henrick	Manchester.
	Twist, Edward Herbert	Prescot.
Equal.	Findlay, James	London.
	Plimmer, William Thomas	Uttoxeter.
	Norton, Thomas	Stafford.
	Micklem, Austen	Reading.
	Barlow, Frederick	Macclesfield.
Equal.	Brown, John Ephraim	Grantham.
	Smith, Charles Clapcott	Rye.
Equal.	Chadwick, James	St. Helens.
	Fletcher, Joseph	Brigg.
	Thring, Edmund John Henry	Trowbridge.
	Walton, Major Foulds	Sowerby Bridge.
	Jameson, Walter George	Reading.
	Rowcroft, Albert Edward	Gravesend.
Equal.	Bowker, William	Bolton.
	Harsant, Frank Worsley	Epsom.
	Norton. Charles	Plymouth.
	Hill, Ernest	Weymouth.

The above names are arranged in order of merit.

* Passed with Honours.

Provincial Transactions.

TYNESIDE CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of the above association was held on Thursday evening, the 18th of July.

In the absence of the President, Mr. Marshall was voted to the chair. The paper announced was by Mr. Crozier, on "Camphor," and it proved to be both instructive and interesting. The discussion was carried on to a considerable extent by Messrs. B. S. Proctor, Marshall, Spence, Foggon, Kerse and Crozier, after which a vote of thanks was proposed by Mr. Heslop, seconded by Mr. Anderson, and carried unanimously.

Parliamentary and Law Proceedings.

HOUSE OF LORDS.

The Petroleum Bill.

On Friday, July 19th, their Lordships having gone into Committee on this Bill, the Earl of Morley proposed an amendment postponing the operation of the test until the 1st of February, 1873, so as to enable the stocks of petroleum now in hand to be disposed of, which was agreed to, and the Bill as amended passed through Committee.

On Tuesday, July 20th, the reports of amendments was received, and the third reading is fixed for Thursday, July 25th.

Adulteration of Food, Drugs, Etc., Bill.

On Tuesday, July 23rd, this Bill was brought from the Commons, read a first time and ordered to be printed.

HOUSE OF COMMONS.

Thursday, July 18th, 1872.

The Metric System.

In answer to Mr. J. B. Smith,

Lord Enfield said that the French Government have intimated that the International Commission on the Metrical System, the sittings of which were interrupted in 1870, will meet again on the 24th September next. It is understood from the Board of Trade that Mr. Chisholm and Professor Miller will attend on behalf of this country.

The Public Health Bill.

The House having resolved itself into Committee on this Bill, Clauses 1 and 2 were passed without discussion.

On Clause 3, which divides the country into urban and rural sanitary districts, Mr. Goldney said that the proper and successful carrying out of the provisions of the Bill would depend much upon the selection of a suitable body in whom to vest the powers. Boards of Guardians had failed to discharge the duties imposed upon them by previous statutes, and he believed that a County Board would perform the duties created by the present Bill in a more effective manner. Its accounts would be regularly published, and its proceedings would receive greater publicity and be more widely criticized than those of the guardians, the only effectual check to whom would be the Local Government Board. The County Boards he proposed would be formed of county magistrates elected at quarter sessions, with an equal number of representatives elected by Boards of Guardians. These would have under their supervision the sanitary arrangements of the county; and he thought there would be a great advantage to the ratepayers that such a Board should have to deal with an extensive area.

Mr. Corrance concurred in the amendment, as also did Mr. Dalrymple; and in reply to a remark made on a former occasion as to the power the Bill would place in the hands of the medical profession, the latter gentleman said that without the aid of that profession sanitary reform would be nowhere. There were some hierarchies that were probably worse than a hierarchy of doctors. There was the hierarchy of engineers, who thought the earth was created that they might operate upon it, and it was even possible to have such a thing as a hierarchy of lieutenant-colonels.

Sir M. Beach thought the Bill eminently unsatisfactory in the choice of local authorities, and was opposed both to Town Councils and Boards of Guardians.

Sir C. B. Adderley, on the other hand, was strongly in favour of Boards of Guardians, which, among other advantages, existed already, and could be set to work at once. If County Boards were created they would be split up into Local Committees, and would, in fact, soon become identical with the Boards of Guardians.

Mr. Stansfeld, in defending the Union as the unit of administration, denied that the Guardians had failed to do their duty, and stated that he had ascertained that the majority of them were prepared to undertake these sanitary functions.

Mr. Hunt objected to Boards of Guardians, which had been tried and found wanting. He preferred a County organization.

Mr. Whitbread, one of the Commissioners, supported the plan for taking Boards of Guardians.

Mr. F. Powell, also a Commissioner, supported the clause; and, Mr. Goldney having withdrawn his amendment, the opinion of the Committee was taken on an amendment moved by Mr. Corrance to Clause 5, which raised the point in a more direct form. On a division, the Committee decided in favour of Boards of Guardians by 84 to 7.

The House remained in Committee until long past two o'clock, and succeeded in disposing of all the clauses up to Clause 41. Many verbal changes were made, but the amendment of most importance was to constitute (in Clause 18) the Corporation of London the Port Sanitary Authority for London. This was done, Mr. Stansfeld explained, at the instance of the Corporation, which had offered to bear all the necessary expenses out of the Corporation funds. Colonel Hogg, the chairman of the Metropolitan Board, thankfully accepted the offer on behalf of the ratepayers, and expressed a hope that the public spirit of the Corporation would not stop here.

In Clause 32, which transfers to the Local Government Board certain statutory powers now vested in the Board of Trade, Mr. Kay-Shuttleworth moved to include in the transfer the powers exercised under the Metropolitan Water Acts. Mr. Clay, on behalf of the Water Companies, objected to the transfer, and Mr. Crawfurd spoke in the same interest.

In the next clause, the Borrowing clause, Mr. R. Gurney proposed to extend the term of repayment from thirty to fifty years. Mr. Stansfeld at first accepted the amendment, but objection being taken by Sir M. Beach and others, he proposed that the period should be limited to the term of years prescribed by the existing Acts.

Friday, July 19th.

The consideration of this Bill in Committee was resumed, Mr. Russell Gurney having proposed as an amendment the extension of the time of repayment of borrowed money from thirty to fifty years, Mr. Stansfeld assented to it, coupled with a proviso that in determining the time of repayment of a loan, the Local Government Board shall have regard to the probable duration and continuing utility of the works in respect of which the loan is required. This amendment was, upon division, carried.

Sir M. Lopes moved as an amendment that not more than $3\frac{1}{2}$ per cent. interest should be paid for money borrowed from the Loan Commissioners.

Mr. Gladstone objected that Government sometimes had to pay more than that rate, and upon a division the amendment was lost.

Mr. Gladstone then said that as "$3\frac{1}{2}$ per cent." would not be the minimum, he would propose to insert after those words, "or such other rate as may in the judgment of the Lords Commissioners of the Treasury be necessary in order to enable the loan to be made without loss to the Exchequer." This was agreed to.

The remaining clauses were then amended and agreed to, and the Bill passed through Committee. The amendments are to be considered on Thursday, July 25.

Monday, July 22nd.

Adulteration of Food, Drugs, etc., Bill.

This Bill was read a third time, and passed.

Public Health and Local Government Bill.

The order for going into committee on this Bill was read and discharged and the Bill withdrawn.

Suicide by an Enormous Dose of Arsenic.

An inquest held on Tuesday, July 2nd, at the Bristol Infirmary, upon the body of Mrs. Jarrett, who had committed suicide by taking arsenic.

The husband of deceased deposed that some years ago, he was a porter in the employ of an ironmonger. At the death of his employer he assisted the son of that employer in the sale of drugs. Some of the drugs were given to him to dispose of at a commission, and among them was a bottle of arsenic. He was not able to find a purchaser for the arsenic, and, as his employer told him either to throw it away or keep it, he labelled it "Poison," and used it for killing mice. This occurred seven years ago.

Other evidence was given that the deceased was in very low spirits in consequence of an accident which had temporarily disabled her husband, and that she was found in bed in a dying state, with the bottle of arsenic by her side.

Dr. Shingleton Smith, house surgeon at the Infirmary, said the deceased woman was taken to the Infirmary about a quarter to two on Sunday last. She appeared to be suffering from intense irritant poisoning, and was in a state of profound collapse. The bottle of arsenic and glass were brought to the Infirmary with her. It was pure arsenic, unadulterated in any way. The deceased never rallied after her admission. He had made a *post-mortem* examination of the body, and found a large quantity of arsenic in the stomach. He found about four ounces in all, $2\frac{1}{2}$ ounces of which was congealed in one mass. Four grains were a sufficient dose to prove fatal, and the deceased had taken at least 1000 grains, so that she had swallowed a dose sufficiently powerful to kill 250 persons.

The jury returned a verdict to the effect that deceased committed suicide while in a state of temporary insanity. —*Western Daily Press.*

Accident near Dunfermline.—An Assistant Drowned.

On Friday last a sad case of drowning occurred at Limekilns, near Dunfermline. It appears that about four o'clock, Mr. John Kemp, who was employed as assistant to Mr. Brown, druggist, High Street, proceeded to take a bathe in what is called "the basin," not far from Limekilns harbour, accompanied by two boys. The tide was receding at the time, and Mr. Kemp had not been long swimming in the water, when he gave indications of having been seized with cramp, on observing which the boys gave the alarm. Help was quickly on the spot, but meanwhile Mr. Kemp had sunk. The body was recovered in a short time, and medical assistance obtained, but life was extinct. Mr. Kemp was a native of Inverness-shire, and came to Dunfermline about four months ago, and during that time he gained the esteem of all who came in contact with him, on account of his very unassuming and courteous disposition, and the thorough knowledge of his profession which he displayed.

To the above extract from a Dunfermline newspaper, we may add that a notice had been received from Mr. Kemp of his wish to compete for the Pereira medal during the present week.

Supposed Poisoning of a Family.

A case of supposed accidental poisoning of a family occurred on Monday in Birmingham. It appears that after dinner a quantity of lemon-kali was purchased, of which the mother and four children drank, and in a very short time afterwards symptoms of poisoning exhibited themselves by excessive vomiting. The youngest was immediately taken to the Queen's Hospital, the others being at first too ill to be removed, but they were subsequently also taken to the hospital. The children, who were very prostrate and suffering a great deal from shock, an indication of poisoning, were detained at the institution as in-patients, but the mother, after the proper remedies had been administered, was able to return home. At a late hour the children were lying in a somewhat critical condition. The lemon-kali unconsumed will be analysed in order to discover whether it contained any poison. The husband, who was from home at the time of the occurrence, states that nothing was kept in the house likely to produce the effects from which his family are suffering.—*Echo.*

Poisoning by Turpentine.

At Birkenhead, on Tuesday, July 23rd, a child five months old, named Eliza Russell, was poisoned with a dose of spirits of turpentine administered by mistake. It appeared that the child was crying, and the father told his daughter to give it some peppermint, and took down the bottle for this purpose, and poured out a spoonful of the liquid, but it proved afterwards to be spirits of turpentine. The child quickly died, with all the symptons of poisoning. A coroner's inquest will be held, and the matter will be investigated by the magistrates.—*Liverpool Courier.*

Suicide by Carbolic Acid.

On Monday the Liverpool borough coroner inquired into the circumstances attending the death of a woman thirty-nine years of age, named Elizabeth M'Dowell, the wife of a bricklayer. From the evidence of her husband it appeared that the woman was in the habit of drinking to excess, and he described her as sometimes queer in her ways and furious in her temper. When he went home to dinner on the previous Wednesday his wife went upstairs. A few minutes afterwards she called to him, and on his going into the room, she held up a glass, saying, "Jim M'Dowell, here's your very good health." Before he could interpose, she drank about a wineglassful of what proved to be carbolic acid, and then said, "You're too late." She did not speak afterwards, and having thrown herself on the bed, died in about half an hour.

A verdict was returned that the deceased committed suicide while labouring under temporary insanity.—*Liverpool Daily Courier.*

Poisoning by Vitriol.

On Monday, July 15th an inquest was held at Battersea, on the body of Henry Wiselthier, aged 3½ years, who died through drinking some vitriol from a ginger beer bottle. A verdict of accidental death was returned. —*Wandsworth and Battersea District Times.*

Death from Drinking Strong Spirits.

According to the account in the 'Preston Herald' of the inquest upon the man whose death was recently attributed to drinking methylated spirit, the spirit in question, upon examination, was found to be a very strong grain whiskey. The quantity drunk is believed to have been about a "noggin." A verdict was returned that deceased died from the effects of drinking too large a quantity of distilled spirit, not knowing the strength.

The Adulteration of Bread with Alum in Melbourne.

We have received from Mr. John Drummond Kirkland, Lecturer on Materia Medica and Practical Chemistry in the Melbourne University Medical School, a copy of the following letter addressed by him to the Editor of the 'Australian Medical Journal,' on the subject of the prosecutions in Melbourne for adulteration of bread, recently reported in this Journal (p. 396):—

"The recent prosecution of several bakers of Melbourne for selling bread adulterated with alum having come to a close, so far as the chemistry of the matter is concerned, I may perhaps be allowed to make a few remarks upon the subject from a chemical point of view, in the 'Medical Journal,' more especially as I had not the opportunity of giving the whole of my evidence in the case.

"It may be remembered that at the District Court, on the 15th September, 1871, I deposed to the fact of having analysed a sample of flour said to contain a considerable proportion of alum, without finding any therein. A process for the detection and estimation of alumina in bread or in flour, the best in use at the time, was described. At the same sitting of the Court, it was determined (not at my suggestion as stated in one of the newspapers) to make up separate samples of flour of one pound each, containing respectively a different and known quantity of alum. Of these samples one was received by myself. During the course of the analysis of the sample, certain phenomena were observed, which rendered it necessary to ascertain the quantitative accuracy or otherwise of the method used, before proceeding further. The results showed that the process, although *qualitatively* correct, was not so *quantitatively*.

"These investigations, and the fact that I could not devote the whole of my time to laboratory work, prevented my being prepared to give evidence on the day set down for hearing. Accordingly notice was sent to that effect to the sitting magistrate, Mr. Call, P.M., and another week stated as being required for finishing the work.

"The trial, however, proceeded, and three gentlemen deposed on the 5th October, 1871, as to the amount of alum found by them, as follows (from the newspaper report), viz.:—

No. I.	found equal to	3·89 grains,	contained	20 grns. per lb.
No. II.	"	8·0	"	15 " "
No. III.	"	25·0	"	10 " "

"During the following week my report was sent to Mr. Call, P.M., in which it was stated that 2·68 grains of alumina, equivalent to 23·6 grains of ammonia alum, had been found in the sample. The analysis was performed after the method, but slightly modified, previously described by me at the District Court.

"I have since requested Mr. Call to be good enough to furnish me with a memorandum for publication of the amount of alum placed in the sample by him; he, however, did not deem it advisable under the circumstances to do so.

"According to a somewhat modified process from that used in the case reported upon, the following results were obtained, viz.:—

	Alum in Flour per lb.	Alum found.
No. I.	60 grains	55·65 grains.
No. II.	30 "	27·12 "

"These numbers show but a slight loss of alumina, when the large proportion of organic matter with which the alum was mixed is considered, and it is remembered that one grain of alumina represents nearly nine of alum.

"It may be observed from the newspaper reports that one at least of the chemists employed calculated the alum from the amount of phosphate of alumina found; if so, the results arrived at cannot by any means be received as correct; from the fact that the precipitate obtained of so-called phosphate of alumina is an indefinite mixture of phosphate of alumina and alumina with possibly some silicate of alumina. Both Watts and Ure in their dictionaries refer to this. Ure says (5th edition): 'The only precipitate which can, under the circumstances of the experiment, simulate alumina, is the phosphate of that earth, which behaves with all re-agents as pure alumina. Such a precipitate, therefore, if taken account of as pure alumina would altogether vitiate a quantitative analysis, if the amount of alum were calculated from it;' *et seq.* Similar remarks are made in Watts's 'Dictionary of Chemistry.'

"Moreover, phosphate of alumina itself varies in composition, under certain conditions of precipitation, and to take it, or any indefinite mixture of it, with alumina, as a basis for calculation is quite contrary to a fundamental and well-known rule in analysis; it being absolutely indispensable that the substance from which calculations are made, should be of known, definite, and unalterable composition, under the circumstances of its preparation.

"The following analysis will show the extreme inaccuracy of such data:—

	Alum in Flour per lb.	Alum found. As calculated from so-called Phosphate of Alumina.	Alum found. As calculated from so-called Alumina.
No. I.	30 grains	17·17 grains	40·86 grains.
No. II.	60 "	38·17 "	98·79 "

"Portions of the same samples analysed by the method now followed by me gave pure alumina equivalent respectively to 27·12 and 55·65 grains of alum to the pound of flour.

"On the contrary, the advantage of the method used in the laboratory of the Medical School consists mainly in calculating the alum from a substance, viz., alumina, the chemical composition of which is definite and invariable, and the purity of which, when obtained, is easily ascertainable.

"In conclusion, it may be confidently stated, that, where any effective quantity of alum has been used in the manufacture of bread it may as surely be detected as the poison arsenic when present in the viscera, or disseminated through the tissues of the animal body; and, on the other hand, where not present, a properly conducted analysis will not discover it."

The Right to Use the Names "Kalydor" and "Odonto."

Rowland *v.* Breidenbach.

Before the Master of the Rolls, July 22nd.

This Bill was filed in December, 1869, by Messrs. A. Rowland and Sons, of Hatton Garden, against the late Mr. Henry Breidenbach, of New Bond Street, claiming an exclusive right in the terms "Macassar Oil," "Kalydor," and "Odonto," as denoting articles manufactured by the plaintiffs under these respective names. The occasion of the suit was an advertisement inserted in the *Times* by the late Mr. Breidenbach, in December, 1869, offering for sale a "Christmas Box," containing 32*s.* 9*d.* worth of "toilet luxuries" for 12*s.*, among such "toilet luxuries" being "Macassarine oil," "Kalydor," and "Odonto," price 1*s.* each. Upon the publication of this advertisement the plaintiffs filed the bill, and obtained an injunction *ex parte*, restraining Mr. Breidenbach from using these terms, except as denoting articles manufactured by the plaintiffs. In March, 1870, this injunction was dissolved on the application of Mr. Breidenbach, as reported in the *Times* of March 25th, 1870. Since then Mr. Breidenbach and the senior partner in the plaintiff's firm have died. The suit was revived by the surviving partners against Mr. Breidenbach's representatives, and now came on to be heard with reference to the terms "Kalydor" and "Odonto" only, it being conceded that Mr. Breidenbach had infringed no right of the plaintiffs by his use of the term "Macassarine oil." The evidence was voluminous, no less than 89 affidavits, containing 900 folios, having been filed by the plaintiffs in support of their contention that they have acquired an exclusive right to the terms "Kalydor" and "Odonto."

Mr. Fry, Q.C., Mr. Day, Q.C. (of the Common Law Bar), and Mr. Bradford appeared for the plaintiffs; Mr. Southgate, Q.C., and Mr. Brooksbank for the defendants.

The Master of the Rolls, who had taken time to consider his judgment, said he was satisfied that the terms "Kalydor" and "Odonto" had become *publici juris*. There was evidence of an article called "Kalydor" having been openly sold by as many as 36 tradesmen besides the plaintiffs since the year 1848, and there was similar evidence before the Court with respect to the article called "Odonto." In fact, any one then in court had as good a right as the plaintiffs to sell "Kalydor" or "Odonto," provided he did not call it "Rowland's Kalydor" or "Rowland's Odonto."

Bill dismissed with costs.—*Times.*

The Right of Scotch Physicians to Practise Pharmacy in England.

A case of some considerable importance to the medical profession recently came before Mr. Macnamara, the judge of the Marylebone County Court. The question, divested of all technicality, was whether a member of the College of Surgeons in England, authorized to practise as a physician by a diploma from the University of Edinburgh, but not qualified as a member of the Society of Apothecaries in London, could recover for medicines supplied without advice or visits. Mr. Macnamara decided that such a practitioner could not recover for medicine supplied which was not auxiliary to a surgical case, although registered both as a surgeon and a Scotch physician. Indeed, according to this decision, such a person is liable to penalties under the Apothecaries' Act. Should this judgment be upheld by the superior court, it will make sad havoc of those who, practising under Scotch or Irish degrees, affect the right to add the practice of pharmacy to their other qualifications, although possessing no licence from the Society of Apothecaries in England. The medical graduates of the old universities practically lay no claim to the practice of pharmacy; the Fellows and Members of the College of Physicians in England are expressly forbidden it by their bye-laws; the medical graduates of the London University are excluded such practice by statute (the Medical Graduates Act, 1854); the Licentiates of the College of Physicians, who have the privilege of compounding and dispensing medicines for patients under their own care, being the single exception among English medical men to the otherwise exclusive privileges of the Society of Apothecaries. Should this decision of the Marylebone County Court Judge have the effect of closing many of the present open surgeries maintained by other than those duly licensed to practise pharmacy, it would add greatly to the respectability of the profession, and save much confusion in the public mind as to the relative qualifications of the different orders of the profession.

The case referred to by Mr. Macnamara, viz. the Apothecaries' Company *v.* Collins, reported in 4 Barnewall and Adolphus, 604, was decided so far back as 1833.

In giving judgment, Lord Denman (Chief Justice) said—"Even English physicians would be included within the 20th section of the Apothecaries' Act if there were not a special exception in their favour in the 29th section." And Mr. Justice Littledale remarked—"The words would include all persons who have taken medical degrees, were it not for the 29th section, which saves the rights of the two Universities of Oxford and Cambridge, the Royal College of Physicians, and the Royal College of Surgeons. But the statute, by expressly exempting the two English Universities, does not exempt those of Scotland also. The Act applies to England and Wales only—Scotland is not in contemplation."

Mr. Justice Parke observed—"The duty of an apothecary as defined by section 5, is 'to prepare with exactness and dispense such medicines as may be directed for the sick by any physician lawfully licensed to practise physic by the President and Commonalty of the Faculty of Physic in London, or by either of the two Universities of Oxford or Cambridge.' A Scotch physician," continued his Lordship, "is certainly not enabled by the Act to perform this duty." The whole contention now is, whether a Scotch physician can recover the price of medicines supplied by him *quâ* medicines; in other words, can he practise pharmacy, pure and simple, by furnishing medicines unconnected with medical attendance? If not, he certainly exposes himself to penalties under the Apothecaries' Act for affecting so to do; and even though, as in the case before us, a member of the Royal College of Surgeons of England, he can only recover for medical attendance as auxiliary to a surgical case.

Such a complication of conflicting interests, especially if the decision of the Marylebone County Court Judge should be affirmed by the superior court, seems at all events to demand further legislation, if only by way of simplifying and amalgamating the licensing bodies throughout the United Kingdom.—*Medical Times and Gazette.*

BOOKS RECEIVED.

A Handbook of Chemical Technology. By Rudolf Wagner. Translated from the Eighth German Edition, with extensive additions by William Crookes, F.R.S. London: J. and A. Churchill. 1872.

The Half-Yearly Abstract of the Medical Sciences. Being a Digest of British and Continental Medicine and of the Progress of Medicine and the Collateral Sciences. Edited by W. Domett Stone, M.D., F.R.C.S. Vol. LV. London: J. and A. Churchill. 1872.

Notes and Queries.

*** *In order to facilitate reference, correspondents are requested to mark their answers in each case with the title and number of the query referred to.*

No notice can be taken of anonymous communications. All queries or answers should be accompanied by the name and address of the writer.

[321.]—IS THE WOOD OF EUCALYPTUS SUITABLE FOR ENTOMOLOGICAL CABINETS?—I was much pleased with the article on the various species of Eucalypti in the PHARMACEUTICAL JOURNAL, and should be very glad to learn if any of our entomological friends at the Antipodes, or elsewhere, have ever tried the service of the wood for insect cabinets. If *Eucalyptus Acajon* is *entirely* free from any resinous matter. I should fancy that it would be as equally valuable as mahogany, and certainly it ought to be cheaper. The desideratum is to get a hard wood free from resin, and cheap. Have we this combination in any of the eucalypti; and, if so, which species?

[322.]—QUILLAI BARK LOTION.—A. D. would be glad if any one can give him a formula for Quillai Bark Lotion for the Teeth.

POISONING BY BELLADONNA PLASTER.—Mr. C. A. Hemingway reports in the 'British Medical Journal' (June 1st, p. 576), that having prepared a small belladonna plaster, about the size of a crown piece, by spreading the extract with his right thumb upon a portion of adhesive plaster, he was afterwards seized with what appeared to be symptoms of belladonna poisoning. Upon examining the pupils of his eyes in a mirror, he found the right pupil much dilated, whilst the left was of the usual size. These symptoms passed off after a short time. There was no wound or abrasion of the thumb, and the inference drawn by Mr. Hemingway is that the external application of a belladonna plaster of even moderate size, might sometimes be followed by dangerous symptoms. Another correspondent, the following week (p. 628), says that he has frequently of late found poisonous effects follow the external use of belladonna, and he has been led to believe that formerly a very inactive extract was dispensed compared with that which is now produced by improved pharmaceutical processes. See also the cases mentioned in this Journal, *ante*, vol. ii. p. 570.

LEAD POISONING BY A "HAIR RENEWER."—Dr. J. M. Crocker reports, in the 'Boston Medical and Surgical Journal,' that he met with a patient suffering from the symptoms of lead palsy and colic, the origin of which was not at first apparent. Upon inquiry, however, he found that he had been for some time in the habit of using a "hair renewer," made by himself, by mixing three teaspoonfuls of lac sulphur and two teaspoonfuls of sugar of lead in a pint of water. The hair dressing being stopped, and proper remedies administered, the man recovered.

POTASSIUM.—Professor A. E. Dolbear has obtained this metal, in small quantity, by reducing the di-potassic sulphide by means of iron. The salt in question is intimately mixed with iron filings, and subjected to a bright red heat, in a suitable distillatory apparatus, the products of distillation being received in naphtha. The reaction is simple, and may thus be represented:—$K_2S + Fe = FeS + K_2$. The author suggests a similar method for the preparation of sodium.—*American Chemist.*

Correspondence.

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

PROVINCIAL EDUCATION.

Sir,—I have not hastily accepted the invitation given to all members, and especially to local secretaries, to criticize the scheme of education now before the Council. The letter of Mr. Barnard S. Proctor makes my course rather clearer; and since the report and action of the Committee of 1870 still seems worthy of commendation from so able an educationalist, I trust it is not presumptuous in a member of that committee to state that, after two years' interval, he also can look back with confidence in the soundness of the position then adopted by the Society. This question can hardly be dealt with as if it were now heard of for the first time. Without straining the claim of consistency unduly, it may be asserted that a society cannot forget that its historical records define its policy, and commit it to a maintainance of the same until its views are enlarged or changed.

An estimate of the present and future demand for education forms an important element of the question under consideration. Upon reflection, it will be seen that the present demand is much below a normal quantity. The Pharmacy Act of 1868 supplied our starting-point, by clearing from the educational arena all assistants of the age of twenty-one years. (Preparation for the Modified examination can hardly be considered in any scheme.) Our estimate of the amount of educational demand that existed at the middle of 1868 must, therefore, be expressed by—*nil.* At the same period of 1869, it is evident that a certain number of young men had reached the age of twenty-one, forming the nucleus of a body from which our present students are recruited. For the years 1870, 1871 and 1872, three similar bodies of young men have to be added; and hence the aggregate number has increased considerably. But the question of how many probable students we have does not depend merely upon an estimate of how many attain the age at which they are legally eligible to offer themselves for examination, but also upon ascertained experience as to the average at which such young men enter upon the studies preparatory to their examinations. Some will do this immediately after completing their pupilage, but it is evident that from financial and other reasons many will defer this for a few years. Probably an average would fall somewhere near twenty-three or twenty-four years of age. As we have shown that the oldest members of the present student-class will now be but twenty-four years of age, it seems fair to estimate the total number as only one-half of what it will be in a few years. Besides this, a very heavy deduction must be made for the young men of this class who are leaving the trade rather than face examinations not contemplated by them when they entered upon it.

I offer this estimate of our numerical position quite independently of any opinions as to the policy we should adopt. It is the interest of all, however divergent our educational plans, to form some such estimate, and it has a special bearing upon the comparative absence of demand for help which followed the Society's earlier action toward supplying this. If we represent the normal numbers of the student-class by the unit 1·0, I incline to the belief that they do not greatly exceed ·3 at the present time; and further, that whilst our education code No. 1 was in force they never reached ·2.

I now come to the scheme of education laid before the Council and the Society by my friend, Mr. Schacht. That it will be received in all quarters with the most friendly predisposition is well-assured by the private and public esteem which Mr. Schacht enjoys. Possibly, this may even check that independent criticism so desirable for a measure of this kind. I could have wished to find in the "Principles" of the new measure, some statement as to the views of the Council about its permanency or the contrary. If the Society accepts the permanent duty of providing and paying for the education of those who in future offer themselves for examination, it is introducing an organic change of the deepest significance. The Committee of Council in 1870 did not shirk this question, but distinctly avowed that the action then taken was temporary and transitional. Has the Society's policy changed, or has it not?

Let us look at the proposed "payment for results" which forms so large a part of the new scheme, not permitting its elaborate and carefully thought-out mechanical details to satisfy us without a deeper inspection. The system of the Government Department of Science and Art being the model followed by the new scheme, the essential differences in object and situation are to be noted, as well as the close resemblances in mere details. The Imperial Government accepts the duty of paying for such educational results, not as a temporary one, but as one to be further developed from year to year. But, even the Government guards itself against merely saving the pockets of those who can afford to pay for their own education, and only recognizes the artizan-class in its payments. The Department of Science and Art does not pay its money until the student has successfully gone through the pass examination, which it regards as the "result" that justifies the payment. In our scheme, the same students are to be allowed to earn payments for three consecutive years; and as chemists and druggists in business are eligible, it is quite possible that the society may pay for results a dozen times, and yet its examining board may not receive half that number of candidates from the rewarded students.

It cannot be irrelevant to enquire what will be the position of our own examining board when this new *imperium in imperio* is established. The Minor Examination will be infinitely the better test because of its practical section, and, I can imagine bitter disappointments and heartburnings as the result of this double test. If A.B., passing the "Payment Examination" in May, and certified by Professor C. D., of the University of Y.Z., to be competent in chemistry, be plucked on this subject in July by our own board, that body will be placed in an unenviable position. It is impossible to avoid this by making the "Payment Examination" stiffer, for it seems certain that we must aim at making it just a shade easier than the Minor Examination. But, how is this to be done when the examiners are two independent bodies? I fear the answer must be—impossible! Further, this theoretical (though impossible) harmony will be believed in by the candidates, and if A.B. be an average student he will shut up his books after success at the "Payment Examination." This result, when multiplied, will, I fear, lessen the amount of preparation for our Minor Examination.

The difficulty of getting an absolutely equitable system of "payment for results" is seen at many points. It is not surprising that this has induced some of your correspondents to suggest that the payment should be made directly to the student. The journey, logically taken from the "principles," leads to this idea. But, it no sooner enters one's mind than it is displaced by the much simpler one that the Chairman of our own Board of Examiners should fill up a cheque for each successful candidate, and thus pay for results. Seriously, the recognition of the payment as one earned by the student has this tendency; it creates the idea that it is his property, to be returned to him in some way by reducing his fees to a nominal amount. Now, every profession contains some students to whom such mitigation of expenses is acceptable, but I contend that it is neither necessary nor desirable to place all our provincial students in such a position.

The other modes of aid to Provincial Chemists' Associations are disposed of by the scheme in half-a-dozen lines, and yet they involve a possibly large expenditure of money. The engagement to "go halves" with any association in any expenditure with "a distinct scientific educational object" is boid in its scope and dubious in its definition. If an association inclines to pay £20 per annum for rent of premises for its classes, it will claim the same amount from the Pharmaceutical Society, and go into rooms at £40 per annum. Business men recognize the evil of having a large balance at their bankers, and I cannot but think that the invested balance of the Society encourages the proposal of outlay without sufficient scrutiny. I would invite comparison between the present provisions and those of code No 1 of November, 1870, believing that the latter offered much greater security for the ratepayers' money," and was at the same time quite as liberal towards legitimate objects. The laxity of view found in some quarters is perhaps at its maximum when we meet with suggestions for giving sums of money to local committees, and letting them decide upon their appropriation. Under such circumstances, an application from a local committee would be a demand—its refusal would be a personal affront.

Finally, let us recognize the fact that the Society cannot afford to make mistakes a third time. There can hardly be any one who will doubt that it was a mistake to sweep away, untried, the *bonâ fide* Education Scheme No. 1. How this happened is still a mystery, but its substitute in scheme No. 2 was so unhappy that it could not find a friend to defend it when attacked. On no principle of equity can it be permanently settled that the education of future chemists shall be paid for largely by an annual tax upon present chemists. Nor can any precedent for such a course be adduced from the practice of other professional bodies. If the present subscription brings an income larger than can be legitimately expended, let it be reduced. Within reasonable limits, I believe that members of the Society generally will recognize and accept the duty of helping provincial education in its present transitional state, because such condition is the result of the changes which the Society effected in 1868. That Mr. Schacht's scheme of payment by results might lead to the earlier establishment of pharmacy classes in a very few places is possible, but I hold this to be an insufficient reason for establishing an unsound and very costly system, incompatible with our present examinations. The scheme would only operate in towns with students numerous enough to form classes. Its object is, therefore, merely to distribute aid proportionately amongst these few towns. I venture to say that this may be done, and ought to be done, without incurring the evils which must result from following that seductive, but wholly inaccurate, phrase, "payment for results."

RICHARD REYNOLDS.

Leeds, July 23rd, 1872.

Sir,—I have read in the Journal with considerable interest Mr. Schacht's scheme for promoting provincial education, with the comments and wise suggestions made thereon. But it appears to me that what he proposes has, to a great extent, been tried in a few localities under able management and has signally failed, through the apathy of those it was intended to benefit. This plan, however, has its peculiar attractions; and assuming that a much greater interest may be taken in schools established under it, I cannot see how it can meet the case, since none can avail themselves of the lectures proposed to be given unless they be in the immediate vicinity of cities or large towns.

If, on the other hand, your schools are established in many towns, how can the expenses be met? And after every effort has been made, there still will remain a very large number of assistants unable to benefit from such an arrangement, who would look with a jealous eye on money grants from Bloomsbury Square in which they were not benefited.

I am aware many of our friends in the country consider they have a strong claim on the "purse of the Society," because they say "it is our money which fills it." I grant such is the case; but in looking through the list of those who pass the examinations and obtain certificates, I find an equal proportion are from the country who either directly or indirectly have obtained from the school in Bloomsbury Square the knowledge which has enabled them to pass.

I am not opposed to grants when satisfactory local efforts have been made for a special object; say, the purchasing of a good microscope, or books of reference, which may be beyond the reach of individual assistants, subject to certain conditions; but it appears to me injudicious to attempt to establish anything like efficient provincial schools aided to any great extent by the funds of the Society.

I contend a school does exist offering every facility for the education required, and in my judgment was intended by the founders to be so. I advise all those who have the means to enter there for one session, when by diligence and perseverance they may easily pass the two examinations, and thus tend by their acquirements to help to raise the body of whom they form a part, and also greatly improve their future prospects.

This is my plan for the many.

There are, I estimate, within a radius of six miles of the Square, one thousand assistants, eight hundred of whom have passed neither the Major nor Minor examination.

Cannot a considerate and generous arrangement be entered into by their employers, whereby many of their assistants may attend two mornings in each week at Bloomsbury Square, say until one o'clock, to hear lectures, examine specimens, in fact do any thing to promote their improvement, and be allowed an hour or so daily (when business permits), and take one or two hours for study by rising early before business commences.

By some such plan as this a young man of moderate abilities, with a fair preliminary knowledge of his business, could pass his Minor examination the first year; and with a little modification of the arrangement his Major in the second year.

If you take in an additional radius of nine miles, you include towns containing about 300 more assistants, who could attend in a similar manner. These gentlemen, thus qualified, could then obtain better remuneration both in town and country, and make room for a fresh supply from the provinces.

This plan has been carried out most successfully by a few houses, and has created between the employer and the employed kindly feelings, which have been mutually gratifying and advantageous to both parties.

I believe there are many very anxious to help the young men out of their present position; but there must also be a desire on the part of the latter to secure at a sacrifice the advantages of an education which may not long be obtainable on such easy terms.

Turnham Green. BENJAMIN HUMPAGE.

Sir,—In reply to some remarks in your leading article in the Journal for last week, I would observe that the first clause of the Royal Charter of Incorporation, granted on February 18th, 1843, states that it was granted for the purpose of "advancing chemistry and pharmacy, and promoting an uniform system of education of those who should practise the same." This clause was confirmed by the Act for Regulating the Qualifications of Pharmaceutical Chemists, dated June 30th, 1852. In the Act passed July 31st, 1868, to Regulate the Sale of Poisons, to Alter and amend the Pharmacy Act of 1852, and to make examinations compulsory, I cannot find any clause which releases the Council from the responsibility of promoting "an uniform system of education of those who practise pharmacy."

It is my opinion that it is still their duty to encourage, to assist, and to foster it, by every means in their power. If it be not their duty to do so, how can they justify their expenditure over the School of Pharmacy in Bloomsbury Square? Do not let me be misunderstood on this subject. I do not begrudge one penny expended over it. It is a source of regret to many that, so few of the London apprentices and assistants avail themselves of such splendid opportunities for improvement. Many of the older members of the trade would have jumped for joy, could they have had in their youthful days such privileges. I trust it is from no niggardly spirit that the institute in Bloomsbury Square has lost the services of one so eminent in his profession as Dr. W. A. Tilden, the demonstrator in its laboratory.

I cannot subscribe to your belief that "the Council of the Society has ever sought, and still seeks, to know how it may assist, to the attainment of the best education possible, those who have already helped themselves." I think the present Council are anxious to do so, but if I am to state my opinion truthfully, it appears to me that past Councils have not been so. I have no doubt but the Sheffield Association and some others will bear out my opinion on this subject.

The country members of the Society are patiently waiting for results. If those expectations are disappointed, probably another list of candidates at the next election of Council will enable them to realize them. Had Jacob Bell lived, the eminent pharmacist, the patron of the fine arts, the country's benefactor, as the walls of the South Kensington Museum testify, this subject had not remained so long unsettled. However, the cry *peccavi, peccavi,* from some of the members of the last Council gives some hope for the future. May the mantle of Jacob Bell rest upon the shoulders and his large heartedness fill the breasts of the present members of the Council.

Hull, July 22nd, 1872. ATKINSON PICKERING.

[*** Our correspondent appears to have fallen into the now somewhat common error of confounding the promotion of a uniform system of education, and the providing of that education. None, we believe, would dispute the opinion that it is the duty of the Society to promote education, and until Mr. Pickering declared the contrary, we believed that most members of the Society at least gave the representative body the credit of having liberally endeavoured to attain that object. Even Mr. Schacht, and those who have with him urged that the means of education hitherto provided by the Society are inadequate for ensuring that general education which is essential, have never disparaged what has been done by the Society, and we venture to think that the comparatively small extent to which the Society's school has been taken advantage of is strong evidence that the real want in regard to education is the absence of such a demand for it as should exist. In regard to this point it is now essential that the trade at large should come forward and zealously cooperate with the society in the endeavour to make the necessity of education more generally appreciated both by apprentices and assistants, as well as by masters. Mere laudation of the labours of Jacob Bell will not justify patient waiting for results unless there be also on the part of country members of the Society an effort to imitate the zeal and energy with which those labours were directed to the advancement of the trade at large.—ED. PHARM. JOURN.]

THE POSSIBILITY OF EFFORT.

Sir,—Permit me to offer a few remarks on the above subject and in reply to Mr. Nuthall's letter, contained in your issue of Saturday last. I have experienced the fact that individual effort, combined with determination, and with no other help than the ordinary text-books, can pull a candidate through the Minor. I served my apprenticeship in a small country village of 800 inhabitants. My master was a "pharmaceutical chemist,"—at least he had a certificate to that effect, though he knew as much about botany and chemistry as the Man in the Moon. Bentley, Attfield, and he never had the slightest acquaintance. Besides being a chemist and druggist, he was postman, grocer, and general dealer; and as to my passing the Preliminary even, it never gave him a thought. There was no other chemist within twelve miles, and I only saw a drug traveller every three months, so I do not think any young man could be placed in a more unenviable position. However, I determined to try, and if I failed, to leave for some large town where there were classes. I passed the Preliminary easy, and then at once commenced preparing for the Minor. I got one of Evans' Cabinets, and also the various text-books in use. I wrote down in a tabular form (for easy reference) every drug, etc., in the Pharmacopœia—its botanical and zoological name, natural order, part of plant, etc., country, preparations, doses, etc.; this I learnt thoroughly. Then I read 'Selecta e Prescriptis,' and got by heart the composition and dose of every compound tincture, powder, etc. After that I went at Bentley for three months, and mastered a good part of it; then I had other three months at Attfield, and then I had a turn at the 'Metrical System.' This I did with no assistance, except, being puzzled with some chemical equations, I wrote to the local secretary, and he kindly put me right. I then went to Edinburgh, and passed, not easily, but I passed. There were six candidates, I was second on the list, two failed. I am now 23 years of age, and in business for myself. I am about to take an apprentice, and I will not bind him until he passes the Preliminary; and if he does not pass the Minor while with me, I will return the premium. I consider this only right, as if I undertake "to teach him the art and mystery" of a chemist and druggist, I undertake that he must pass the necessary examinations.

Too many masters never consider the moral obligations they are under to their apprentices. However, let us hope that a new era has dawned upon us, that with a new generation a new state of things is about to arise.

Allow me to add that a short time before I left my old situation, I coached a young man for the Preliminary, and he is now studying for the Minor.

I have not written this to boast, only to let intending candidates see what perseverance and determination will do.

July 8th, 1872. MINOR ASSOCIATE, 1871.

"*Tolu.*"—Your customer probably made a false statement to induce you to lower your price. If this be the case, you are doing your neighbour an injustice in asking us to publish your letter without first communicating with him as to the correctness or otherwise of the price named.

S. T. S.—Either or all of the substances mentioned, together with iron, would be precipitated if present.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. R. F. Morcom, J., S. T. S., R. H. Z., S. P. S.

EXPERIMENTS ON COMMERCIAL IODIDE OF POTASSIUM.

BY W. B. BISHOP,

Student in the Laboratory of the Pharmaceutical Society.

Some time ago, M. Lepage published in the 'Journal de Pharmacie,' a process for estimating volumetrically, iodide in the presence of bromide of potassium. The method he adopts is based upon the property possessed by perchloride of mercury of precipitating the iodide to the exclusion of the bromide, the bromide of mercury being soluble in water. After having ascertained by previous tests that the iodide under examination is free from chloride, carbonate and iodate, 1 gram of the iodide is dissolved in 30 c. c. of distilled water. A solution of 1 gram of perchloride of mercury in 20 c. c. is also prepared, and the latter dropped from a burette into the solution of the sample to be tested until it ceases to form a precipitate. If the iodide be pure, 16 c. c. of the solution are sufficient for this purpose. From the above data may be calculated the real amount of iodide in the solution. To detect the bromide in the supernatant liquid, it is left some time at rest, then decanted on to a filter so as to obtain it perfectly clear. This is then evaporated in a capsule till its volume is reduced to about 20 c. c.; after cooling, it is poured into a tube and mixed with a few drops of a solution of perchloride of iron. On boiling, the vapour of iodine is given off, and may be easily recognized by placing at the mouth of the tube a piece of starch paper. When the last traces of iodine have been expelled, the solution is filtered, and the clear liquid mixed with a little chlorine water, which sets the bromine at liberty and colours the solution strongly yellow. On agitation with a few grams of sulphide of carbon, the bromine is removed and furnishes a yellow solution in which it can be recognized by the usual tests. This process will answer under careful manipulation and is at first sight a promising one, but it has some defects which interfere with the accuracy of the results obtained by it. In the first place the iodide of mercury does not settle very readily, and even by filtration it is very difficult to remove the suspended red particles. It is, moreover, rather troublesome to have to filter a liquid two or three times on the addition of each drop of the test, and certainly leads to loss. There can also be little doubt that the mercuric iodide is not by any means insoluble in the alkaline chloride and bromide retained in the mother liquor, and thus another source of error is introduced. A more convenient method consists in the employment of a standard nitrate of silver solution in the place of perchloride of mercury. A weighed quantity of the iodide of potassium is dissolved in a little water, and I find a stoppered bottle the most appropriate vessel in which to perform the experiment, as the liquid may be more conveniently shaken in it. The standard solution of nitrate of silver is then run in from a burette, taking care to shake well after each addition. When nearly enough has been added, the precipitate will be seen to coagulate and fall to the bottom. Enough nitrate of silver solution is added to make the supernatant liquid perfectly clear.

The following 10 specimens have been examined by the foregoing process:—

Percentage of iodide of potassm. in the dry salt as indicated by the $AgNO_3$.	Water.	Chloride.	Carbonate.	Iodate.
99·2	·47	none.	very faintly alk.	none.
98·6	·59	none.	alkaline.	large quantity.
102·8	·45	large quantity.	faintly alk.	none.
100.8	·36	trace.	neutral.	none.
100·0	·58	none.	neutral.	none.
98·8	1·58	faint trace.	very alk.	trace.
99·7	·33	trace.	alkaline.	trace.
99·1	·7	none.	alkaline.	none.
100·8	2·1	trace.	neutral.	none.
100·3	1·5	trace.	very faintly alk.	none.

It will be seen that in some cases the percentage of iodide indicated in the table is greater than 100. This arises from the presence of chloride of potassium, for in no case was any appreciable quantity of bromide detected. The equivalent of chloride and bromide of potassium being less than that of the iodide, it follows that these salts will consume more of the solution of nitrate of silver than an equal amount of iodide. Advantage has been taken of this circumstance in calculating the percentage of chloride in bromide of potassium by E. Baudrimont* and Falières† in a recent number of the 'Journal de Pharmacie.'

It will be seen by reference to the tabulated statement of the results obtained by myself that the iodide of potassium of commerce may be considered to be remarkably pure, considering its present high price. It certainly appears to be free from adulteration.

THE MICROSCOPE IN PHARMACY.

BY HENRY POCKLINGTON.

(*Continued from page* 63.)

Scammoniæ Radix.—With the superficial appearance of this root every pharmacist is familiar. Its microscopic characters are more difficult to become familiar with, and it would occupy more space than can fairly be devoted to it were I to attempt a thorough description of its somewhat anomalous structures and morpho-histological peculiarities. We may briefly classify its various component parts into two groups, those belonging to the cortical or outer layer, and those of the inner or woody layer. The line of demarcation is not clearly marked, and it is doubtful whether the apparently sinuous medullary rays may not more properly be regarded as a sinuous involution of the cortical parenchyma. The structure of the inner zone is somewhat complicated. There is no true medulla. There are no wood wedges strictly speaking. The vascular bundles are irregularly distributed, are large, and of varied constituents. I will describe them first. The vessels are pitted, the cells of which they are formed are not long, but the original membrane which formed the septa between the cells has been completely absorbed, and all that remains to show that the vessels were once short cells is the somewhat unusually slight "horizontal wall" of Schleiden, with a perforation nearly as large as the internal diameter of the vessel. The course

* 'Journal de Pharmacie,' vol. [4] vii. 411.

† Journ. Pharm. [4] xiv. 247; and Pharm. Journ. [3] ii. 541.

of the successive depositions of sclerogenous matter of which this "wall" has been formed can be readily made out without the use of reagents, and the same may be said of all the secondary structures in the root. The vessels are of the usual size and shape common to climbing plants, are coarsely pitted, and, except in the immediate neighbourhood of the "horizontal walls," are somewhat thinly consolidated. These walls are seldom if ever perforate; there are no traces of "reticulations," but some are disposed to tear longitudinally with unusual freedom. The course of the vessels and their accompanying tissues is not directly vertical, but is slightly curved and approximates to the endogenous type, and would induce the young student to refer the root to that class. A more minute examination of the nature of the vessels would of course undeceive him. The woody fibres which enter into the composition of the vascular bundles are pitted chiefly and much thickened, and are fusiform. There are a few unpitted ones. Following the course of the pitted vessels, and separated therefrom by the layers of woody fibres, are short, as broad as long, cells containing a semi-fluid and granular matter. These cells resemble somewhat closely in shape those found in some specimens of English medicinal rhubarb, but are larger. They appear to be closed cells, and to communicate only by transfusion through the double separating cell walls. These cells are arranged in a single linear series; and the walls not in adhesion in the series are often consolidated by several layers of sclerogen, and in this case are porous. Very rarely the separating membrane or diaphragm is also thickened and porous.

The rather spongy parenchyma which forms the medullary rays does not possess any remarkable features. The cells are small, cubic, oblong, with somewhat rounded angles, and have thin walls when in the denser portions of the root. In other positions these parenchymatous cells have very varied features. The prevalent form is the more or less modified simple globose cell with walls of very varied thicknesses. With these are intermixed a few cells with very angular outline, thick walls, porous and somewhat stellate, resembling slightly the porous cells in the petiole of *Cycas revoluta*, or more closely those figured by Schleiden,* and found in the leaves of *Pilularia globulifera*. The globose, oblong, and other of the larger parenchymatous cells are minutely pitted.

Arranged in nearly moniliform series by the side of the resin and other receptacula, and distributed amongst the parenchymatous cells, are rhombic prisms of some inorganic substance of small size, and brilliantly doubly refractive. These, a little starch, and various resins and allied semi-fluid matter constitute the cell contents. The form of the starch granules is tolerably uniform, as also their size. They may perhaps be best described as flattened, slightly lenticular discs with no very decided polariscopic reactions. The cortical layers possess several features of interest. Besides the ordinary parenchyma, which is similar to that just mentioned, there are numerous cells closely similar to those found in the medulla of *Hoya carnosa*, and figured in Schleiden's 'First Principles,' and, scarcely correctly, in Von Mohl's 'Vegetable Cell.'* These cells are porous with a very thick wall, the pores of contiguous cells communicating freely, and they are either globose, oblong, elliptical, or slight modifications thereof. There are also semi-tubular liber cells present in the cortical layers containing a similar, but of a lighter colour, semi-fluid substance as the internal special receptacula. These cells may perhaps be regarded as transitional laticiferous vessels, but their functions are somewhat doubtful. Distributed amongst these cells and grouped closely between the several layers of the "bark" are great numbers of the rhombic prism previously described. The bark layers themselves do not call for special notice.

A few words on the mode of preparing Scammony root for examination, and I pass on to the examination of the resin.

The root must be soaked in water for a considerable period to render it soft enough to be cut. Sections cut longitudinally and transversely should be examined in glycerine without further treatment. Others must be treated with spirit and examined with glycerine also. Further examinations should be made of sections treated with turpentine, benzole and ether. These latter may be conveniently immersed in oil of anise for observation, and if desired to be retained for the cabinet mounted in dammar. The other specimens may be mounted in glycerine or glycerine jelly. The latter is preferable. It is a difficult root to examine thoroughly, on account of the great variety of tissues which enter into its composition. Several unimportant details have probably escaped my description here.

Scammonium.—.—The British Pharmacopœia furnishes directions for the chemical testing of the scammony resin. The microscope will be of service in this, as smaller quantities may be dealt with, and the detection of a lesser amount of adulteration rendered possible. Dr. Hassall† quoting from Pereira's 'Materia Medica,' publishes a list of the "rarer kinds of adulteration which have been detected by different observers."

Calcareo-dextrinous Scammony.—This sort differs (from ordinarily adulterated specimens) in the circumstance that iodine produces a reddish purple tint when added to the filtered decoction after it has become cold. It appears to contain carbonate of lime and dextrine.

"*Selenitic, or Gypseous Scammony.*—This kind has been described by Marquart. Its specific gravity was 1·731, and it contained no less than fifty-two per cent. of gypsum.

"*Bassorin Scammony.*—Marquart met with a Scammony which had a horny consistence and a specific gravity of 1·167. After it had been deprived of its resin and extractive, it swelled up in boiling water. The constituent which thus swelled up was soluble in caustic potash. Marquart regarded it as *bassorin*."

Further specimens are spoken of as consisting of an admixture with scammony of tragacanth, sand, various resins, starches, wax and wood.

The microscopical examination of scammony is simple enough. If not already in the form of powder, it should be finely pulverized and a small portion placed on a glass slip moistened with distilled water and covered with a piece of thin glass. A quarter

* An easily demonstrable similar class of cell may be seen, according to Quekett, in the Sweet Burr-reed—*Sparganium ramosum*.

* Henfrey's translation. Van Voorst.

† 'Adulterations Detected,' page 651.

inch objective will render the detection of the presence of starch very easy, and in some cases also of chalk and sand. The addition of a drop of hydrochloric acid at the edge of the cover, a portion of the water having been abstracted on the opposite side of the cover by means of blotting-paper, will render the presence of chalk visible by the gas bubbles which will gradually appear and make their way to the edge of the cover. The polariscope will demonstrate the presence of sand and facilitate the detection of wood fibres. Starch and chalk appear to be the prevalent adulterants at the present time. A sample forwarded to me lately, labelled "Pulv. Scammon. Virg. (Pure)," was remarkable on account of the variety of starches it contained, many being unknown to me, and of the organic remains* in the chalk with which it was adulterated. This sample was also adulterated with other resins. When the scammony is adulterated abroad by admixture with starch, etc., whilst the resin is soft, it is needful to heat it with ether and spirit before examining it.

(*To be continued.*)

REPORT ON CINCHONA BARK GROWN IN JAMAICA.

By the kindness of J. E. Howard, Esq., we are enabled to print a report made by him upon some samples of cinchona bark forwarded to him by Mr. Sargeaunt, the Crown Agent for the Colonies. The samples included five species grown in the Botanical Gardens, Jamaica, and one from a locality named Cold Spring. Those from the plantation had been planted out three and a half years, the specimens from Cold Spring was supposed to be about eight years old.

Report by J. E. Howard, Esq., F.L.S., etc., *to the Crown Agents for the Colonies on the above samples.*

Sir,—Referring to your letter of the 27th June, † I have to inform you that the samples of cinchona bark from Jamaica have been received and fully investigated; and I am glad to be able to report that the result is highly satisfactory as regards the prospects of cinchona cultivation in that island.

The total contents in alkaloid may be described as quite favourable for the time of growth, with specialities which seem to indicate that some species are more exactly suited than others. The *C. calisaya* is in this case decidedly the most promising, and it has already attained a percentage of quinine which would fit it for the purposes of the manufacturer. This may be owing to a difference in the sort cultivated; if otherwise, it marks a more favourable climate for this species than the East Indies present.

The reverse may be remarked of the *C. officinalis*, which has probably not been planted at a sufficient altitude above the sea.

The *C. succirubra* resembles that grown in India, with the exception of the specimen from "Cold-spring." This latter is thin, and with the appearance of having grown slowly, but is of very good quality, containing quinine, cinchonine, and cinchonidine in almost equal proportions, together with great abundance of the peculiar cincho-tannic acid. It would be exactly suited to pharmaceutical purposes.

The *C. micrantha* and the *C. pahudiana* are of equal value. The *C. micrantha* contains more quinine and less cinchonine than usual. The *C. pahudiana* contains about as much quinine, more cinchonidine, and the same amount of cinchonine as the last.

They are both inferior to those previously named. The three best specimens might be worth from 1*s.* 6*d.* to 1*s.* 10*d.* per lb., for manufacturing purposes, or might command even a higher price for druggists' use. The others would also sell at prices higher or lower, according to the fancy of the purchasers.

I return samples for quantitative analysis, and remain yours, etc.,

(Signed) John Eliot Howard.

* Foramenifera similar to those found in the Gravesend chalk.

† "The samples of cinchona bark have been forwarded, and I shall be glad to receive the report which Mr. J. E. Howard has kindly promised to give on their botanical qualities and commercial values. I enclose an extract from a letter from the Superintendent of the Botanical Gardens, Jamaica, which may be of assistance to Mr. Howard in his examination of these specimens.

"*Extract referred to under date, April* 22*nd,* 1872:—'I send herewith all the species (five) grown here, and also a specimen from Cold Spring. They are all labelled. Those from the plantation are now three years and a half old, that is, from the time they were planted out, when they were four to six inches high. The specimen from Cold Spring is, as nearly as I can make out, about eight years old.'"

THE TRADE IN ALOES.

BY P. L. SIMMONDS.

Our supplies of this important drug do not seem to increase, and an annual import of about 700,000 lb. may now be considered as the average supply from all quarters. Although much useful information has been given from time to time on this subject in medical and botanical works, a few recent notes may be found useful to many.

The simply inspissated juice of the leaves of the various species of the genus *Aloe* constitutes this well-known drug. It is best obtained by using neither heat nor pressure for extracting the sap. By re-dissolving the aqueous part in cold water and reducing the liquid by boiling to dryness, the extract of aloes is prepared. The quality of the product is apparently more dependent on soil, climate and preparation than on any specific difference in the plant itself. A great deal depends on the mode of preparation.

The usual way of extracting the substance is by making a transverse incision in the leaves, or cutting them off at the base; then scraping off the juice as it flows if done in the former way, or allowing it to run into a vessel placed for the purpose if in the latter. Pressure is made occasionally to assist the flow, but as Dr. O'Shaughnessy observes, "by this means large quantities of the mucilage are forced out and mix with the proper bitter juice which is proportionately deteriorated;" for it must be recollected that the aloe contains a great deal of mucilaginous matter, abundant towards the centre of the thick fleshy leaves. The juice, after being received into a vessel, is exposed to the sun or other heat by which means it becomes inspissated.

All species of this genus are highly valuable in countries where they are hardy, and can be used irrespective of their medicinal importance, to beautify any rocky or otherwise arid spot and as hedge plants.

Analysing the official customs returns and taking the imports through Egypt, Bombay and the East coast of Africa to be Socotrine and hepatic, the sources of supply were as follows in pounds:—

	Total receipts.	Cape.	Socotrine.	Barbados.
1867	781,306	630,688	80,906	58,202
1868	725,295	534,108	96,524	69,013
1869	661,559			
1870	701,573			

The deliveries for home use and export from the London warehouses in the past five years were as follows:—

	Cases.	Kegs.	Gourds.
1867	4347	138	1965
1868	3505	34	1858
1869	3451	26	918
1870	3092	83	747
1871	4346	19	804

The stock on hand in London at the beginning of this year consisted of 3538 cases, 98 kegs, and 607 gourds.

Cape Aloes.—*A. ferox*, Lamark, of South Africa, yields the best Cape aloes as observed by Dr. Pappe. *A. purpurascens*, Haworth, is also one of the plants which furnishes the Cape aloes of commerce, and so does *A. spicata*, Linnæus, an exceedingly handsome plant. This species is very common in the Madras Peninsula. The drug of *A. plicatilis*, Miller, acts milder than that of *A. ferox*. According to Thunberg, the finest gum-resin is obtained from *A. linguiformis* (or *angulata*), Miller. *A. Syheri*, Harvey, a magnificent very tall species, is doubtless valuable like the rest.

Dr. Pappe, in his 'Flora Capensis Medicæ Prodromus,' says the Cape aloes are procured from several species of this extensive genus so peculiar to South Africa. The *Aloe ferox*, Lam., a native of Swellandam is generally acknowledged to yield the best extract. That obtained from the *Aloe africana*, Miller, is also equally good, but not so bitter nor so powerful as a drastic. It is the produce of the Eastern districts of the Cape Colony, whence large quantities are annually exported. The drug commonly used by the colonists, is prepared from the *Aloe plicatilis*, Miller, whose extract is a much milder purgative, and much resembles the Barbados aloes. It inhabits the mountainous range near the Paarl Drakenstein and Fransche Hoek. It is much to be regretted that the farmers do not take more trouble in purifying this valuable drug.

Barbados Aloes is obtained from *A. vulgaris*, Lamark, *A. barbadensis*, Miller. It is met with in countries around the Mediterranean Sea, also the Canary Islands, on the sandy or rocky coast. Dr. Sibthorpe identified this species with the *Axon* of Dioscorides; hence it is not improbable that *A. vulgaris* is simultaneously also of American origin, although it is cultivated in the Antilles, and furnishes from thence the main supply of Barbados aloes. In the East Indies this species is also seemingly only existing in a cultivated state. Haworth found the leaves of this and of *A. striata* softer and more succulent than those of any other aloe. It is said to be the only species with yellow flowers among those early known. It is also this species only which Professor Willkolm and Professor Parlatore record as truly wild in Spain and Italy. Barbados aloes is chiefly sent in gourds.

Socotrine Aloes.—*A. Socotrina*, Lamark, is indigenous to the hills of the island of Socotra. It is also cultivated in Barbados and elsewhere, thus yielding the Socotrine aloes. It is difficult to ascertain what is the precise produce of the island now. Our imports are so mixed up with the Indian aloes which comes from Bombay and through Egypt, and from the east coast of Africa, that it is scarcely possible in the official returns to separate Indian and Socotrine produce. The Barbados and the Cape aloes used to be separated in the official trade returns, and all the eastern classed as Socotrine. Within the last year or two the Board of Trade officials have not thought it worth while, however, to classify the supplies, and we now only know the gross quantity received.

The East Indian or Hepatic Aloe, so called from its bright liver colour, is said to be the produce of *A. arabica*, Lam. Some quantity used to be shipped from Madras chiefly to Bengal and Australia. It comes here in casks or kegs. In India an inferior description of aloes is obtained from *A. indica*, Royle, and a better kind is procurable from *A. litoralis*, Kœnig, which grows plentifully at Cape Comorin and the neighbourhood; it is readily distinguishable by the reddish colour of its leaves. The natives attach much value to the juice of the leaves, which they apply externally in cases of ophthalmia, and especially in what are commonly called country sore eyes. The mode of administering it is to wash the pulp of the leaves in cold water, and mix it up with a little burnt alum. In this state it is applied to the eyes, being previously wrapped in a piece of muslin cloth.

IN A QUICKSILVER MINE.

"Grace Greenwood," who has been for some time travelling in the west of America, sends to the *New York Times* the following account of a recent visit to a quicksilver mine.

"It was a brilliant May morning when we set out from San José for the new Almaden Quicksilver Mine, some twelve miles away, in the Santa Cruz range of mountains, and on the Alamitos Creek. This quicksilver mine, the largest and richest in the world, with the exception of the old Almaden in Spain, was first known to white men as long ago as 1824, worked awhile for silver, and then for a long time abandoned. It is the most uncertain sort of mining, there being nothing like a regular vein of ore to follow, but only in many places very slight threads connecting the 'ore-spots,' while some of the deposits are isolated, lying hidden slyly away in nature's most secret drawers and dark pockets. The process of reducing the ore, of rousing the latent mercury from its sleep of a million or so of years, is very interesting and easy of comprehension, even to a woman, when patiently and pleasantly explained, as it was to us. It is simply burnt out of house and home, or its dull old body perishes by cremation, that it may appear in a glorified form, to shine and serve in a thousand beautiful ways. It is compelled to awake and come forth, or as an old miner said, to 'get up and git,' by intense and long-continued heat. The ore is put into furnaces, each holding 15,000 lb., and having in one end the fire, which is kept up for about three days. The vapours from the heated ores pass from the furnaces through small apertures, like pigeon-holes, into condensing chambers, on the cool walls of which the globules of mercury form and glide at once to the floor, where they collect in little gutters and flow out into troughs, which convey them to an iron cauldron, from which they are transferred to the wrought-iron flasks in which they are sent to market. Each flask contains $76\frac{1}{2}$ lb., the equivalent of 75 lb. Spanish measure, and is worth 40 dollars. It was strange to see this fluid treasure come flowing and flashing down like a mountain stream, to see it dipped up like so much spring water. The unstable, illusive character of this costly product is not understood by all visitors. Young and curious tourists have been known to attempt to carry away a thimble full or so in their pockets, and have confessed to having at once experienced a singular trickling, tickling sensation, usually passing like a streak of cold lightning down the right leg and into a boot. One elderly gentleman, by profession clerical, but by temperament mercurial, once succeeded in secreting a portion of quicksilver in his spectacle-case, which he carried in the same breast pocket with his watch. His little theft was not discovered at the time, but the next morning he indignantly proclaimed that he had been robbed. His valuable gold repeater had been taken from his pocket, and a silver watch put in its place. The contents of the spectacle-case had also mysteriously disappeared. Quicksilver in the mass has such a molten look that you shrink from touching it; but it is exceedingly cold. It gives you a strange sensation to plunge your hand into the solid, fluid, heavy, buoyant substance, which has the very chill of death, yet is alive in every infinitesimal globule. There seemed to be something unsubstantial about it, after all. I could clutch it, but not hold it. It was like palpable moonshine. I dipped my hand in up to the wrist, and not a particle adhered to my fingers. Silver never would stay by me. The manager first showed us the reduction works, of which I have tried to give some slight idea. I was surprised at the number of chambers necessary for the thorough condensation of the vapour. It sometimes passes through 10 or 11 before all the quicksilver is precipitated. The uncondensed and deleterious portions are carried on by flues into an immense high chimney, which lets them off when they can do no harm to man or beast. The stories of miners and mules 'perishing gloomily' of mercurial poison; of unhappy smelters 'working out their own salivation with fear and trembling,' are no longer to be credited. From the works we drove up the mountain to the new tunnel, which is the one most worked at this time. It is several hundred feet below the old workings, is about 2500ft. in length, 10ft. wide, and well timbered where it is not cut through the hardest kind of rock. Into this grand tunnel our party was taken in grand style. We rode in ore-cars, on blocks of wood, which made the most reliable sort of seats. We were drawn by a stout and serious-minded mule, and each fellow of us carried a lighted candle, stuck in a split stick. Thus we plunged into the darkness and silence of the inner earth, and woke the sullen echoes with laughter and merry shouts, and called out with our flicking torches momentary gleams from crystals imprisoned in the dull rocks for ages, dreaming of the light. Looking back from the first car in the procession, it had a strange wild look, and we all had a sense of something adventurous and mysterious, and delightfully awful and Arabian Nightish, about the expedition. We should hardly have been surprised to come upon the cave of the 'Forty Thieves,' with all their treasure in it—or, when we turned back to the day, to have found the door of the tunnel closed against us. When about 1800ft. in we left our cars and walked the rest of the way, and a wild, rough, pitfallish way it was, to drifts, where the men are now working at the new discoveries. The ore is very fine, and apparently abundant, the cinnabar showing in wide, long deposits, the rich, red arteries of the heart of the old mountain. The air in the tunnel and drifts we found not impure, damp, or oppressive, yet we were quite willing to return to the outside wind and warmth and sunlight, and drive down to the picturesque country-house built by General Halleck when he was manager of the mine; and then our friend and host proceeded to crown the courtesy which had made for us a day of unequalled enjoyment by having attached to his carriage four fresh, spirited, handsome horses; and so, in such state, he drove us back to our hotel at San José, through the splendours of sunset and the freshness of evening airs. Could anything have been finer or jollier, more nobby or nabobby, than that?"—*Times.*

THE LAST NEW METAL, INDIUM.*

BY WILLIAM ODLING, ESQ., M.B., F.R.S.

(*Concluded from page* 67.)

Lastly, a most important guide to the establishment of the atomic weight of a metal is the determination of its specific heat. In cooling through the same fall of temperature, different bodies, as is well known, give out exceedingly different quantities of heat. In the case of a pound of bismuth and a pound of brass, for instance, both raised to the temperature of boiling water, and then immersed in an excess of ice, the quantity of ice melted by the pound of brass in cooling down to the freezing point, will be found to be more than three times as great as the quantity of ice melted by the pound of bismuth. Now the determination of the specific heats of most of the metals, compared with the specific heat of an equal weight of water as unity, has been made with extreme care and exactitude by Regnault; and on looking at the following list of specific heats, mostly of his determination, it is evident almost at a glance that the specific heats of the metallic elements are inversely as their respective atomic weights. Thus, taking the first and last elements on the list for example, it is observable that the specific heat of lithium, or 0·94, is weight for weight thirty times greater than the specific heat of bismuth, 0·03; but then the atomic weight of bismuth is thirty times greater than that of lithium. And throughout, the product of the specific heat into the atomic weight of one metal, divided by the product of the specific heat into the atomic weight of another metal, is approximatively equal to one, as shown in the fourth column of the following table, in which the product of the specific heat into the atomic weight of silver is taken as the standard dividend. Now, only last year, concordant estimations of the specific heat of indium were made by Bunsen and a Russian chemist, Mendelejeff; the mean of Bunsen's two estimations being 0·0569, which it will be observed is very close to Regnault's estimations of the specific heats of silver, cadmium and tin. Accordingly, the atomic weight of indium must approximate to the atomic weights of silver, cadmium and tin; or, in other words, it cannot be $37·8 \times 1$ or $37·8 \times 2$, but must be $37·8 \times 3 = 113·5$; and the quantity of chlorine combined with this weight of indium being three times 35·5 parts, indium chloride will necessarily appear as a trichloride, and be expressed by the formula $InCl_3$. The determination of specific heats being a matter of direct experiment, with scarcely any ratiocination whatever, it seems impossible for any one to observe the relationship subsisting between the accepted atomic weights of the metals, deduced from experiment by a highly complex train of reasoning, and their directly ascertained specific heats, without recognizing that in the case of the metals, at any rate, the atomic weights of the chemist are something more than vain imaginings, but that they are beyond question the terse expression of a fundamental truth in nature.

The most important chemical characters of indium being thus established, there remains for consideration only the question of its affinities to certain of the previously-known elements. And seeing that the atomic

* Lecture delivered at the Royal Institution, Jan. 19, 1872.

ATOMIC HEATS OF METALS.

Chlorides.	Atomic Weights	Metals.	Specific Heats.	Atomic Heats.
Li Cl	7	Lithium . .	·9408	1·07
Na Cl . . .	23	Sodium . .	·2934	1·09
Mg Cl_2 . . .	24	Magnesium .	·2499	0·97
Al Cl_3. . . .	27·5	Aluminum. .	·2143	0.95
K Cl	39	Potassium. .	·1695	1·07
Ca Cl_2 . . .	40	Calcium . .	·1686	1·09
Mn Cl_2 . . .	55	Manganese .	·1217	1·08
Fe Cl_2, Fe Cl_3 .	56	Iron . . .	·1138	1·03
Ni Cl_2 . . .	59	Nickel . . .	·1075	1·03
Co Cl_2 . . .	59	Cobalt . . .	·1067	1·02
Cu Cl, Cu Cl_2 .	63·5	Copper . . .	·0955	0·98
Zn Cl_2 . . .	65	Zinc . . .	·0955	1·01
As Cl_3 . . .	75	Arsenic. . .	·0814	0·99
Mo Cl_4 . . .	96	Molybdenum .	·0722	1·12
Ru Cl_3, Ru Cl_4.	104	Ruthenium .	·0611	1·03
Ro Cl_3 . . .	104	Rhodium . .	·0580	0·98
Pd Cl_2 . . .	106	Palladium. .	·0593	1·02
Ag C.. . . .	108	Silver . . .	·0570	1·00
Cd Cl_2 . . .	112	Cadmium . .	·0567	1·03
In Cl_3 . . .	113·5	Indium . .	·0569	1·05
Sn Cl_2 Sn Cl_4.	118	Tin	·0562	1·07
Sb Cl_3 Sb Cl_5.	122	Antimony. .	·0508	1·00
Te Cl_4 . . .	129	Tellurium. .	·0474	1·03
W Cl_4, W Cl_6.	184	Tungsten . .	·0334	1·00
Au Cl, Au Cl_3.	196·5	Gold . . .	·0325	1.03
Ir Cl_3, Ir Cl_4 .	197	Iridium. . .	·0326	1·04
Pt Cl_2, Pt Cl_4.	197	Platinum . .	·0324	1·04
Os Cl_2, Os Cl_4.	199	Osmium . .	·0311	1·00
Hg Cl, Hg Cl_2	200	Mercury . .	·0319	1·03
Tl Cl, Tl, Cl_3.	203	Thallium . .	·0325	1·07
Pb Cl_2 . . .	207	Lead . . .	·0314	1·05
Bi Cl_3. . . .	210	Bismuth . .	·0308	1·05

weights of the elements range from 1, the atomic weight of hydrogen, up to 240, the atomic weight of uranium, there opens out the further question, whether the more obvious chemical properties of the different elements are seriated in any way with their atomic weights; or, to put this last question in another form, whether the varied chemical properties of the elements are distributed among them haphazard, or according to some definite system of which the relationship subsisting between their several atomic weights may possibly serve as a key. Now the atomic weights, as distinguished from the combining proportions of yttrium, erbium, cerium, lanthanum and didymium, must be regarded for the present as quite unknown. Out of the fifty-eight elements, however, of which the atomic weights have been more or less well determined, forty-six have their several atomic weights ranging from 1 to 137, in an almost unbroken succession. Ten of the other twelve have atomic weights ranging from 184, that of tantalum, to 210, that of bismuth; while the remaining two, namely, thorium and uranium, have the closely-approximating atomic weights 238 and 240 respectively. In the above table, the symbols of the forty-six elements having atomic weights ranging from 1 to 137, are set down in the order of the atomic weights of the elements symbolized,—save only in the case of tellurium, of which the symbol is placed immediately above, instead of below that of iodine, and of which the atomic weight may not improbably have been somewhat over estimated. And violating the order of numerical seriation in this small particular only, it is remarkable with what facility the symbols of the forty-six elements may be arranged in parallel lines and columns, corresponding to a natural classification of the elements themselves into analogous groups and series. Indeed, a study of the entire number of elements at present known, would seem to indicate that they are one and all associated with each other by a certain community of relationship; of which the well-known gradation and parallelism in properties and atomic weights, of the members of the alkali and earth-alkali, and of the halogen and oxygen families of elements afford only the most prominent examples.

ELEMENTS, IN ORDER OF ATOMIC WEIGHT.

1	2	3	4	5	6	7	8	Type.
I. H 1	Li 7	Na 23	K 39	...	Rb 85	Ag 108	Cs 133	R Cl
II.	G 9	Mg 24	Ca 40	Zn 65	Sr 87·5	Cd 112	Ba 137	R Cl_2
III.	B 11	Al 27·5	...	...	*Xa*	In 113	*Xb*	R Cl_3
IV.	C 12	Si 28	Ti 50	...	Zr 89	Sn 118	*Xc*	R Cl_4
V.	N 14	P 31	V 51	As 75	Nb 94	Sb 122	...	R Cl_5
VI.	O 16	S 32	Cr 52·5	Se 79	Mo 96	Te 129	...	R Cl_6
VII.	F 19	Cl 35·5	Mn 55	Br 80	...	I 127	...	R Cl_7
VIII.	...	...	Fe 56	...	Ru 104	...	...	R Cl_8
			Co 59		Ro 104			
			Ni 59		Pd 106			
	Na 23	...	Cu 63·5	...	*Ag* 108			

Taking the second line of the table as an illustration, it is observable that the seven metals symbolized thereon are distinguished from all the others by their common property of forming one chloride only, and that a dichloride; further, that the metals figuring in the uneven-numbered columns of this line, namely, magnesium 24, zinc 65 and cadmium 112, are permanent in the air, are volatilizable in the direct, and basylous in the inverse order of their atomic weights, and are otherwise specially associated with one another; while the similarly associated metals of the alternate or even-numbered columns, namely, calcium, 40, strontium, 87·5, and barium 137, are quickly oxidizable in the air, are practically non-volatile, and are basylous in the direct instead of the inverse order of their atomic weights; and similarly, on the other lines of the table, the elements symbolized are divisible into sub-groups, according to their odd and even positions respectively.

Such being the relationship of the elements placed on the same line, the relationship of those in the same column is of a different kind. Taking the third and seventh columns by way of illustration, it is observable that the consecutive elements in each column have closely consecutive atomic numbers; that the element on the first line forms a mono-chloride; that on the second line, a di-chloride; that on the third line, a tri-chloride; and that on the fourth line, a tetra-chloride; while those on the fifth, sixth and seventh forms oxide or oxichlorides, corresponding to a penta-, hexa-, and hepta-chloride respectively.

By reason of its atomic weight, 113·5, indium is observed to figure on the third line and seventh column of the above table; but its position among the elements is better recognizable by a glance at the table below, containing a portion only of the preceding one, supplemented by an additional column of elements of higher atomic weight than any of those included previously.

In respect of its atomic weight, then, triad indium occupies a position exactly intermediate between the positions of diad cadmium and tetrad tin, to both of which metals it presents a most marked resemblance in properties. They all three have the same extreme degree of fusibility, and much the same oxidizability and reducibility. Their sulphides are alike characterized by a yellow colour, that of cadmium, Cd S, being neutral; that of tin, Sn S_2, being acidulous; and that of indium, $In_2 S_3$, being strictly intermediate.

	3	7	10	Type.
I. . .	Na 23	Ag 108	. .	R Cl
II. . .	Mg 24	Cd 112	Hy 200	R Cl_2
III. . .	Al 27·5	In 133·5	Tl 203	R Cl_3
IV. . .	Si 28	Sn 118	Pb 207	R Cl_4
V. . .	P 31	Sb 122	Bi 210	R Cl_5
VI. . .	S 32	Te 129	. .	R Cl_6

Viewed in another aspect, triad indium occupies a position intermediate between the positions of its remote triad congeners, aluminium and thallium. The mean atomic weight of the three metals being 114·3, the atomic weight of indium is 113·5. The mean specific gravity of the three metals being 7·3, the specific gravity of indium is 7·4. And in respect of purely chemical habitudes, hydrated alumina and hydrated india might easily be mistaken for one another. It is interesting, moreover to remark that the last-discovered two metals indium and thallium—discovered, it will be remembered, by the same process, that of spectrum analysis—should bear to one another much the same sort of relation that is borne to one another by the jovian and saturnine metals of the alchemical or even pre-alchemical era. Just, for example, as the unstable and least-known chloride of lead, $Pb\,Cl_4$, corresponds to the stable chloride of tin, $Sn\,Cl_4$, so does the unstable and least-known chloride of thallium, $Tl\,Cl_3$, correspond to the stable, and as yet only known, chloride of indium, $In\,Cl_3$, as suggested, indeed, by the lecturer some six or seven years ago.

The study of such relationships necessarily suggests many inquiries. Arranging the entire fifty-eight elements of which the atomic weights are known, in a table similar to the preceding one for the forty-six elements having atomic weights not exceeding 137, some twenty or five-and-twenty new elements would be required to fill up the gaps in the different series; but why should not new elements be discovered having atomic weights as much above that of uranium, 240, as its atomic weight is above that of barium, 137?

Again, does it seem probable that bodies capable of being arranged in such a well-marked numerical series, are really elementary and mutually independent; or is it more likely that the gradation of properties and atomic numbers manifested by these bodies, depends on their possession of different increments of common material?

May it not be that the numerical ratio between the atomic numbers of proximate elements, $\frac{x}{y}$ = approximatively $\frac{y}{z}$, is really absolute; and that it will hereafter be proved to be so by a better determination of atomic weights. Seeing that a short time back, cæsium with the atomic weight 133, and rubidium with the atomic weight 85, both occurred as unrecognized impurities in potassium with its atomic weight, 39, who shall answer for the absolute accuracy of even the best established of our present atomic weights?

Again, the mean difference in atomic weight between consecutive analogous elements, is, in the case of the nine following pairs of elements, lithium and sodium, glucinum and magnesium, boron and aluminum, carbon and silicon, nitrogen and phosphorus, oxygen and sulphur, fluorine and chlorine, sodium and potassium, magnesium and calcium, 16·1; the lowest difference being 15, and the highest 17. The mean difference in the case of the four following similar pairs of proximate elements, phosphorus and vanadium, sulphur and chromium, chlorine and manganese, arsenic and niobium, is 19.25; the lowest difference being 19, and the highest 20·5. Lastly, the mean difference in the case of the seven following similar pairs of proximate elements, calcium and zinc, vanadium and arsenic, manganese and bromine, rubidium and silver, strontium and cadmium, silver and cæsium, tantalum and bismuth, is 24·6; the lowest and highest differences, even in the case of these elements of such high atomic weight, being 23 and 26 respectively. Are these differences in atomic weight only approximatively, or are they indeed absolutely, 16, 20 and 24 respectively; and if so, why should the numerical difference between proximate associated elements be 16 in one set of cases, 20 in in another set, and 24 in a third?

TURBIDITY OF LONDON WATER.

In a Report to the City Commissioners of Sewers for the year 1871, Dr. Letheby makes the following remarks on the alleged turbidity of the London water-supply:

"The water supplied to the City by the New River and East London Companies has been invariably bright and nearly colourless; and so also has been that of the Kent and West Middlesex Companies; but that of the Southwark and Vauxhall Company has been turbid on one occasion, that of the Lambeth Company on five occasions, and that of the Chelsea and of the Grand Junction Companies on eight occasions respectively. The turbidity has been at all times due to the presence of a very small quantity of finely-divided clay, in which there was occasionally a trace of vegetable tissue; and no doubt it had been caused by the heavy floods of the river. Although perfectly harmless, a slight turbidity of the water is sure to command attention, and may easily be made the subject of popular clamour."

The *Lancet* in publishing these remarks comments on them as follows:

These statements are so positive, in some respects so improbable, and in all so different from those published by the Registrar-General on the authority of Dr. Frankland, that we are compelled to examine them somewhat critically. And we must confess that the more we examine them the more unsatisfactory do they appear to us. On the mere question whether the waters are clear or turbid, for example, we often find the reports of householders in direct opposition to that of Dr. Letheby. A lady who lives at Wandsworth complained to us the other day that the water supplied to her was never quite clear, and was often "muddy." She is compelled to refilter every drop used in the house, and asserts that the members of her household know the difference in *taste* as well as in appearance between the filtered and unfiltered water. A tumbler of each was brought to us; we saw the difference at a glance, although the weather was dry, and the water in consequence better than usual. How is this to be reconciled with Dr. Letheby's statement, that in 1871 the water of the Southwark and Vauxhall Company was turbid "on one occasion."

Again, with regard to the quality of the turbidity. How can Dr. Letheby prove that of all the foul impurities which mix with the sources of our water-supply only "clay and vegetable tissue" are able to pass through the filters? We all know the difficulty of separating clay from water by filtration, but surely the very fact suggests the idea that other matters, more noxious and less easy of recognition, may be equally difficult to remove. And here, again, the idea is confirmed at once by common observation and by experiment. Our Wandsworth friend informed us that three times in the last few years the water-pipes of her house had been choked up with large eels; and stories of this kind are pretty rife. Does Dr. Letheby reckon an eel as clay or as vegetable tissue? The evidence of experiment is even stronger. Dr. Frankland found that water contaminated with one-five-hundredth of the rice-water discharge of cholera remained opalescent after filtration through paper, or even animal charcoal, both much better filtering materials than the sand used by water companies. That sand should be capable of removing organized germs—spores, ova, or corpuscules—from water which contained them is indeed a notion so improbable as to be almost absurd. Dr. Letheby would seem to concede as much; for he quotes with approval the remarks of Major Bolton, that "it is impossible altogether to get rid of the simplest forms of vegetable life by the most perfect filtration."

The case, divested of all exaggeration, appears to stand thus:—It is highly probable that imminent risk attends upon the use of water which contains in suspension certain low forms of life, though it is conceded that other forms of life are harmless. It is a fact that noxious and probably organized matters are introduced into the sources of our water supply; and it is furthermore a fact that one, at any rate, of the most noxious of these matters—the discharges of cholera—will pass through all filters. How then can Dr. Letheby, or any one else, prove to us that no such noxious matter is ever present in the water supplied to our houses? As we understand it, Dr. Letheby's answer is twofold. Firstly, he tells us he knows by his experience that all dangerous matter must have been destroyed by oxidation in water which has been exposed to the conditions of the London water-supply. This argument we may set aside as a bare opinion. It is obvious that no amount of mere experience can decide the question. Dr. Frankland and Sir Benjamin Brodie have come to a different conclusion, and they are surely as well entitled to have an opinion as Dr. Letheby. Secondly, Dr. Letheby relies on his analysis of the water, which tells him that the quantity of organic matter in it is very small and not noxious. How far his analysis may be trusted for this all-important proof a single example will show. In the report which we have before quoted he says:—"The proportion of organic matter in the water has been very small, for the quantity of oxygen required to act on every description of oxidizable matter has ranged from only 0·01 of a grain per gallon in the chalk water of the Kent Company, to 0·102 of a grain in the Thames water supplied by the Grand Junction Company." Now Dr. Frankland has found that water contaminated with one-five-hundredth of rice-water discharge—that is, water which contains in every gallon 140 grains of the evacuations of a cholera patient—only requires, after filtration, 0·03 of a grain of oxygen per gallon for its oxidation. In other words, such a deadly mixture as this would exhibit under this test less than one third of the pollution of the Grand Junction water!

HEAT AND THIRST, AND SOME OF THEIR POPULAR ANTIDOTES.

By the Author of a "Report on Cheap Wines."

I think I may appeal to experience and the instincts of mankind, that something more than mere water is required to gratify the compound craving called thirst. *Lew*, or as it is more commonly called *luke-warm* water, supplies the place of fluid, and so far does good, but it is not a true quencher of thirst, whilst from its negative properties, being neither hot nor cold, and so incapable of exciting the nerves of sensation, it has become a byword for everything nauseous, disgusting, and contemptible, both moral and physical. "Because thou art lukewarm, and neither hot nor cold, I shall spue thee out of my mouth," says the Apocalyptic writer. A lukewarm ally is usually more disgusting than an open enemy.

Heat is by no means a bad antidote to thirst, if a liquid be sipped which is hot enough to produce some pungent effect on the tongue. This may be effected by tea or coffee, the surface of which is often sipped at a temperature of 130° to 140°. Of course, if the aromatic and astringent and stimulating elements of tea or coffee are present, the nervous exhaustion, of which thirst is a symptom, will be more effectually combated, but even hot water sipped is better than lukewarm. Thirty years ago dyspeptic physicians used to order their patients to sip with their meals water as hot as they could bear it.

But the stimulant effect of cold is far more sought after than that of heat, and is more appropriate. Let it be observed that it is much abused: that ice taken in excess enfeebles the stomach, and that some people are as really intemperate in gulping down unmeasured draughts of cold liquid, for the relief of an unpleasant sensation, as others are in the use of alcoholic drink. To drink to excess for mere pleasure is intemperate, be the beverage what it may.

Next to cold, carbonic acid is the most popular stimulant and the most beneficial. It may be had in natural waters, as the Nassau, Seltzer, and Apollinaris, or in waters aerated under pressure, or in liquids in which it is evolved by fermentation. Of the aerated waters in popular use, some are very vapid; the gas escapes at once on exposure, and the result is hardly more satisfactory than that of pure water. There is an immense difference to the *connoisseur* between such waters as those of Ellis of Ruthin and those which may be got over a confectioner's counter. Perhaps for a mere summer draught it does not much matter; but in the treatment of disease the "seltzer-" or "soda-" water prescribed should be from a good maker, who is careful in the choice of his raw material—the water—and has a first-rate plant for aerating it.

The next and most obvious method of any for evolving carbonic acid is by fermentation; and this method of preparing a popular drink that shall be cold, aerated, subacid and stimulant, deserves not the contempt with which some may be inclined to regard it as beneath the notice of political philosophers. Given heat and thirst, and a natural tendency to allay their effects, it is to the public interest that drinks shall be readily accessible which are better than water, more refreshing, more quenching to the thirst, containing some alcohol, and yet not enough to do mischief. Such a drink is that beer which ought to be brewed in every household, from white sugar, a small quantity of cream of tartar, a little lemon-juice and peel for flavour, and a liberal allowance of infusion of ginger. Such real fermented ginger-beer is very different from a mere ginger-drink aerated by forcing carbonic acid into it. Sugar, which ferments with yeast, yields carbonic acid in abundance, but alcohol even more abundantly; this may be easily produced from ginger-beer by distillation, and ginger-beer is as strong as any other cheap "small" beer. The carbonic acid is better combined, and more telling to the palate. Then there is the ginger, a good stimulant, which substitutes a grateful warmth on the soft palate for the flabby nauseousness of atonic thirst, and which corrects the faults of a cold acid drink. I am perfectly certain that this drink, well prepared and cheap, would be a serious antidote to the public-house bar in summer.

Some years ago I was Medical Officer of Health of the district, and tried hard to get at the secrets of the "poor man's home"—how they live; what they do with their money; whether the obtrusive almsgiving which is practised does good or harm. Now, the time to see the London working classes at home, and as they are, is on a Sunday morning, when all the respectable people are at church; and many a Sunday morning from 11 to 12.30 did I spend in these explorations. One such morning I spent chatting with the keeper of a little "general" shop at the back of Grosvenor Square, and was both amused and instructed by the run of custom that was going on all the while—more especially at the number of women, of the class of mechanics' wives, who came in for ginger-beer. "You see, sir," said the mistress of the shop, "that whilst the public-houses is closed, ginger-beer is the only thing they can drink of a morning, and we sell a good deal every Sunday." It were to be wished that they took nothing worse at other times.

There is a modification of ginger-beer called *pepper-punch*, the receipt for which I learned from a West Indian family, (West Indians, by the bye, are famous for their knowledge of gastronomy), and which I have at times found very serviceable in treating persons fond of taking "too much," with atonic stomachs, nausea, thirst, and the like. It is made as ginger-beer, but heightened in piquancy and endowed with a most agreeable flavour by adding some of the green pods of the capsicum. The West Indian receipt, I am sorry to say, orders the addition of about a teaspoonful of rum to each half-pint bottle. This gives it a finish which few ladies can resist; but, although I urge the use of stimulants and of wine in moderation for the more effectual quenching of thirst, yet I am afraid we must draw a line at pepper punch, and leave out the rum.

The Pharmaceutical Journal.

SATURDAY AUGUST 3, 1872.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE ADULTERATION OF FOOD, DRUGS, ETC., BILL.

WHEN, at the beginning of the present session, the above Bill, as printed in the last volume at p. 715, was introduced into Parliament by Mr. MUNTZ, it naturally attracted the attention of persons likely to be affected by its provisions. While it was felt that the object sought to be attained was a good one, it was also known that great care and circumspection would be required in working out the details, or the hardships created by such a law would render it a dead letter through the difficulty of carrying it out.

What should constitute an adulteration under such an Act? The question is one that has been asked many times without being satisfactorily answered, and the Bill, as it originally stood, contributed nothing towards the solution of the problem. In fact, one part of clause 2, which provided that "every "person who shall sell as pure and unadulterated any "article of food or drink or any drug which is adulte-"rated or not pure" should be liable to a penalty of twenty pounds and other inconveniences, was, if carried out, sufficient to make the words "pure and unadulterated" a terror to all sensible men.

Curious evidence of the various meanings that might be attached to the words "pure and unadulterated" was given in the slight debate which took place on the second reading. Mr. MUNTZ, himself, pleading for the Bill, said, "If one choose to mix "beans with coffee, or water with milk, no one under "this Act could say anything; but if any baker "adulterated his bread with brickdust, or poison of "any sort, or with plaster of Paris, the clauses of "this Bill would render him liable to severe punish-"ment." On the other hand, Sir D. CORRIGAN objected to immunity attending such processes as mixing water with milk, and said that adulteration meant either adding to or subtracting from an article.

With so much vagueness respecting the principal object of the Bill, it is not surprising that there should have been a general opinion that the subject should be dealt with by the Government in their Public Health Bill, and progress was deferred month after month for this purpose, until further hope was prevented by the mutilation of the Government measure. Then, at the fag end of the session, this important Bill was pushed through its remaining stages in the lower House, and to a second reading in the House of Lords, with no more notice than could be described in six lines of a newspaper report.

This being the case, and the danger being great that the Bill would pass with all its imperfections, and probably become a source of annoyance to chemists and druggists, prompt action was taken by the Parliamentary Committee of the Council of the Pharmaceutical Society. A deputation, consisting of the PRESIDENT, Mr. HILLS and Mr. SANDFORD, sought an interview with the Marquis of SALISBURY, who has charge of the Bill, to urge their objections to certain features of it as it stood; and, fortunately, they succeeded in obtaining his consent to the modification of one or two of its most obnoxious points.

It will occur to many of our readers that the word "pure," in the penal clause, when applied to some drugs, might be so construed as virtually to prohibit their sale. The omission of the words "pure and" removed this danger, but still left the difficulty as to what constituted an adulteration. This it was sought to meet by adding a clause containing a definition of "adulteration," which, especially as it is now qualified by the important word "fraudulently," introduced at the request of the deputation, will have the effect of considerably narrowing the range of interpretation that might have occurred had it been left to the individual opinion of judicial authorities. The following are the words of the new clause:—

"Any person who shall sell any article of food or "drink or any drug, knowing the same to have been "mixed with any other substance with intent *frau-"dulently* to increase its weight or bulk, and who "shall not declare such admixture to any purchaser "thereof before delivering the same, shall be deemed "to have sold an adulterated article of food or "drink or drug as the case may be, under this Act."

There are sundry other alterations, mostly verbal, in the Bill; thus, the duties of the inspectors appointed under it are now made compulsory, also the appointment of analysts, which before was left at the option of the local bodies, is now made compulsory upon the request of certain authorities; but since at the time of going to press the Bill has not been read a third time in the House of Lords, and most of the amendments will have to be submitted to the House of Commons, we refrain from reprinting it *in extenso* until next week.

THE KEW CONTROVERSY.

THE storm which Mr. AYRTON has raised by his treatment of Dr. HOOKER, will probably be sufficient to teach even him that courtesy is as absolutely necessary in the head of a great department as in the humblest functionary under his control. The debate in the House of Lords on Monday night fell rather flat through the absence of the person whose conduct was arraigned. But Lord Derby's speech was temperate and forcible, and its fairness contrasted strongly with the insinuation of Lord Stanley of Alderley, that the celebrated memorial to Mr. Gladstone, signed by eleven leading men of science, was not called forth by sympathy for Dr. Hooker, nor ill-will to Mr. Ayrton, but by the fact that Professor Owen had expressed certain views in a recent Blue Book. This is not the way to meet such a charge as that made against the First Commissioner of Works, in which his colleagues, to judge by a recent Treasury minute, appear to some extent to concur, and most people now think that it is quite time that the person principally concerned had made a reply to it from his place in the House of Commons.

The Calcutta correspondent of the *Times* writes that the Government of India have conferred the title of Rai Bahadoor upon a purely native medical man, Baboo Kanny Loll Dey, teacher of chemistry and medical jurisprudence in the Medical College, Calcutta, and Honorary Member of the Pharmaceutical Society of Great Britain, in recognition of his services to medical science. The *Sunnad* was presented at the inaugural lecture of the session amid much applause, and was followed by very hearty congratulations. The native Press is quite enthusiastic on the subject. The title is equivalent to our order of knighthood, and is highly esteemed in India.

We are informed that, in consequence of an intimation that such a course would be more agreeable, it has been resolved by the Brighton pharmacists to invite the members of the Pharmaceutical Conference to meet them at a cold supper instead of the proposed dinner. Members of the Conference wishing to be present are requested to communicate with the Local Secretary, Mr. Thomas Glaisyer, 12, North Street, not later than Saturday, August 10th, in order that arrangements may be made for a specified number.

Another instance of the manner in which sometimes at the end of a session a Bill undergoes important modification with scarcely any discussion occurred last week. So much of the original Public Health Bill had been sacrificed to the necessity of time that it would have appeared hopeless to expect the introduction of any clauses dealing with the metropolitan water supply. But the proposition of Mr. Kay Shuttleworth, carried by a majority of 177, to transfer the statutory powers of supervision over the companies supplying the metropolis with water, hitherto possessed by the Board of Trade, to the Metropolitan Board of Works, may possibly lead to some improvement. The members of the Board of Works have no personal an interest in the matter, and they have already exerted themselves so well to secure a constant and improved supply, that it may be hoped they may be able to overcome the inertia with which the Companies have so long baulked the just desires of the consumers.

It is a fact beyond dispute that the great International Shows which were inaugurated in 1851 have not been productive to any appreciable extent of new economic or pharmaceutical products. No doubt they have acted as incentives to arts and manufactures, and the annual recurrence of these Exhibitions, confined as each one now is to particular or special objects, will no doubt prove of more lasting value to those whose interest is centred in one or more of the sections.

According to the arrangements at present issued for the next eight years, one section of the Exhibition next year will come more under our own ken than that of the present or last year; for amongst the subjects for 1873, under the general head of "Substances used for Food" will be exhibited drysaltery, grocery, preparations of food, wines, spirits, beer and other drinks and tobacco. Though these are not subjects immediately connected with this Journal, there are off-shoots which will make the exhibition of some interest in a pharmaceutical point of view. It is not, however, till 1880 that we are promised a full recognition of our own direct branches of science, but in that year "chemical substances and products, and experimental pharmaceutical processes," etc., will form one of the most conspicuous divisions.

We are led to these remarks by a consideration of the divided opinion as to the value or otherwise of these international shows, and by the attempt this year of the officials having charge of the Queensland Annexe to introduce a new article to British pharmacy, in the shape of the oil of the Dugong, an account of which we gave at p. 3 of the present volume of the Journal,

In the great Exhibitions of London and Paris from 1851 down to 1867, chemical and pharmaceutical products found a special feature in some of the Colonial collections, and these were duly reported upon by juries of competent men, but the efficacy of the articles or their preparations were never made the subjects of actual tests. An exception, however, to the rule occurred at the close of the Exhibition of 1862, when, at the instance of Baroness (then Miss) Burdett Coutts, the collection of medicinal barks of British Guiana and Trinidad were subjected to the test of actual experiment in the treatment of diseases by Mr. Charles Hunter at the Royal Pimlico Dispensary; but, besides a published report, we are not aware of any good accruing from this investigation, or of further notice being taken of the substances. The success which, it is said, has attended the use of Dugong oil in Queensland, and the sanguine hope of the promoters of its ultimate adoption in this country, is a sufficient recommendation that new articles with strongly reputed medicinal properties should be fairly and satisfactorily tested.

Transactions of the Pharmaceutical Society.

ERRATA.—PRELIMINARY EXAMINATION.

On p. 15, col. 2, line 7, *for* Leighton, Tompsett, *read* Tompsett, Leighton.

Same page and col., between lines 21 and 22, *insert* Francis, Charles Ernest ...... Wigan.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL ASSOCIATION.

At a special meeting of the Council of the Sheffield Pharmaceutical and Chemical Association, held Thursday evening, July 25th, for the purpose of considering the scheme for provincial education proposed by Mr. Schacht.

The following resolution was proposed by Mr. G. B. Cocking, seconded by Mr. Wilson, Local Secretary of the Pharmaceutical Society, and carried unanimously.

"That this Council, whilst assenting to the general principles of Mr. Schacht's scheme for promoting provincial education as adopted by the Council of the Pharmaceutical Society at their meeting, held July 3d, 1872, and published in the Journal of July 6th, are of opinion that the *mere* payments of money on the result of local examinations to the amount of £1 and £2, to students passing in the proposed second and first-class grades, would in this locality prove comparatively insignificant and totally inadequate to the requirements of this association.

"That the proposal to make grants of money towards tthe formation of libraries, museums, etc., is not stated in terms sufficiently explicit; and that the proposed additions thereto by Mr. Frazer as published in the Journal, July 13th, page 29, are much more equitable, and likely if adopted to prove satisfactory to this and many other provincial associations, viz., 'that the award of money in aid of any scheme which shall have a distinct scientific educational object' should *include* the payment of fees to teachers or lecturers employed by such provincial associations.

"They concur with Mr. Hills in his suggestion—(Journal, July 6th) that a complete account of all the results accomplished by any association need not be required, so long as a properly elected committee of management guarantee that the funds at their disposal should be appropriated in furtherance of such scientific pharmaceutical education."

BRISTOL PHARMACEUTICAL ASSOCIATION.

The annual meeting was held on Wednesday, July 31st; Mr. Townsend, President, in the chair.

After a few introductory remarks, the President requested the Hon. Secretary, Mr. Schacht, to read the Report, which was as follows:—

"The Council of the Bristol Pharmaceutical Association have the pleasure of offering the report of another year's proceedings.

"Commencing with the least satisfactory portion of their duty, they have to admit that as yet but little has been done towards the provision of a museum and library, the original difficulty, namely, the want of suitable rooms having still to be overcome. Some progress, however, has been made towards the raising of a fund to start the project with some effect when the favourable moment arrives.

"The monthly evening meetings have been fairly attended. Through the kindness of certain gentlemen, whose interest in the progress of science appears never to halt, the Council have been able to announce some very interesting lectures during the past session. Mr. Stoddart, Mr. Collens, Mr. Harding Warner, Mr. Lant Carpenter and Dr. Tilden have met the association on these occasions, and have delighted and instructed their audiences.

"One of these monthly meetings was set apart for the reading and discussion of papers upon subjects connected with pharmacy. That evening was fully and profitably occupied, and the Council have reason to believe that if more opportunities had been offered, a proportionate number of papers would have been presented.

"With regard to the systematic courses of lectures upon chemistry and botany provided by the Association, the Council are glad once more to be able to point to the evidences of the success that attends the teaching in these classes. The results are most encouraging, and cannot fail to attract larger numbers of students in future sessions.

"For the Botanical Class, nine of our students entered, and the following succeeded in passing the Government examination:—

Structural and Economic Botany.

Mr. Charles Bennett	Advanced Grade	2nd Class.
Mr. Ernest Samson	" "	" "
Mr. Henry Stephens	Elementary Grade	" "

Vegetable Anatomy and Physiology.

Mr. Ernest Samson	Advanced Grade	2nd Class.
Mr. Charles Bennett	" "	" "
Mr. Henry Stephens	Elementary Grade	" "

"For the Class on Chemistry, seventeen of our young pharmacists entered; of these, twelve went in for the Government examination, and all succeeded in passing. The following is the list:—

Mr. A. Little	Advanced Grade	1st Class.
Mr. C. Bennett	" "	" "
Mr. C. J. Miles	" "	" "
Mr. T. Stubbs	Elementary Grade	" "
Mr. J. G. Taylor	" "	" "
Mr. J. Goulter	" "	" "
Mr. W. Crocker	" "	" "
Mr. W. E. Milton	" "	2nd Class.
Mr. J. T. Callis	" "	" "
M. C. G. Boorne	" "	" "
Mr. R. H. Nuttall	" "	" "
Mr. W. H. Wheeler	" "	" "

"These are the results of the ordinary examination in inorganic chemistry. But in addition to the questions of which this was constituted, the examiner, Dr. Frankland, thought right to append others directed especially to the object of ascertaining the *practical* acquaintance of the students with the subject of their examination. These he treated as a separate examination, and gave the following award:—

Mr. A. Little	Advanced Grade	1st Class.
Mr. C. Bennett	" "	" "
Mr. J. Goulter	Elementary Grade	" "
Mr. J. T. Callis	" "	2nd Class.
Mr. R. H. Nuttall	" "	" "

"The Council have, moreover, every reason to believe from communications already received from the Department, that a Queen's medal will be awarded to one of the above students. As the official announcement, however, is not yet received, they reserve for the present the publication of the student's name.

"The Council have also to report that during the past year a most useful course of lectures was delivered by their late president, Mr. Stoddart, upon the Chemistry, Botany, and Materia Medica of the Pharmacopœia, and that it was attended by a numerous and very attentive class. The fees paid by the students who attended this course, and which amounted to the sum of £17. 17*s*., have been set apart as the nucleus of the Museum and Library Fund, and those gentlemen are congratulated upon having so materially assisted in laying the foundation of what is hoped to be a very useful feature in the scheme of the Association. The Council feel that the part taken in the matter by Mr. Stoddart has earned for him the gratitude of every member of the Association.

"The Council also consider that special thanks are due to those who, by their earnest efforts in the cause of 'earlier closing' have done much to secure the provision of a due proportion of leisure for the assistants and apprentices of the trade, and they sincerely hope these increased opportunities will be turned to good account

"The Council, therefore, believe that the general estimate of the proceedings of the past year will, upon the whole, be attended by a feeling of content; and after a careful review of the history of the Association throughout the period of its existence, they are of opinion that its present position and prospects and the work it is doing fairly realize the hopes of its founders and justify the labour bestowed upon it.

"They have, moreover, observed with considerable gratification that the Bristol Pharmaceutical Association is regarded with interest, and is spoken of with some respect by many who are utterly unconnected with the locality; and chiefly, as it would seem, for the prominence it gives to the provision of means for the systematic scientific training of its younger members. Confirmed as they thus are, by the opinion of others as well as by their own experience, in their impression of the wisdom of this feature of their scheme, they once more urge its importance upon the consideration of their fellow-members and beg them to use their best efforts to enlist to the utmost degree the interest of the juniors themselves in the measures adopted to so large an extent for their especial benefit."

The following is the report of the Treasurer:—

The Bristol Pharmaceutical Association in account with
JOHN STROUD, *Treasurer.*

1871.	For the Year 1871 and 1872.	Dr. £ s. d.
July 21.	To Balance received from late Treasurer, Mr. Taplin	19 11 1
,,	,, ,, on Prizes from Mr. Taplin	0 13 6
,,	,, 59 Members' Subscriptions at 10*s*. 6*d*. each	30 19 6
,,	,, 40 Associates' Subscriptions at 5*s*. each	10 0 0
,,	,, Lecture Fees from 18 Associates at 5*s*. each	4 10 0
,,	,, Extra Fees from three Absentees at Examination	0 15 0
		£66 9 1
	To Balance	13 12 5

1871.	For the Year 1871 and 1872.	Cr. £ s. d.
July 21.	By Ledger and Receipt Book	0 8 0
Sept. 5.	,, Cash to Professor Leipner for four Absentees at Examination, 1871	1 0 0
,,	,, ,, Professor Coomber for eight Absentees at Examination, 1871	2 0 0
,, 22.	,, ,, Honorary Secretary for Current Expenses	1 11 6
Oct. 31.	,, ,, Jeffries for Binding four Books	0 10 0
Nov. 2.	,, Lecture Fees to Professor Coomber	7 7 0
,,	,, Lecture Fees to Professor Leipner	7 7 0
1872.		
Jan. 23.	,, Cash to Arrowsmith for Printing	2 10 6
Feb. 2.	,, ,, Honorary Secretary for Stamps, etc.	1 0 0
,,	,, Lecture Fees to Monthly Lecturers	5 5 0
Mar. 18.	,, Carriage of Photographs for Mr. Warner's Lecture	1 4 9
,, 23.	,, Cash to Honorary Secretary for Stamps, etc.	1 0 0
July 5.	,, Advertising Early Closing in three Newspapers	4 10 0
,, 23.	,, Cash to Arrowsmith for Printing	3 0 0
,, 26.	,, ,, W. Sanderson, Esq., Treasurer of Bristol New Institution, for use of Offices, etc., for Meetings and Lectures	10 0 0
,,	,, ,, Mr. Westaway	1 1 0
,,	,, ,, Professor Leipner five Extra Fees for Absentees at Examination, 1872	1 5 0
July 26.	,, Cash to Professor Coomber three Extra Fees for Absentees at Examination, 1872	0 15 0
,, 28.	,, ,, Arrowsmith for Printing	0 18 6
,,	,, Postage Stamps, etc., used by Treasurer	0 3 5
,,	,, Balance in the Hands of the Treasurer	13 12 5
		£66 9 1

Museum Account.

1872.		£ s. d.
Jan. 23.	To Cash received from Mr. Stoddart for Lecture Fees from seventeen Students who attended his classes	17 17 0
		£17 17 0

Examined the above Account with the Vouchers, and found correct.

WM. HY. COLLINGS, *Auditor.*

The President moved the adoption of the report. The motion having been seconded by Mr. Towerzey, was carried.

The result of the election of members for the new Council was then announced. The names were:—Messrs. Boorne, Boucher, Giles, Isaac, Martin, Player, Pitman, Schacht, Stoddart, Stroud, Taplin and Townsend.

Mr. Collings was appointed to act as Auditor for the ensuing year.

A vote of thanks to the retiring Council was then carried, and the proceedings terminated.

At a subsequent meeting of the Council, the following officers were elected:—President: Mr. Townsend. Vice-President and Treasurer: Mr. Stroud. Joint Honorary Secretaries: Mr. Schacht and Mr. Pitman.

NORTHAMPTON CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The monthly meeting was held on July 29th, 1872; Mr. H. J. Masters, President, in the chair.

The Secretary, Mr. Druce, having read the minutes of last meeting, and a letter which had been sent by Professor Attfield inviting the association to send delegates to the meetings of the Pharmaceutical Conference at Brighton, said that since their last meeting, they had received from Messrs. Evans, Lescher and Evans a very handsome cabinet of Materia Medica specimens; also several specimen prescriptions from various sources.

Mr. Masters, in referring to the invitation sent by Professor Attfield, said he was sure the association would be much gratified if the secretary could make it convenient to represent them. He then continued,—We have met this evening for the express purpose of commenting upon the scheme brought forward by Mr. Schacht; and, while I feel all must be thankful to him for what he has done, I think every one must see it is impossible for the *third principle* to be carried out if the *second process* by which the aid is to be given be adopted. With regard to persons eligible to earn prizes and payments, it seems to me scarcely a pleasant position for a chemist in business to be in, or fair to his apprentice, for both to be striving for the same prize. Then, again, how would it be possible for associations to remunerate qualified teachers if those members who had passed the Minor examination are not eligible to earn money for their association? I believe that associations consisting of apprentices and assistants *only* would be better attended and prove more useful than those which comprise both employers and employed; for, what assistant would like to be asked a simple question in the presence of an employer and be unable to answer it? My opinion is that all that is wanted is what has been already done, only carried out more liberally; that is, to give help where there is a disposition to self-help, and to those who are found either through the local secretary or an inspector to be deserving. I shall now move,—

"That, in the opinion of this association, great credit is due to Mr. Schacht for the interest and trouble he has taken in pharmaceutical education, also that the three principles he has laid down are most excellent; but, at the same time, it would be impossible for them to be carried out if this scheme be adopted, since his proposed plan could not meet the requirements of a great majority of students."

The resolution was seconded, and carried unanimously.

Mr. Lance, in proposing the second resolution, pointed out the disadvantages of having both employers and employed members of the same association, and instanced the objection many assistants would have to attending if their employers were present; he said he had no doubt that his resolution would meet with their hearty approval—

"That as hitherto associations conducted by apprentices and assistants had been equally or more successful than those managed by chemists and druggists, it would not be advisable to compel associations to alter their rules so long as they meet with the Council's or Local Secretary's approval."

This having been seconded, was carried.

Mr. Branson said that it was proposed that no student should be allowed to compete unless he had attended twenty out of twenty-five lecture, Now, how could students, in houses of business where only two were kept, contrive to get out that number of times? How many members of that association would, if that rule were carried out, be eligible? Not more than two or three; and if their employers also were allowed to compete, not one of those for whom this scheme was especially designed would be eligible. He should accordingly move,—

"That as it will be perfectly impossible for more than 25 per cent. of students to attend the lectures a sufficient number of times to qualify them to compete, that this association would suggest that the non-attendance at lectures should not be a disqualification."

After being seconded, it was put and carried *nem. con.*

Mr. Thomas, in a forcible, argumentative, and aptly illustrated speech, moved,—

"That this association, much regrets the invidious distinction made between examined and non-examined chemists, and would suggest that no chemist in business should be eligible for competition in the proposed yearly examination."

This having been seconded, was carried amid much applause.

Mr. Mellor inquired if only a quarter of the number of students were eligible to compete, how many could they look upon as being able to obtain prizes? Not nearly sufficient to pay for lectures upon one, much less two subjects. He also referred to the difficulty of obtaining a sufficiently competent teacher in small towns, and hoped that the meeting would support his resolution,—

"That the proposed system of payment by results will prove totally inadequate to remunerate associations for the great, and in many cases, unnecessary expense which would be incurred in employing paid lecturers."

Mr Wallis pointed out the injustice (if they adopted the payment by results) of depriving an association of those who would be the most likely to obtain money, namely, the students who had passed the Minor examition. He, therefore, moved—

"That the passing of the Minor examination should not disqualify a student from earning money for his association or prizes for himself."

The Secretary observed that the great unfairness of the proposed scheme was its local character; by that he meant that it could be only successfully adopted by the largest towns, and where help was less needed. If the resolution he had the honour of proposing were adopted, a student resident in the smallest town would have the chance of obtaining a prize of books which would much assist him in his praiseworthy endeavours to pass the Minor or Major examination; and why, because he was resident in a small town, though he contributed equally with his brother student in a large town to the Society he should be debarred from competing he could not imagine. He begged to move the following resolution,—

"That no scheme can with any propriety be called 'just or universal' that renders neither assistance nor encouragement to students situate in towns or districts where by no possibility associations can be established. This association would respectfully suggest that if the system of payment by results be adopted, the proposed examination for grants and prizes should be open to all *bonâ-fide* assistants and apprentices of chemists and druggists, even if they should not be connected with an association."

After passing a vote of thanks to Messrs. Evans, Lescher and Evans for their handsome cabinet of materia medica specimens, the meeting terminated.

Proceedings of Scientific Societies.

PARIS SOCIÉTÉ DE PHARMACIE.

A Meeting of this Society was held on Wednesday, June 5th, under the presidency of M. Stanislas Martin.

Referring to a note recently read by M. Godin, calling attention to the solubility of benzoate of iron in oils, M. Méhu said that he had already pointed out this fact in 1868. He added that not only the benzoate of iron, but also the cinnamate, was soluble in oils, whilst the arseniates of iron were insoluble.

M. Limousin, on behalf of M. Ferrand, presented a note on the adulteration of essence of bitter almonds by nitro-benzol. The author heats to ebullition in a test tube three or four c. c. of a twenty per cent. alcoholic solution of potash, together with ten drops of the suspected essence. If nitro-benzol be present, the mixture takes a red colour; if the essence of bitter almonds be pure, it becomes a pale straw colour.

M. Adrian read a report, prepared by himself and MM. Dubail and Boudet, upon the essence of absinthe, which, according to the recent decision of the National Assembly, can now only be sold in the pharmacies. The report made known the composition of the various absinthe liqueurs met with in commerce, and the processes by which they are ordinarily prepared. These processes mainly consist of (1) alcoholic distillation from the fresh plant, and (2) simple mixture of alcohol and essence of absinthe. The report gave rise to considerable discussion.

M. Grassi regretted that the report gave no indication of the pharmacien's duty under the new law. He asked whether it was the pure essence of absinthe, such as is known to chemists, that was in future only to be sold by pharmaciens, and whether the order of a medical man would be necessary for its delivery.

M. Boudet explained the text of the law, from which it appeared that it was the essence of absinthe which was dealt with. The second question he thought would be answered by a public ordinance, similar to that which regulated the sale of poisons. In reply to several criticisms upon the law itself, M. Boudet said that it was made less in a fiscal or pharmaceutical than in a hygienic point of view. It was necessary to restrain the consumption of absinthe liqueur, the abuse of which had led to the most deplorable consequences, and among the means which presented themselves to the Assembly, one of the most certain was to prevent its preparation by the simple mixture of the essence and alcohol.

M. Dubail said that the essence of absinthe was actually supplied to the public on a large scale by the drug trade; also that it was certainly destined for the preparation of absinthe liqueur by simple mixture, and that it was chiefly so used by the small makers.

Some conversation then followed upon the difference which existed in the symptoms produced by the abuse of absinthe and that of alcohol, M. Boudet being of opinion that the more disastrous effects which followed the use of what was commonly known as absinthe liqueur, was due to the anise and other essences frequently mixed with it. MM. Delpech and Adrian said that some recent investigations brought before the Société de Thérapeutique showed that whilst the anise exercised upon animals only a slow, almost insensible influence, the action of absinthe was rapid and most fatal.

M. Poggiale said that although the law might be wanting in clearness as to scientific terms, it was evident that the pharmacien alone would have the right to sell the essence and concentrated preparations of absinthe upon the order of a medical man.

M. Vuaflart read a note upon orange-flower water. The author having observed that orange-flower water, even when obtained from the most respectable pharmacies, lost its odour shortly after being opened, and even acquired a disagreeable smell, was led to think that this was caused by distillation by steam. This method of proceeding he believed to yield a product that is at first satisfactory, but which it is not possible to keep a long time unchanged. Having mentioned this idea to M. Machet, he was informed by that gentleman that he had long renounced the distillation of roses by steam, as he had noticed that the water so prepared did not keep so well as that distilled over a naked fire in an alembic furnished with a diaphragm. The author, therefore, prepared orange-flower water by this method, which he succeeded in keeping unchanged for some years. He so arranged his supply as to be able to use water made the preceding year, in order to give it time to lose a slight taste of the fire, which disappeared completely with the first frost. He considers that distillation over the fire is more thorough, affecting all parts of the flower, and releasing some principles which tend to the conservation of the product. In adopting this process it is necessary, besides the diaphragm, to place in the cucurbit sufficient water to form a kind of bath for the flowers, and so to conduct the distillation as to keep them the least possible time in contact with the heat.

M. Roucher said that the Arabs prepared this distilled water with great care over the bare fire; the liquid, after several cohobations, being well saturated strongly aromatic, and keeping well.

Parliamentary and Law Proceedings.

HOUSE OF LORDS.

Adulteration of Food, Drugs, etc., Bill.

On Thursday, July 25th, this Bill was read a second time; on Monday, July 29th, it passed through Committee; on Tuesday, July 30th, it was reported and the amendments agreed to. The third reading is set down for Thursday, August 1st.

Poisoning by a Vermin Killer.

An inquest was held at Leeds on Thursday, July 25, concerning the death of Kate Groocock, an infant that had been poisoned by Battle's Vermin Killer, administered by its mother, who had also taken some herself, from the effects of which she was recovering. Evidence was given to the effect that the child was found by the servant dead, and the mother in convulsions and suffering very much. Mrs. Groocock told her husband afterwards that she had given the child the contents of a threepenny packet of Battle's Vermin Killer in some treacle, and had taken another herself. It was stated by several witnesses that the mother had for some time past been suffering from great mental depression.

Mr. John Wm. Longley, druggist, North Sreet, said a female came to his shop on the previous Monday and made some purchases. She put down the money for them, and as he was turning for change she said, "I might as well take some Battle's Vermin Killer." Witness said, "You are aware it's poison?" and she smiled, and said, "Perfectly well." He then gave her two threepenny packets, which she had asked for. He put a label on to the packets with his name and address; the word "poison" was already on the packets.

The Coroner asked the witness if he did not know that it was against the law to sell strychnia in this manner? Did he not know that he was required by the Pharmacy Act to observe certain specified regulations?

Mr. J. G. Turner, solicitor, here interposed, and said he appeared for Mr. Longley. He urged that Battle's Vermin Killer did not come within the first part of the schedule, and that when the packets were labelled poison, and had on them the name and address of the seller, that was all that was required.

The Coroner said he had had to warn druggists that the restrictions mentioned in the 17th section of the Pharmacy Act applied to Battle's Vermin Killer as it contained strychnia. Strychnia was expressly mentioned in the schedule of the Act, but he should not discuss the matter there with Mr. Turner, as he could not decide it.

Mr. Turner said that Battle's Vermin Killer was defined by the Pharmaceutical Society (who had the authority so to define) to belong to the second section poisons,* and if that were so he had done all that was required.

The Coroner replied that if that was the case he would have the question settled by the magistrates.

Mr. Turner, after some further conversation, said that if the Coroner gave it as his opinion this composition should be dealt with as a poison—coming within the first part of the Act, he should advise Mr. Longley to act upon that opinion.

The Coroner said that if Mr. Longley would promise that hereafter he would carry out the 17th section in reference to Battle's Vermin Killer, he did not suppose anything more would be said about it.

Mr. Longley said he most decidedly would.

The Coroner then intimated to the jury that the case would certainly have to go to the assizes, as the question of the sanity or insanity of the mother was not one for them to decide. It was desirable to have an adjournment for a *post-mortem* examination. The inquest was accordingly adjourned.

At the adjourned inquest, Mr. Scattergood deposed that he had examined the body and found no natural cause for death, while all the external appearances of the body were consistent with death from strychnia. He found a quantity of blue colouring matter in the stomach which he had set aside for analysis.

* This is incorrect. As we stated recently, under the powers given by Section 2 of the Pharmacy Act, upon the resolution of the Pharmaceutical Council, and the approval of the Privy Council, a list was published in the 'London Gazette' of December 21st, 1869, of articles that ought to be deemed a poison within the meaning of the Pharmacy Act, 1868, which list contained among other articles, "Every compound containing any poison within the meaning of the Pharmacy Act, 1868, when prepared or sold for the destruction of vermin," and then the resolution goes on to say, "and also that of the same, each of the following articles, viz.,—

Preparations of prussic acid,

Preparations of cyanide of potassium and of all metallic cyanides,

Preparations of Strychnine,

Preparations of atropine,

ought to be deemed a poison in the First Part of the Schedule A to the said Pharmacy Act, 1868."

The jury returned a verdict that the deceased died from the effect of poison administered by her mother. The foreman expressed the opinion of the jury that Battle's Vermin Powder should be classed among poisons, and the sale of it placed under greater restriction.

The coroner said that as he observed previously the powder came within the 17th section of the Act of Parliament, and the sale of it ought to be conducted under the regulations and restrictions provided for the sale of poison. If any case of a similar description should come before him after this, he should deem it to be his duty to direct the prosecution of the druggist, for what, he thought, was an offence under the Act of Parliament.

Suicide by Laudanum.

On Monday, July, 22nd, an inquest was held at Tooting upon the body of Charles Messent, veterinary surgeon. It appeared that the deceased, who had lost his temper through some domestic occurrence, was seen to go into the surgery; presently afterwards he came out and wished his family good-bye, saying he had "done it now." They did not believe he had poisoned himself, as he was in the habit of saying so to frighten them. Shortly afterwards he said that he had swallowed half an ounce of laudanum, and as he became insensible medical assistance was obtained, but he died the same evening. A verdict of suicide whilst of unsound mind was returned.—*Wandsworth and Battersea Times.*

Action for Payment for the Supply of Apparatus and Chemicals to a Class.

On Thursday, July 25, in the Sheffield County Court, Mr. Harrison, pharmaceutical chemist, brought an action against the Committee of the Mechanics' Institution in Sheffield, to recover £8. 1s. 2½d., for chemicals and apparatus supplied to the chemistry classes in connection with the institution. The items extended from 1870 to 1871. The plaintiff formerly acted as lecturer to some chemistry classes then existing at the Mechanics' Institution, and as such he supplied a quantity of chemicals and apparatus, which were the subject of the action. In support of his claim he relied upon two resolutions passed by the committee. The first was agreed to on the 29th of June, 1869, and was to the following effect: "That the committee provide Mr. Harrison with a room for the purpose of establishing a chemistry class in connection with the science and art department, Mr. Harrison to receive the money granted by that body for successful students, he providing all materials, etc., required." The second resolution was dated the 21st of August, 1870, and was to the effect that Mr. Harrison continued to conduct the science classes on the same terms as stated in the resolution of the 29th of June, with the exception that the committee provide the apparatus as soon as practicable, and to the extent they considered desirable. The plaintiff contended that the word "apparatus" included chemicals, and that he supplied what was required for the classes under the impression that the committee would repay him. The case for the defendants was that they relied upon the two resolutions, and that they never heard of any claim whatever from Mr. Harrison until they refused to give him £5 for each class, which he was to conduct during the session of 1871. The claim, it was said, was not made until eight months after the last class had ceased to exist, and that when it was made it came upon the committee quite by surprise. His Honour said he must nonsuit the plaintiff. The resolution of August, 1870, was that "the committee were to provide the apparatus as soon as practicable, and to the extent they considered desirable." From that it was clear there was no contract between the parties that the plaintiff was to provide anything, and the defendants to pay for it. The resolution showed that the committee were to be the judges of what was wanted; and that they were to get what was wanted. It was clear the plaintiff found the chemicals and found the apparatus; but it ought to be proved clearly to him (his Honour) that he did so on the understanding that he ought to be paid for it. Some arrangement of the kind ought to be proved. No such arrangement, however, had been proved. It seemed to have been left on the understanding that the committee were to pay for the chemicals and apparatus. But that did not establish a contract to pay, nor did it establish a state of things from which an implied contract arose.—Mr. Clegg (who appeared for the defendants) asked for costs; but his Honour refused the application, saying that it was not a case in which he should grant costs. Mr. Clegg observed that the plaintiff had been paid for what he had done and supplied, by the sum which he received from the Science and Art Department.—The plaintiff denied that that was so, and said all he received during the last year he taught the classes was £2.—His Honour expressed the opinion that the plaintiff supplied the chemicals and apparatus, believing that he was warranted in doing so by the first resolution, but there was nothing whatever in that or the subsequent minute which entitled him to be paid.

Excise Prosecutions.

A case was recently reported from Exeter (*ante* p. 17) of a chemist having been fined for keeping a male servant without a license, the said "male servant" being an errand boy, ten years old, whom a Revenue officer had detected helping his fellow-servant by brushing some shoes. We learn that since then another fine has been inflicted by the Exeter magistrates, the victim again being a chemist and druggist.

Review.

Pharmacopœa Germanica.—Berolini, apud Rudolphum de Decker, 1872.

A change similar to that which was made in this country in 1864, when the British Pharmacopœia was published, has now been effected in Germany by the publication of the Pharmacopœa Germanica. Hitherto several of the German States have had Pharmacopœias of their own, and no one of these has had authority throughout the Confederation. This subject has been under consideration for some years, and at the instigation of the Pharmaceutical Societies of North and South Germany, with a view to the subsequent adoption of an authorized German Pharmacopœia, a work was provisionally issued in 1867, under the title of Pharmacopœa Germaniæ, which was submitted to the governments of the German States for examination, and, if approved of, for public use.

After the establishment of the North German Confederation, the government of Mecklenburg-Schwerin referred to the Federal Council the introduction by authority of a general Pharmacopœia, and on the 19th Dec., 1868, it was decreed that medical men and pharmacists should be appointed to prepare such a work. They met on the 28th of May, 1869, and decided that both the Pharmacopœa Borussica and Pharmacopœa Germaniæ should be used as the basis of the new work, but they also determined to consult medical and pharmaceutical authorities throughout the Confederation with reference to its extent and construction. The proceedings were interrupted by the late war, but on the establishment of the German Empire they were resumed.

By a decree of the Federal Council issued on the 29th of April, 1871, a new commission, including representatives of South Germany, was appointed to prepare the Pharmacopœia. They commenced their labours in September, 1871, and having invited the co-operation of men of eminence in different departments, they completed the task in December of the same year.

The work is written in Latin, and the reasons assigned for adopting that language are, that it is understood everywhere, and that medical men are accustomed to write their prescriptions in Latin.

As in the case of other modern Pharmacopœias, the quantities of ingredients ordered in the processes are represented by proportional numbers, no reference being made to any particular weights or measures; indeed, there is not even a table of weights or measures given in the book, the subject being disposed of with the following remark in the preface, "As to the weights to be used in pharmaceutical laboratories, we have omitted to add a special table, as they are prescribed by law throughout the whole German Empire." At the end of the book, however, there is a posological table in which the doses are expressed in grammes, and in another place it is stated that measures are never to be used, but that the quantities even of liquids are to be determined by weight.

The articles are all arranged alphabetically in one general list, as they are in the British Pharmacopœia.

A table of atomic weights is given, in which the new atomic numbers are used; and in the few instances in which symbolic formulæ are employed, they are constructed according to the new or unitary system. Symbolic formulæ, however, are but very sparingly used—in only some twelve cases throughout the entire work.

The names applied to chemical substances are such as have been used in previous German Pharmacopœias, and they frequently differ considerably from those used in this country. It is stated in the preface that, "with respect to those drugs, whether simple or prepared, which belong to chemistry, it seemed advisable to use chiefly those names that have long been used by medical men and pharmacists, as also in books that record remedies and methods of treatment." It was probably the determination to retain these names that prevented the more general employment of symbolic formulæ, for as the modern system of notation is adopted, this would not accord with some of the old chemical names. Thus, sulphate of iron is *Ferrum sulphuricum*, and sulphate of soda is *natrum sulphuricum*, but the term *natrum* represents the alkaloid soda, and not the metal, which is represented by *natrium*, as in *natrium chloratum*, common salt. Now if the symbolic formula were given for *natrum sulphuricum*, as the new system is followed, it would represent it as sulphate of sodium, and not of soda (Na_2SO_4), thus making the name and the formula inconsistent one with the other. Therefore as the old name is retained, the formula which is founded on new and altered views is omitted. In the British Pharmacopœia, a similar course was pursued with regard to the retention of old names, but to justify the use of symbolic formulæ without involving inconsistency, and at the same time without ignoring the system generally adopted by scientific chemists, it was determined to insert formulæ according to both systems. That course was admissible at the time the last edition of the British Pharmacopœia was published, but it would hardly be so now, as the new notation has almost entirely superseded the other. The authors of the German Pharmacopœia, therefore, had but two courses before them, either to insert symbolic formulæ according to the new system, and to change the names so as to correspond with the formulæ, or retaining the old names to omit the formulæ. They have adopted the latter course. Very slight changes in the names would have removed the difficulty, and this might have been done without altering the general construction of the Latin names hitherto used in German pharmacy, if it had been particularly desired to retain that construction. All that would have been required would be to change *Magnesia sulphurica*, the present name of Epsom salts, to *Magnesium sulphuricum*, and to make other changes in a similar direction. There is, however, one view of the case that tends to reconcile us to what has been done, and it is, that in the prospect of a full discussion of the desirability of having even a more general Pharmacopœia than the Pharmacopœa Germanica, one, namely, that should embody the formulæ of the Pharmacopœias of all nations—an universal Pharmacopœia—the question must necessarily arise as to what nomenclature is the best and should be adopted. And the necessity for settling this question, as well as others of equal importance, such as the strength and composition of compound medicines, in the event of undertaking a Universal Pharmacopœia, supplies a motive for urging that undertaking forward, and adds to the probability of its accomplishment.

If the question of chemical nomenclature as applied to saline compounds were fully considered on its merits, it would probably be found that there are names better suited for pharmaceutic use than those used in German pharmacy. *Kali sulphuricum* is their name for sulphate of potash and *Kalium iodatum* for iodide of potassium, *Kali* standing for the alkali, and *Kalium* for the metal. So again, sulphate of soda is *natrum sulphuricum*, and common salt *natrium chloratum*. In translating these terms into English some doubt might arise whether *iodatum* and *chloratum* signified iodide and chloride or iodate and chlorate, but the latter terms are represented by *iodicum* and *chloricum*.

It is much to be regretted that the chemical nomenclature applied to medicines ordered in different pharmacopœias should differ as it does. Surely medical men and pharmacists might be brought to agree to one general system to be universally used in medicine. There would seem to be less difficulty in accomplishing this object than in getting all to agree as to what medicines should be ordered and how they should be compounded. At present the three great neighbouring nations, France, Germany and England, have three perfectly distinct systems of chemical nomenclature in their pharmacopœias, as will be seen by referring to the following names applied to three chemical substances:—

French.	*German.*	*English.*
Sulphas sodicus.	Natrum sulphuricum.	Sodæ sulphas.
Carbonas calcicus	Calcaria carbonica	Calcis carbonas.
Oxidum ferricum	Ferrum oxidatum.	Ferri peroxidum.

Fortunately synonyms are often given, and these, especially where there is no symbolic formula, assist in explaining what the name is intended to refer to. Thus the name "*Natrum subsulfurosum*" used in the Pharmacopœa Germanica might puzzle even a chemist, occurring as it does without any process being given for its preparation, or any chemical formula representing its composition, if it were not accompanied by a synonym, "*Natrum hyposulphurosum.*" So again the name "*Tartarus natronatus*," although not very unlike the name given in our pharmacopœia, is rendered more clear by having the synonyms appended, "*Natro-Kali tartaricum*" and "*Sal polychrestum Seignetti.*" All will agree in thinking, however, that a symbolic formula would have made this clearer.

Not only is the new German Pharmacopœia very sparing in the use of symbolic formulæ, but also in describing processes for the production of chemical compounds. This omission is accounted for by a statement in the preface that, "as numerous chemical preparations are better and more correctly made in large laboratories from which they are supplied to pharmacists either directly or through wholesale dealers, instructions are only given in the Pharmacopœia for the making of certain chemicals, especially those whose composition or properties are dependent upon some-special method of preparing them." This is no doubt a satisfactory reason for omitting to give *minute* details relating to the manufacture of articles that can only be made on the large scale, such as oil of vitriol, acetic acid, carbonate of soda and alum, and it may be also applied to many other articles that are only made by the manufacturing chemist; but we think it is carried too far in the work before us. We often hear of instances in which chemical processes given in the Pharmacopœia, although seldom used, yet sometimes prove serviceable; and we believe the wholesale omission of such processes would be a subject of regret to many of those who use the Pharmacopœia. If for no other purpose than that of keeping constantly before the notice of those who from day to day are using the articles the methods by which they are produced, the descriptions given in the Pharmacopœia are not without their use. To the pharmacist, the Pharmacopœia is, or should be, something more than a work of reference; it is his daily companion, and information contained in it which he might otherwise miss or forget is forced upon his attention and kept fresh in his memory. We think, therefore, that some account should be given of the origin and mode of production of every article described in the Pharmacopœia. This may sometimes be very brief, as in the descriptions given in our Pharmacopœia of arsenious, benzoic, carbolic, nitric, and sulphuric acids, but still in connection with the characters and tests, which are more fully described, it supplies what is required in those cases. Now, referring to the descriptions of those articles given in the German Pharmacopœia, we find that in only one instance, that of benzoic acid, is there any reference made to their origin or mode of production. The same thing might be said in a great number of other instances in which, although minute details are not required, something more might with reason be looked for than is given. But there are some cases in which the want of a process with even minute details, is an obvious defect. Thus, for instance, *Acidum chromicum*, is described as a red crystalline acid, the characters and tests of which are given with sufficient minuteness, but nothing is said as to its source or mode of production; yet chromic acid, when used as a medicinal agent, as it sometimes is, might be required to be made, and might without difficulty be made, by the pharmacist, if proper, and they should be minute, instructions were given for the purpose of enabling him to do so.

But while there is reason, we think, to regret the absence of some information which would be acceptable, and the omission of which has surprised us the more, because German pharmacists used to be required to make many preparations that are not generally made by the same class in this country, and we were, therefore, prepared to look to the German Pharmacopœia for processes suitable to such cases, yet, notwithstanding some disappointment in this respect, we find much to satisfy us in other respects. Especially we commend the copious reference made to the use of tests, and the general tendency manifested and progress made towards the simplification of old complex formulæ for galenical preparations.

Before referring more minutely to that class of preparations, however, we must allude to the strength of the mineral acids. Sulphuric acid is ordered in four different states. First, we have *Acidum sulfuricum fumans*, Nordhaussen oil of vitriol, the strongest fuming acid, sp. gr. 1·86 to 1·90. Then we have *Acidum sulphuricum crudum*, common unpurified oil of vitriol, sp. gr. 1·830 to 1·833. Then we have *Acidum sulphuricum*, or distilled oil of vitriol, sp. gr. 1·840. And, lastly, we have *Acidum sulphuricum dilutum*, sp. gr. 1·113 to 1·117. This diluted acid is made by mixing one part by weight of sulphuric acid, sp. gr. 1·84, with five parts of water; it is much stronger than our diluted acid, the sp. gr. of which is only 1·094, but both the crude and rectified acids are less concentrated than the sulphuric acid of the British Pharmacopœia. There are also four sorts of nitric acid described. The strongest is *Acidum nitricum fumans*, a fuming reddish-brown acid, of sp. gr. 1·520 to 1·525. This is the most concentrated nitric acid that can be obtained, but no process is given for its preparation, which we think is a mistake, for it does not keep well, and should be prepared when wanted, by distilling a mixture of commercial nitric acid and oil of vitriol. *Acidum nitricum crudum* is common *Aqua fortis*, sp. gr. 1·323 to 1·331. The *Acidum nitricum* of the Pharmacopœia is described as a colourless acid, sp. gr. 1·185, and containing only 30 per cent. of true nitric acid (HNO_3); it is, therefore, a very weak acid as compared with ours. *Acidum nitricum dilutum* is prepared by mixing equal parts by weight of nitric acid and water. Its sp. gr. is 1·086 to 1·089; it is, therefore, weaker than the diluted nitric acid of our Pharmacopœia. Hydrochloric acid is ordered in three different states. *Acidum hydrochloricum*, the strong pure acid, is weaker than our strong acid, the sp. gr. being only 1·124. It contains 25 per cent. of anhydrous hydrochloric acid. *Acidum hydrochloricum crudum* is about the same strength as our pure acid, sp. gr. 1·16 to 1·17, and percentage of anhydrous acid from 30 to 33. *Acidum hydrochloricum dilutum*, made by mixing equal parts by weight of hydrochloric acid and water, has a sp. gr. 1·060. It is rather stronger than ours.

We may perhaps infer that sulphurous acid is in less repute in Germany than here, as it is not in any form included in the German Pharmacopœia, unless, indeed, we consider hyposulphite of soda to represent it. But the omission of sulphurous acid is amply compensated for by the introduction of a considerable number of chemical remedies not mentioned in our Pharmacopœia. Among these are boracic, chromic, lactic, succinic, and valerianic acids, acetic ether, petroleum ether, Dutch liquid (under the name of *Œthylenum chloratum*), nitrate of silver and potash, chloride of gold and soda, valerianate of bismuth, bisulphide of carbon, hydrate of chloral, iodoform, etc.

Of course there are many preparations that we are not familiar with, and there are methods new to us for making preparations with which we are familiar. *Ammonium carbonicum pyrooleosum*, the existing representative of the old *Sal volatile cornu cervi*, which is now made by mixing carbonate of ammonia with the disgusting Dippel's oil, is a remnant of ancient pharmacy which we might soon hope to have seen the last of. In the same category might also be included *Aqua fœtida antihysterica*, *Decoctum sarsaparillæ compositum Zittmanni*, and *Electuarium Theriaca*.

With reference to decoctions, it may be well to remark that, unless otherwise directed, they are to be so prepared that ten parts of strained product are obtained from one part of the drugs operated upon; if, however, concentrated decoctions are ordered, the solid ingredients are to be increased to one half more; and for the most concentrated (concentratissimus) they are to be increased to double. The decoctions are made by heating the ingredients together for half an hour in a steam-bath.

In making infusions the same proportions of solid ingredients to the water are ordered as for decoctions, and as in the case of decoctions, there are three strengths, the two strongest of which are distinguished as "concentrated" and "most concentrated." They are made by pouring boiling water over the ingredients in a suitable closed vessel, and immersing this in a steam-bath for five minutes. The shortening in this way the duration of the process of infusion or digestion, is certainly an important consideration if the results should be found to be equally good.

A somewhat similar mode of operating is directed to be adopted in making some of the tinctures. All tinctures are made by maceration or digestion, continued for eight days, the ingredients being confined in partly-filled bottles, and shaken every day. Maceration is conducted at temperatures ranging from 59° to 68° Fahr., and digestion at temperatures between 95° and 104° Fahr. Tinctures of wormwood, aconite, aloes (compound and simple), arnica, assafoetida, orange-peel, benzoin, cascarilla, catechu, bark (simple and compound), cinnamon, and a great many others are made by digestion; while tinctures of belladonna, cantharides, capsicum, castor, digitalis, euphorbium, and many others are made by maceration. It is not explained how the temperature is to be maintained between 95° and 104° Fahr. night and day, for eight days, which we presume would be the principal difficulty in conducting the process by digestion.

One of the peculiar features in this pharmacopeia is the small number of pill masses ordered. Besides the *Pilulæ odontalgicæ*, intended merely for local application, there are only three formulæ given for pills, under the titles of *Pilulæ aloeticæ ferratæ*, *Pilulæ ferri carbonici*, and *Pilulæ jalapæ*. This forms a marked contrast with the twenty different sorts of pills ordered in our Pharmacopeia; and we should be glad to think it indicated an improvement in the practice of physicians, in prescribing other forms of medicine for their patients. The *Pilulæ jalapæ* of the German Pharmacopœia are composed of resin of jalap, soap, and powdered jalap; and notwithstanding the number of formulæ for pills we have already in the British Pharmacopœia, we are disposed to think that this or a simliar form might with advantage be introduced, omitting at the same time some of those we have, for while pills with aloes are repeated over and over again, we have no purgative pill without aloes.

Obituary.

EDWARD PALK.

We have to record this week the death of another of the founders of the Pharmaceutical Society, in the person of Mr. Edward Palk, Pharmaceutical Chemist, of Southampton, who died on Thursday, July 25th, at the age of seventy-three.

Mr. Palk was born at Portsmouth, but early in life removed to Southampton, where he was apprenticed to Mr. Gillmour, of the High-street. He afterwards commenced a business on his own account, which he carried on for more than fifty years. During that time he always threw himself heartily and zealously into every movement for the public good, and became prominently identified with the benevolent institutions of the town, and with the discharge of the public duties associated with municipal government. In 1847 he was elected alderman, and held that office until 1865, when upon the cessation of his connection with their body, the Council passed a vote of thanks to the ex-alderman for the important services he had rendered to the borough; and the inhabitants marked their appreciation of his labours on their behalf by subsequently presenting a testimonial to Mr. Palk in the form of a handsome gold watch, a timepiece, silver salver, and candelabrum, at a large public meeting held at the Philharmonic Hall. In 1858 he was elected mayor of the borough, and served the office with the utmost advantage to the community. In 1856 he accepted the appointment of a justice of the peace for Southampton.

Mr. Palk was also for thirty-two years churchwarden of the parish of Holy Rood, in which he resided. In connection with the religious, benevolent and philanthropical institutions of the town, his labours were unceasing. In conjunction with other zealous workers he founded the ragged school, of which he became treasurer, and was regarded as the father of an institution which has accomplished an inestimable amount of good among the poorer classes of the town. He also took a deep interest in the Female Penitentiary, was a Governor of the Royal South Hants Infirmary; Vice-President of the Southamptom Dispensary; and Honorary Vice-President of the Southampton Athenæum, etc.

The deceased gentleman was one of the earliest members of the Pharmaceutical Society of Great Britain—his membership bearing date 1841—and for many years he acted as its local secretary for the district.

During the last three years Mr. Palk suffered from a painful internal disease, for the relief of which he on the 11th June last underwent an operation. This was considered to have been very successfully performed, but the long period of suffering he had undergone had undermined his naturally vigorous constitution, and after returning to Southampton he gradually got weaker until his death. On Saturday last the magistrates of the borough held a special meeting, and passed a vote of condolence with the bereaved family, and on Monday, they, together with the Corporation and an immense concourse of his fellow townsmen, paid a further mark of respect, by attending the funeral.

Notice has been received also of the following deaths:—

On the 15th July, Mr. William Paine, Pharmaceutical Chemist, of St. Margaret's Street, Canterbury. The deceased gentleman had been a member of the Pharmaceutical Society from 1842 till the time of his death.

On the 10th July, Mr. Richard Lewins, Chemist and Druggist, of Morpeth.

On the 14th July, Mr. Richard Hardy, Chemist and Druggist, of Dicconson Street, Wigan.

On the 18th July, Mr. James Waits, Chemist and Druggist, of Poplar.

Correspondence.

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

Provincial Education.

Sir,—If they have taught us nothing else, the discussion and correspondence on the Education Scheme now before the Council, as well as the scheme itself, are calculated to arouse in the minds of all pharmaceutists a sense of profound humility.

If we regard the very modest requirements of the Preliminary examination, and notice the large proportion of candidates who are rejected, if we consider the elaborate schemes that have been and are propounded to enable young men to pass such easy examinations as the "Minor" and even the "Major," we must acknowledge that the day is far distant when we can hope to take the position that some of our body are sanguine enough to think the practitioners of pharmacy ought to take in this country.

I am not saying in the present state of things that it is either desirable or possible to make either the Minor or Major examinations more difficult, and we might go far to find a better Board of Examiners than we now have, still the fact remains, as everybody's experience will testify, that it is possible for a young man to pass his examinations whose general education is wofully deficient, and who knows but little of his business. Only the other day an assistant of 26 years of age (who I need hardly say only stayed a day with me), and who had lately passed his "Minor," was constrained to confess that he had never silvered a box of pills in his life, and he directed some pills that were to be taken "si opus possit" to be taken "with posset."

I sympathize with Mr. Schacht's philanthropic endeavours to help those young men who entered the business before the passing of the last Pharmacy Act, although I question if the scheme he advocates, for reasons amongst others lately given by Mr. Reynolds, will be found in practice to work well. I earnestly hope, however, that it will be decided that any help that is given by the Society will be given only to those who entered before the passing of the Act.

To do otherwise, I cannot but think would defeat the very object we have in view, and instead of raising would tend to lower our already very low standard by holding out inducements to boys and young men of deficient education to join our body.

It is not by being able to call ourselves members (by examination if you will) of the Pharmaceutical Society that we shall gain the confidence and respect of the public, but by showing that we are men of an education at all events a little higher than that of the mere huckster, and only so shall we be able to attract boys of a better class into our ranks.

It seems to me, and every one is invited to give his opinion, that what we have to do is to make the Preliminary examination a really effectual bar to the entrance of the ill-educated. By taking care that only those who have had a fair general education are admitted, we may rely upon it we shall hear no more about difficulties in passing the Minor and Major; and instead of offering premiums for ignorance, the plethora of money at "The Square" may be much better expended by establishing scholarships available for three to six months in the laboratory for those who pass the best Preliminary examination.

Charles Ekin.

Bath, July 30th, 1872.

Sir,—At the risk of being considered hard-headed, a characteristic common to north-countrymen, I am induced to address to you a few more remarks on the subject of Provincial Pharmaceutical Education. In my last letter, I endeavoured to show by the Society's Charter, and by the Acts of Parliament which they have been instrumental in passing, that it is their duty "to promote an uniform system of education of those practising pharmacy." I think I have satisfactorily made out my case.

It is now my object to endeavour to prove that the Society has not attempted to promote or to provide a uniform system of education adapted to the requirements of the country members of the trade. It is now nearly thirty years since their charter of incorporation was granted to them for this purpose. With the exception of a few donations, amounting in the aggregate to a very small sum, they have never attempted anything of the kind, until the meeting of the Council on November 2nd, 1870, when the scheme proposed by Mr. Richard Reynolds was adopted in principle by the Council. Had this been faithfully carried out, there was much in it that was well calculated to effect the object in view. Had the Council of that day had sincerely at heart the success of this object, the result would have been very different from what it has been. But the Committee to which this scheme was referred so mutilated and mangled it, and utterly destroyed its usefulness, that its author did not know his own scheme again. They produced one in the place of it, soulless, useless, and impracticable; the paternity of which no person has ever owned, and nobody ever will. Those who read it, cannot come to any other conclusion than that it was admirably adapted to defeat the object it had in view, and it at the same time conclusively proves that the Committee of that day were utterly incapable of grasping and dealing with so important a question.

The country members of the trade are thoroughly roused on this subject. They will never rest until assistance is given for the instruction of their apprentices and assistants, in all those subjects on which they are required to pass examinations. They will no longer tolerate the useless waste of money by allowing the surplus income, amounting to about £2000, to be annually invested in the Three per Cents. for the benefit of posterity. A luminary in our town council once asked, "what has posterity done for us that we should have so much regard for them?" The age for endowments is quickly passing away. What is the use of saving for posterity that which is absolutely required for ourselves? I have a strong impression that posterity will be able to hold its own quite as well, and perhaps better than ourselves. In my next letter, if time permit me, I will endeavour to show why the Council should assist provincial pharmaceutical education, and how they can do it.

Hull, July 29th, 1872. Atkinson Pickering.

[*** We are at a loss to understand the meaning of Mr. Pickering's remark that the amended scheme to which he refers was admirably adapted to defeat the object which it had in view, and do not see that his letter contains any justification of the charge he has brought against the Council. We are glad however to hear, upon Mr. Pickering's authority, that the country members of the trade are thoroughly roused upon this subject. We trust they will continue their exertions until there is a satisfactory solution of the very difficult question of education, and meanwhile, we shall be glad to publish Mr. Pickering's views as to the measures which ought to be taken with that object.—Ed. Pharm. Journ.]

Sir,—You invite opinions upon the scheme for provincial education of druggists' apprentices. As I understand the motives assigned for the establishment of our Society, I think that so far as the members are collectively concerned, they are not more competent to form an opinion than any other portion of her Majesty's subjects. All that we, or rather the Council which represent us, have to do is to see that each candidate for admission to the honour of membership has received a liberal scientific education; and, further, that the candidates are able to pass such examination as they in their wisdom think fit. But I certainly protest strongly against the Pharmaceutical Society paying either directly or indirectly any portion of the expenses of educating any present or future apprentices.

One of the objects of the promoters of the Society was, I think, to raise the status of chemists and druggists; and I think, and venture to hope that others will think with me, that the apprentices to chemists, like pupils to surgeons, etc., should pay the expense of their own education; and I would further suggest for the consideration of the Council that no person other than men who have been in business prior to the passing of the Act, should be eligible for examination until they had attended a course of lectures at the Pharmaceutical Society for twelve months and upwards after their pupilship or apprenticeship shall have been completed. The Council might in their discretion offer prizes of free membership to the Society for such pupils receiving certain certificates to be hereafter arranged; and all the balance moneys, or rather profits, should and ought to be placed to the credit of the Benevolent Fund, which, by the bye, should be for members and not outsiders, who, in my humble opinion, have no claim to its bounty.

I also strongly object to any distinctive marks in the diploma granted by the Society distinguishing between examined and unexamined members. I contend membership should be equal, never forgetting that had it not been for the unexamined members the examined would never have existed; and after years of toil, expense and trouble, it is too bad that the junior members should take advantage of their seniors, whose grey hairs they frequently insult, instead of honouring, by remarks in your columns which do not do them credit. If education teaches foppishness and insult to the founders of the Society to which they are proud to belong, better, I say, had they never received it. I think the Council should introduce bye-laws to the effect that all members, by paying a certain sum *down*, in addition to that already subscribed, should be life members, and that no person be hereafter admitted, except as a life member, and that no distinction should be made between examined and unexamined members, the latter claiming their right to membership by Act of Parliament. Depend upon it, the distinction is invidious, uncalled for, unexpected, and tends to lower rather than heighten the moral tone of the Society. I think the interest of the public, so much prated about, is not sincerely meant, otherwise, we should endeavour to simplify our prescriptions by refusing to make up any which had not the full directions written plainly in English, the drugs and quantities, as now; it would appear more in consonance with a wish to avoid errors than to write in Latin, and then educate up to the mark. Besides, the instructions are for the patient, and not for the exclusive use of the druggist, and physicians should also write the quantity of drugs for the whole, and not one dose; it would be truthful, and frequently prevent mistakes.

X. Y. Z.

Sir,—With regard to the subject of payment for results, 'G. T.' states (July 6th, 1872) that I had better leave the matter in abler hands. What authorizes 'G. T.' to say so? Although I write anonymously, it is not that I am unqualified to write. Permit me to tell 'G. T.' that I was till last year a science teacher, and that I have had very large science classes under my instruction; that I know every part of the Government system; and that I speak as a practical man.

I should like Mr. Schacht to say why he favours the Government system. He ought not to favour it simply because it is adopted by our Government. Were Mr. Schacht to tabulate the results of the Government schools of these last three years, and notice the narrow escape the system had from a collapse—at the same time the secession and disgust of both teachers and students, as well as the disadvantages of the scheme—he would, I think, recommend anything but it.

I much regret that others of practical experience have not spoken against the imitation of the Government scheme. Mr. Schacht has yet to show that the scheme adapted (even if it were so) to the Government is adaptable to the Pharmaceutical Society. I should have been glad to see more originality—some scheme that the Pharmaceutical Society has really given birth to.

Would Mr. Schacht be disposed to reconsider his scheme, and leave out such parts as are objectionable, or such parts as are not adaptable to the Pharmaceutical Society?

The system of payment for results is hateful to every one who has experienced it. I fancy that the scheme cannot be adopted into our Society, simply from the objection of examined men to allow some of the interest of their money deposited in the Society to be distributed to the students of the country.

Mr. Reynolds and I are not the only persons who consider that it is neither necessary nor desirable in every case to mitigate the expenses of students.

The time may come when there will perhaps be no occasion for any country schools. To bear out this remark, I will advance my own case. I am an examined pharmaceutist, and delight to teach. On my assistants wishing to attend the local association, I reply that there is no necessity for it; that in my pharmacy are more specimens than in the local museum; that in my library, which all my young men are invited to use, are more books and better ones than in the local library; that if they require instruction, I am happy to give it; that when they converse about the examination subjects, I am happy to converse with them. In these respects my case (now that the Society has in the field a magnificent army of trained men, which army is increasing year by year) is not unparalleled.

As I write, Mr. Schacht's system seems to me more like the oolite system of geologists than anything else. The oolite at one time teemed with life; now it is a mass of of dead things fossilized. The Government system was full of life; now it is dead, or fossilizing, as may be proved by the revolt of teachers and other circumstances. What the geologists do of the oolite we, can also do of Mr. Schacht's system, viz., give an ideal representation of the society, committee, teacher and student under it.

I am glad to observe Mr. Schacht's remark, "Details to be understood as incomplete."

A COUNTRY MAJOR ASSOCIATE.

MICROSCOPICAL SPECIMENS ILLUSTRATIVE OF THE MATERIA MEDICA.

Sir,—Mr. D. Hanbury having very kindly sent me a copy of "Möller's Price-list of Microscopic Preparations," I am able to give your microscopical readers information I have reason to believe many of them will be glad to receive, namely, that specimens well-mounted and reliable, illustrating the structure of pharmaceutical roots, etc., may be procured at a moderate cost. Möller gives on page 24 of his catalogue a list of what he calls expressively "Pharmacognostische Präparate," numbering 144 slides, many of which contain from two specimens and upwards. The list comprises the starches and arrowroots commonly met with, and the principal roots, barks, fruits and seeds. Sections of "Radix Sarsaparille Caracas, S. Honduras, S. Lissabon, S. Veracrux," in my possession, are without exception the finest specimens of the art of mounting I have ever seen, and present the peculiarities of the structure in a manner our English preparers would do well to imitate.

I have not been able to learn that these slides are procurable in England otherwise than by order. Möller's price is "32 Thalers for the collection of 144 specimens." 6⅔ thalers is equal to 20s. English. Single slides cost 8 silver gr., of which 10 equals 1. Microscopico-pharmaceutical Associations could easily arrange to procure as many as their members might require direct from Möller. The postage of small parcels is heavy. Möller's address is "Institut für Microscopie, Wedel in Holstein (per Hamburg).

HENRY POCKLINGTON.

Hull, July 29th, 1872.

EXAMINATION FEES.

Sir,—I have no wish to detract attention from the discussion as to educational assistance, of which the students in the trade seem very much in need (judging from the results of the recent examinations); but I am of opinion that, as the Society have funds and to spare, the present is a time when they ought to reconsider the question of examination fees.

For the right to practise medicine, dispense prescriptions, and sell drugs—poisons included—the Apothecaries' Company claim six guineas, and for their Assistants' examination in dispensing, pharmacy, etc., two guineas, whilst the Pharmaceutical Society charge ten guineas, and five for a certificate, merely to dispense prescriptions and retail poisons. We must remember that there is not any restriction as to the selling of drugs—any one may do that.

W. B.

July 29th, 1872.

DUGONG OIL.

Sir,—In your impression of the 6th ult. a notice appears regarding the great value of Dugong oil as exhibited at the Queensland Annexe of the International Exhibition, and that you believe at present there has not been any attempt to introduce the oil to the English market. I must inform you that for many years past I have brought it to public notice, and endeavoured to introduce the oil from the East at a reasonable price. Its medicinal import is well known at the hands of my medical friends and myself, the introducer, as most valuable in cases of phthisis, pulmonary, and scrofular diseases. I would merely refer you to Mr. Hill, of Bell and Co., Oxford Street, the well-known chemists, in confirmation of my exertions to bring the oil to England at a cheap rate, in which I have hitherto failed. I intend to make the acquaintance of Mr. Daintree regarding his importation; and if we can unite our exertions to cheapen the oil, a most valuable boon will be conferred on the public.

J. McGRIGOR CROFT.

Mandarin Villa, St. John's Wood, N.W.
July 18th, 1872.

X. Y. Z. entirely misunderstands the object we had in view in the remarks to which he refers.

R. H.—Apply to the Secretary for a pamphlet entitled 'Hints to Apprentices and Students.'

R. F. Moreom.—You can obtain the information at the College of Surgeons.

W. C. M.—(1) A rudimentary knowledge of chemistry would enable you to answer the question without any special work on arithmetic. (2) We are informed that a new edition is in preparation which will be ready in the autumn.

"*Tere Bene.*"—Probably of any respectable dealer in druggists' sundries.

"*A Constant Reader.*"—The subject of your suggestion has already been under consideration, and arrangements have been made for partially carrying it out. The chief obstacle is the difficulty in getting information.

Curiosities of Labelling.—A correspondent has sent us a label, on which the following words occur in red upon a black ground:—

"In conformity with the Sale of Poisons Act, 1868, this preparation must be labelled
POISON,
but its composition remains unaltered"
LAUDANUM.
[Name and address of seller follows.]

COMMUNICATIONS, LETTERS, etc., have been received from Mr. J. Mackay, Mr. C. R. C. Tichborne, Mr. Stone, Dr. Porter Smith, Mr. J. Bienvenu, Mr. Glaisyer; "Oxonian".

THE BRIGHTON AQUARIUM.

In this country the tradition that Britannia rules the waves is a popular and cherished one; but it must be confessed that the rule is very superficial, since she sees little and knows less of the myriads of living creatures which live beneath them. Nor are we likely to be able much to increase our knowledge of these creatures by visiting them at home, and probably we shall have to content ourselves by noting the habits of those which, under more or less compulsion, play the part of visitors with us. Slight exaggeration would it be to say that at the present time it would not be difficult to find many persons who have never seen a starfish except in a picture, and who if shown a common barnacle would be puzzled to say whether it were fish, flesh, or fowl. Even among the many thousands who now flock every year to our fashionable watering-places, acquaintance is generally confined to what may truly be called the "common objects of the seashore." It is, therefore, a matter for congratulation that we can point to a bold attempt to follow the good example set first by the Zoological Society of London, about the year 1852, when they began to exhibit a collection of aquatic animals within their grounds, and subsequently by the Crystal Palace Company, in so far as those efforts are now to be supplemented by an aquarium at Brighton constructed on a larger scale than has ever before been attempted.

Although not forming one of the subjects for the Preliminary, or Minor, or even the Major, the fact that this new experiment is intended to be inaugurated during the coming scientific gathering at Brighton, must be our apology for alluding to it in these pages, for, independent of the interest it must present to all scientific men, it may be presumed that it will there be a special attraction to many of our readers. Notwithstanding its popular aspect as a show, the possibility of such an aquarium is due entirely to scientific observation. It may afford additional interest to know that some of the earliest and most valuable information on the subject of aquaria dated from Apothecaries' Hall, and came from the pen of the late Mr. Robert Warington. In a paper read before the Chemical Society, March 4th, 1850,* that gentleman described some of the difficulties he met with in his attempts to keep gold fish. Having placed in the glass vessel containing them a small plant of *Vallisneria spiralis*, he found that after a time the decaying leaves produced a slime which began to affect the fish injuriously, and that it was necessary this impurity should be got rid of, He therefore introduced five or six pond snails (*Limnea stagnalis*), which soon removed the nuisance and restored the fish to a healthy state, thus perfecting the balance between the animal and vegetable inhabitants and enabling both to perform their functions with health and energy. The fish became lively and bright, the *Vallisneria* became extremely luxuriant, and the snails, depositing enormous quantities of gelatinous masses of eggs, afforded a large quantity of food to the fish in the form of young snails. Mr. Warington thus sums up the results of his experiment:—"We have an admirable balance sustained between the animal and vegetable kingdoms, and that in a liquid element. The fish, in its respiration consumes the oxygen held in solution by the water as atmospheric air; furnishes carbonic acid, feeds on the insects and young snails, and excretes material well adapted as a rich food to the plant and well fitted for its luxuriant growth. The plant, by its respiration, consumes the carbonic acid produced by the fish, appropriating the carbon to the construction of its tissues and fibres, and liberates the oxygen in its gaseous state to sustain the healthy functions of the animal life—at the same time that it feeds on the rejected matter, which has fulfilled its purposes in the nourishment of the fish and snail—and preserves the water constantly in a clear and healthy condition. While the slimy snail, finding its proper nutriment in the decomposing vegetable matter and minute confervoid growth, prevents their accumulation by removing them; and by its vital powers converts what would otherwise act as a poison into a rich and fruitful nutriment, again to constitute a pabulum for the vegetable growth, while it also acts the important part of purveyor to its finny neighbour." This paper was followed by several others on the subject of the aquarium, which appeared principally in the 'Annals of Natural History,'* and conveyed much information respecting principles that must not be lost sight of by any one wishing to successfully superintend an aquarium, whether marine or fresh water, and amongst these we must no omit reference to Mr. Allchin's paper on the construction and management of aquaria for the preservation of leaches.†

But to return to the aquarium which is more particularly the object of our notice. The site of the building is close to the Chain Pier, just below the cliff. Its length may be roughly stated as being over 600 feet; its width sloping off from about 120 feet in its widest part to about 60 feet in its narrowest. At the principal entrance there is a flight of granite steps by which the visitor descends to an entrance court (60 feet by 40 feet) and an entrance hall (80 feet by 45 feet), arcaded, and composed of terra cotta and ornamental brickwork, and near to which is a commodious dining and refreshment room. From the entrance hall the visitor passes to the aquarium proper. On each side of a corridor 220 feet long and 23 wide, divided in the centre by columns of serpentine, polished granite, and Bath stone, alternately, the caps and corbels of which are elaborately carved with designs of shells, fish, sea-birds, etc., and support a groined roof, are ranged the tanks for exhibition, varying in size from 11 feet 6 inches by 20 feet to 103 feet by 40 feet. At the end of this corridor, which runs nearly from west to east, is the "conservatory," 70 feet long by 23 feet wide, the eastern end being designed to form a rockwork waterfall, with ledges, dropping well, small aquaria, ferns, etc. A short passage running north and south leads to the second main corridor, 160 feet by 23 feet, also running from west to east, and containing twenty tanks, part for the exhibition of fresh-water specimens and part for tropical specimens requiring a higher temperature. A portion of this corridor is arranged for small table aquaria requiring minute inspection. Beyond are the engine rooms, for pumps, machinery, etc., while underneath the corridors are large sea-water reservoirs communicating with a well in the engine-room. The water is pumped to an upper reservoir, from which a supply can be passed to each tank at any required rate, the surplus water passing off from the tank

* 'Quarterly Journal of the Chemical Society,' iii. 52.

* Second series, x. 273; xii. 319; xiv. 366, 419; xvi. 313 330, etc.

† Pharm. Journ. 1st ser. xv. 453.

through stand-pipes when it reaches a certain level. Outside the building, terrace promenades are con structed over the corridors; these are decorated with flowers, ferns and shrubs, and are reached by flights of stone steps from various parts of the building.

As to the specimens themselves, it is too soon to say much, since here it is necessary to reverse Mrs. Glass's celebrated maxim,—first catch your hare,—for, as in this case, the fish are not caught to be cooked, it is necessary to provide a suitable domicile before catching the fish. The collection, therefore, will be one that will require time to bring to perfection. But among the specimens at present in it are many of great interest. In the tanks will be found a large angel-fish or monk-fish (*Squatina Angelus*); a scad or, as it is sometimes called, a "horse mackerel" (*Caranx trachurus*), from a fancied resemblance to the resplendent colours of the ordinary mackerel (*Scomber vulgaris*); the grey mullet (*Mugil sp.*), with its long cylindrical body, the surmullet (*M. surmuletus*), and the red mullet (*Mullus barbatus*), all of them delicacies of the table and much esteemed by the Romans, who feasted their eyes on the dying colours of the latter before feasting on its body; the hungry whiting (*Merlangus vulgaris*) and its black brother, the coal-fish (*M. carbonarius*); a pouting bream; curious-looking "picked" dog-fishes (*Acanthias vulgaris*), belonging to the shark family, each with a poisonous "pick" or spike in front of its dorsal fins; wrasse; rocklings; two or three species of the brilliantly coloured but odd-looking gurnards or pipers (*Trigla sp.*), owing their name to the curious sound they sometimes emit; that delight of the Cornishman, the pilchard; basse, or sea-dace (*Labrax lupus*) whose voracity gained for them the name of "wolf" from the Romans; various long slender pipe-fishes, the male of which have the credit of acting as wet-nurses, carrying the eggs laid by the female in a kind of pouch in the belly until the birth of the infant fry; and a sixteen-spined stickleback. Besides these, there are lobsters, crawfishes, crabs, prawns, shrimps, etc., too numerous to mention. We may remark that a description by Mr. Warington,* of the habits of the stickleback,—reward of many a city arab's piscatorial excursion,—and his account of the building of its nest and the care it takes of its young, gives such a glimpse of the interest to be found in an aquarium that we regret space will not allow of its quotation.

In the table tanks are the anemones, the flora of the sea, and some very handsome specimens of the curious and beautiful "dead men's fingers" (*Alcyonium digitatum*). Here, too, are the blennies, a common variety of which is reputed to act as a tide indicator, by, if possible, throwing itself out of water at the time of low water, and regaining its element when the tide rises; also two turtles from the Isle of Ascension, young lobsters, and the latter being certainly among the earliest, if not the cleverest adepts at corking and capping serpulæ.

The successful carrying out of experiments like the Sydenham and Brighton aquaria must tend to promote a taste for such studies; and, as sometimes a marine aquarium may be desiderated at an inconvenient distance from the sea, a knowledge of a ready method of producing artificial sea-water will probably be of service to some of our readers. We, therefore, conclude our notice by extracting a recipe furnished by P. H. Gosse, F.R.S.,* for a compound which he has successfully used for the purpose:—

Chloride of Sodium.	$3\frac{1}{2}$ oz.
Sulphate of Magnesia	$\frac{1}{4}$ oz.
Chloride of Magnesium	200 grs. Troy.
Chloride of Potassium	40 grs. ,,

To these salts, thrown into a jar, a little less than four quarts of (New River) water was added, so that the solution was brought to a density of about 1026. This formula is based upon an analysis of the Channel seawater, by Schweitzer, bromide of magnesium, sulphate of lime and carbonate of lime being omitted, because of the minute quantity required. It was criticized by Mr. Warington a few months after its original publication;† but, as Mr. Gosse has since republished it in his 'Handbook to the Marine Aquarium,' we may presume that he has found it satisfactory.

* Ann. Nat. His. [2] x. 273, and xvi. 330.

*Ann. Nat. Hist. [2] xiv. 66.

† Ann. Nat. Hist. [2] xiv. 419.

THE MICROSCOPE IN PHARMACY.

BY HENRY POCKLINGTON.

(*Continued from page* 83.)

Veratri Viridis Radix.—The rhizome of *Veratrum viride* will not detain us long, as it is interesting to the micro-botanist rather than to the micro-pharmacist, and not specially interesting to him. The type of structure is strictly that of ordinary rhizomes. The vascular system is composed of simple pitted vessels and unpitted wood fibres, and its distribution, being necessarily determined by the rootlets, is too varied to permit description. The vessels are small, the pits are long and transversal. The walls of the vessels are little thickened, and they are usually little, if at all, coloured. When coloured it is by transfusion from the accompanying laticiferous vessels. The parenchymous cells are of considerable size with firm walls in the rhizome, with very thin walls and spongy consistence in the root fibres, and contain great quantities of an amorphous starch. Under a low-angled quarter but slight evidences of granulation are apparent, and the use of iodine is needful to satisfactorily demonstrate the presence of starch. Some of these cells appear to contain a dextrinous matter. The other cell contents of importance are true raphides (acicular), and a dark brown colouring matter which is present in the laticiferous vessels. The raphides are contained in special cells, and are very much more common in the rhizome than in the rootlets. Sections stained first with iodine and then with a dilute solution of magenta, form very interesting and instructive objects, but the persistence of the staining cannot be relied on. When thus treated, the starch-bearing cells are stained the blue-violet peculiar to iodide of starch, the vascular vessels and secondary deposits are stained a brilliant magenta red, and the *bioplasm* in certain other cells is also stained, so that the various structural elements are well demonstrated. The cells of the cuticle are stained naturally a deep brown, and appear to resist the action of the magenta. They possess no feature of interest.

Aconiti Radix.—This root does not come into commerce in any adulterable form where the use of the microscope is required, but as it is occasionally used in mistake for the roots of *Cochlearia Armoracea*, it is desirable that the analyst should make himself familiar with its structural peculiarities as compared with those of the latter root. Fortunately the structures of the two roots are as distinct as, or more distinct than, their botanical characteristics. The medulla of *Aconitum Napellus* is large, angular, and usually well defined by a more or less dark ring. The medullary sheath, or more correctly, for there is no true sheath, vascular environment of the medulla is very incomplete; and the vascular bundles, which are small and wedge-shaped, are principally situate in the angles of the medulla, and are composed of thin-walled pitted vessels, small in diameter with oblong transversal pitting, and of wood fibres, unpitted, and of long vessels, apparently transitional laticiferous vessels containing a dark brown (when the root is dry) colouring matter. The cells of the medulla are large, sinuous in cross section, with moderately thick cellulose walls, and containing great quantities of starch granules. The starch granules are aggregate in three or more, or single, variable in shape with a distinct punctate hilum. A very decided black cross is given by polarized light. The cells of the outer layers differ widely in shape and size. In the immediate neighbourhood of the vascular bundles they form a transitional pleurenchyma with thick-walled cells, only partially attached by their parietes. The more truly parenchymatous cells of this layer are ovate, slightly angular, thick-walled cells, with irregular parietal adhesion, so that numerous intercellular spaces exist, not only at the angles of the cells, but along the sides and ends, but are very minute in the latter position. The contents of these cells are starch granules imbedded in semi-albuminous (?) matter, which becomes deeply stained if a section be immersed in dilute magenta for a short time. Immersion in a weak iodine solution will be found helpful to the elucidation of the more difficult points in the structure of the cell walls and intercellular spaces the more so if the section be transferred from the iodine solution to glycerine jelly, which causes a slight contraction of the then deeply coloured cell contents, and throws the cell wall into decided prominence. The cuticle layers and the layers contiguous thereto, are much more compressed; those of the cuticle itself possess some interesting features, arising out of their number and the nature of the deposits on the primal membrane of the cell walls. Immediately below the cuticle a few liber cells are found entirely isolate, oval sometimes, extremely elliptical in cross section, and with central cavity.

The whole of these characteristics would be discernible in the scraped root if prepared for table in mistake for horse-radish, and most of them could be detected, with a little care, in partially digested contents of a stomach in the case of a toxological investigation.

Armoraceæ Radix. — The root of *Cochlearia Armoracea*, more commonly known as horse-radish, is both botanically and structurally very distinct from the root of Aconite, the 'Daily Telegraph' notwithstanding.

Medulla.—There is no true medulla, A group of vascular bundles probably represents an aborted medulla and medullary sheath.

Wood Zone.—The wood zone is relatively very large and occupies upwards of two-thirds of the diameter of the root. Its structure is simple and easily made out. Little consolidated, or entirely unconsolidated, oblong, or cubic cells, a few wood cells, and vascular bundles enter into its composition. The vessels are large, much pitted, and rarely reticulated, are distinctly cellular, the diaphragm or septum in some cases being unabsorbed, often only partially absorbed. They are arranged in bundles, are variable in size, and irregularly distributed. The oblong and cubic semi-prosenchymatous cells are unpitted, with no visible pores, and contain great quantities of starch. The wood cells are unpitted, often of considerable length, with central cavity, and are probably to be regarded as transitional laticiferous vessels, or wood cells acting as such. The starch granules are ovate or sub-ovate, somewhat free in the cells and with a very limited variation in size. They are very dissimilar to those of Aconite.

Cortical Zone.—The cells of the cortical zone are according to their situation, globose, sub-globose, and cubic. The few liber cells present have no special features, and, like the cells of the bark layers, are strictly of the usual type.

The chief points to be borne in mind are, the shape and size of the starch granules, the size, number, and general characters of the vascular bundles, and the tissue of the "wood zone" with the semi-prosenchymatous character of its cells.

Belladonnæ Radix.—A vascular bundle replaces the medulla in this root also, and consists of pitted vessels and wood cells. . . .

Wood Zone.—The wood zone possesses none of the usual characteristics of wood zones, except the presence of irregularly distributed and not numerous vascular bundles. The cells are parenchymatous excepting at the outer margin, where they become semi-prosenchymatous. The distribution of the vascular bundle is irregular, their chief aggregation is at the outer margin of the zone, where, elliptical in shape, these are arranged more regularly and form an interrupted ring. Thus the wood zone has partially the characteristics of the ordinary medulla. The cells of which it is in chief part composed are modified cylindrical cells, with somewhat tapering or oblique ends. They are very thin walled, excepting quite near the cortical layer, where they are slightly thickened. They suffer much change of form in drying, and do not wholly resume their original shape when re-moistened. The wood cells enveloping the vascular system are unpitted, with a central cavity. The vessels are pitted with small oval pits, are thin walled, not septate and imperforate, with no spiral fibre, discs, or reticulations. The larger cells of the "wood zone," and the cells of the cortical layers, contain small, or medium (rarely large) quantities of starch, excessively variable in shape, but slightly variable in size, and with a "furrow" hilum and no central cavity. In certain cells the starch appears to be aggregated into a large compound granule, composed of very many granules, each of which suffers the usual modification of form consequent upon such aggregation. But this is probably entirely due to cementation with the protoplasmic contents of the cells, as the granules separate immediately upon immersion in warm water, and do not otherwise display the characteristics of compound granules. The whole of the granules give a distinct cross, necessarily variable in form, by polarized light.

Cortical Layers.—The cells near the margin of the "wood zone" are very similar to those within the zone. The middle cortical layers are composed of much larger cells, elliptical in shape, sometimes oblong and angular, with thin walls. The outer layers are of the usual type. Liber cells are infrequent, oval in cross section, with a central cavity.

(*To be continued.*)

LIQUID EXTRACT OF YELLOW CINCHONA.

BY S. W. CLEAVE, SHANGHAI.

The process indicated for the preparation of this important liquor is extremely unsatisfactory in practice. The exhaustion from the bark of its medicinal constituents cannot be accomplished by water alone; and the evaporation of so large a quantity of aqueous extract at 160° is not only a tedious operation, but one likely to damage the alkaloidal constituents from the prolonged exposure to the atmosphere. The U. S. formula is undoubtedly a good one, but from 16 troy ounces of bark the product is 40 fluid ounces, while we require it to be but 4 fluid ounces from 1 lb avoirdupois. The process which I now use produces a thoroughly reliable preparation which represents the remedial properties of the bark in every particular and keeps well. It is the following:—

Powdered Yellow Cinchona Bark 1 lb. avoirdupois.
Proof Spirit . . . . Oij.

macerate four days and percolate with proof spirit to lb. ij, then percolate the residue with three pints of distilled water; boil the marc in three pints more of distilled water, and express. Evaporate the decoction, add the aqueous percolate, and continue the evaporation. Then add the spirituous percolate and distil off the spirit; evaporate the residue on a water-bath to 4 fluid ounces, add 1 fluid ounce of glycerine, evaporate to 3 fluid ounces, and strain through muslin; and lastly, add 1 fluid ounce of rectified spirit. After a week, filter through paper to 4 fluid ounces.

LOSS OF AMMONIA AND PHOSPHATES.

BY H. MACCORMAC, M.D.

I am not an agricultural man, but I take the utmost interest in agricultural progress. The loss of ammoniacal ingredients and phosphates of transition I have long deplored, and very often have I intended to draw up some observations on the subject. I have now done so, and describe the means by which I would purpose to accomplish the important result of effectively rescuing the now lost azote lime and phosphorus of transition. Without further preface, therefore, I shall proceed to read my essay on "The Economic and Effective Arrest of the Lime Phosphorus and Azote of Transition, through the Medium of a prepared Humus or Soil, and their Application, along with that of ordinary Excreta, to Purposes of Agriculture." The liquid phosphate of lime now sells for some £20, and ammonia at from £80 to £100 per ton. Vast quantities of these important substances are imported from abroad, and very largely fabricated at home. But whatever be the actual amount made use of, the supply of animal and mineral phosphates and preparations of ammonia falls far short of the requirements of the soil. Everything, speaking of alimentary substances, which the earth is made to yield ought to be returned in some shape to the soil. This plain and indubitable canon is nevertheless violated continually. What the land gives is very insufficiently and sparingly returned to the land. Fluid and solid feculence, instead of being deposited in the soil, is suffered to pollute the earth's surface, and the interior of human dwellings as well; or, gathered in cesspools or trailing sewers, contaminates the atmosphere, violating self-respect and human dignity, and everywhere promoting discomfort and disease. Agriculture, properly conducted, would enrich the earth, whereas it positively impoverishes it, so that foreign ingredients, apatite from Spain or America, and guano from the Chincha or other islands, are needful to prevent the land from wearing out, a spectacle which Maryland and Virginia, as I have witnessed, furnish on a large scale. As it is, the yield is vastly less than are our requirements, and much, very much, less indeed than what, with proper management, our 40 to 50 millions of acres might be made to afford. The better the soil is treated the more it will return, and the worse and more grudgingly it is treated the less it will return. Bad treatment involves bad and insufficient returns, whereas good treatment involves copious returns—abundant corn and green crops, plenty of milk and butter and eggs, any amount of legs and shoulders of mutton, ribs and rounds of beef, flocks of poultry, flitches of bacon, and well-nourished instead of half-starved impoverished men and women. The food supply in these islands, though relatively less both in quantity and quality than what it ought to be, is still absolutely very considerable. Taking the returns made in June last, there were then, fractions omitted, some 9,000,000 of horned cattle on hand, 31,000,000 sheep, and 4,000,000 swine, irrespective of imported cattle and preserved meats. And yet of the 31,500,000 constituting the population of the United Kingdom, very considerably more than one-half almost never taste butchers' meat at all, and of those who do, the meat supply might often be most advantageously increased. With spade labour or machine labour the equivalent of spade labour and house feeding, the corn yield and the meat yield of our acres might be doubled, possibly trebled, at once. Of course, stalled animals would be the better for a little daily outing, with strict attention to stall ventilation and stall cleanliness as well. As at present conducted, the feeding of stock, horned cattle and horses alike, is conducted with the greatest possible waste—the land is not adequately utilized, and the manure supplies, or possible manure supplies, are in a great measure dissipated and lost. Now, as manure is of quite as much moment as the soil itself, and as manuring ought to be carried to as great an extent as the soil will profitably take it in, it is of the very greatest urgency that no available particle of compost should be wasted. It is quite as important to save manure as to reap grain or to feed stock. One, in fact, is the needful correlative and complement of the other; and yet the collection of manure is most imperfect, and what is actually stored past is exposed to almost every element of waste and decay, at once over head and under foot. In addition to the proper storage and preservation of manure, in respect of which the practice of the Chinese Colonists in Java seems to me deserving of special attention and consideration, I propose that the solid and fluid excreta of man and brutes should be commingled with a prepared humus or soil, consisting of the following ingredients, as well calculated to ensure the desired results:—

Prepared Humus.	lb. or parts.
Perfectly dry humus or soil	100
Calcined gypsum powder, from	10 to 20
Common alum, from	1 to 5
Copperas, from	1 to 5
Sulphuric Acid, from	1 to 5

These ingredients—and the proportions hold equally good for 1000 or 10,000 tons as for a single hundredweight—duly comminuted and commingled, constitute a very effective disinfectant and deodorizer and vehicle. The cost of 1000 tons of earth or soil I need not specify, but I may mention that common gypsum may be had at some 30s. per ton, sulphuric acid and sulphate of iron at 7s. 6d., and alum at 10s. per cwt. The humus or soil has its own great especial merits, while the three sulphates, along with the sulphuric acid, combine their several utilities and constitute an admixture well adapted to the objects in view, namely, the effective and inoffensive conservation of the products of animal waste and decay until they can be returned to the soil. This admixture will grasp the ammonia compounds, whether in *esse* or in *posse*, firm and fast: and as for the phosphates, they will likewise be laid hold of and retained. Every farm steading, according to its dimensions and requirements, ought, at the outside of every year, to be provided with hundreds or thousands of tons of this prepared humus, properly stored, and at hand in order to be effectively utilized. The ordinary summer soil, dried and levigated, answers every purpose as a main ingredient; clays, however, calcined and levigated, might be resorted to. The waste refuse of brick and limekilns, road dust, turf, and coal ashes, charred seaweed, and charred peat, so far as the supply sufficed, might also be had recourse to. The foregoing effective and economic compound might further be advantageously employed wherever animal waste was liable to be deposited, as in provision stores, slaughter-houses, sheep-pens, fowl-houses, catgut factories, knackers' yards, pigstyes, stables and stable yards, pork and fish curing establishments, and the like. The water now employed in the closet system, leading as it does to extended cesspools, beneath the level of the streets, fouling the rivers and foreshores of the sea, ought to be entirely superseded by sanitary humus instead. The importance of common soil as a deodorizer and disinfectant, as we find from Roman and Israelitish records, was not unknown to the ancients. By the moderns its utilities have been strangely neglected. The inhabited surfaces of India are dense with trodden-down ordures. The towns and villages of Europe are in little better case. And yet feculence, of whatever description, ought to be consigned to the soil, and never for a moment suffered to pollute our dwelling-places, or those of the creatures whom we associate with us. In my treatise entitled *Moral Sanitary Economy*, published some twenty years ago, the subject was dwelt upon in the strongest terms. The resultant admixture of sanitary humus and feculence, fluid and solid, might be preserved until needed in suitable receptacles, slate or brick lined, or dried, as in the sample now exhibited, by a moderate temperature, in kilns or otherwise. The sooner, however, the procedure here described could be resorted to, the better would it prove—at least, if we are to realize the great objects to be accomplished. The recent bones of a horse or ox weigh, let us say, from 80 to 100 lb.; of a man, from 11 to 15 lb.; of a sheep or swine, from 10 to 15 per centum of its living weight. Now, all the phosphorus—or, if we prefer the expression, all the phosphates of the bones, brain, and nerve structures generally, along with all the azotized excreta, or possible ammonia, which, guided by the laws of tissue metamorphosis, I calculate at one-half the amount of phosphates—that is to say, all the bones and all the flesh of any given animal—find complete transit from within to without in about ten weeks or so, mainly through the kidneys and allied structures, and, owing to our present treatment of them, are almost utterly lost and dissipated. The proportions and the time as above stated, though not absolutely, are approximately true, inasmuch as tissue change is much more rapid with some than others, but with young animals and children at least twice as rapid. Otherwise, the calculations are founded on physiological data, and in the main correct. Suppose we take the horse or ox in illustration. During each and every year of its life, then, this animal, and other animals in proportion, sheds or expends, be the same more or less, 1000 lb. avoirdupois of the phosphates, and about 5 cwt. of nitrogenous compounds, both of which all-important substances, human wants and the requirements of the soil regarded, are now as effectively lost and dissipated as if that phosphorus and that nitrogen were actually thrown into the great deep—a destination, indeed, which, for the most part, they positively incur, or as if the annual tens of millions sterling which the lost phosphates and ammonia of transition may be supposed to amount to were squandered similarly. By the judicious application of sanitary humus, the nitrogenous and phosphatic compounds, the amount furnished by the individual multiplied by the grand aggregate of living beings, might, I believe, be effectively saved and utilized, thus supplying a mine of wealth to which all the Potosis and Golcondas in existence were the merest trifles in comparison. In effect, animal waste, both fluid and solid, could be turned to full account, the general health and well-being prodigiously enhanced, and the yield of the soil multiplied to an extent to which I am quite incompetent to fix a limit.—*The Gardeners' Chronicle.*

THE CHEMISTRY OF THE HYDROCARBONS.*

BY C. SCHORLEMMER, F.R.S.

(*Concluded from page* 69.)

Besides the aromatic hydrocarbons having the general formula, C_nH_{2n-6}, there exist others containing less hydrogen. The constitution of these can also be readily ascertained. Thus styrolene, C_8H_8, obtained from styrax, yields on oxidation benzoic acid, a proof that it contains only one radical, combined with the aromatic nucleus. Its constitution is therefore $C_6H_5.C_2H_3$, or it may be considered as ethylene, in which one atom of hydrogen is replaced by the group, C_6H_5, and indeed in many of its reactions it behaves exactly like an olefine, combining with one molecule of bromine, etc., and being easily converted into polymeric modifications.

When styrolene dibromide is acted upon by alcoholic potash, two molecules of hydrobromic acid are abstracted from it, and acetenyl-benzene, $C_6H_5.C_2H$, is formed. This reaction corresponds exactly to the formation of acetylene from ethylene. Acetenyl-benzene shows, in fact, very great resemblance to acetylene, forming, like the latter, metallic derivatives, as $C_6H_5.C_2Na$; $C_6H_5.C_2Ag$., etc.

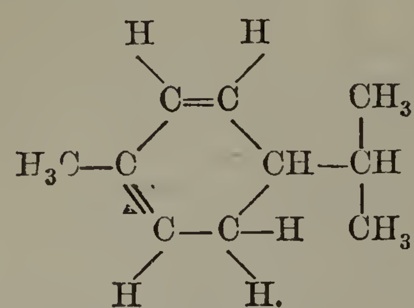
Although the hydrocarbons which are homologous with benzene, behave in most of their reactions, like saturated hydrocarbons, yet, under certain conditions, they can be made to combine directly with other elements, like the olefines, and other so-called non-saturated compounds. Thus benzene can combine with one, two, and three molecules of chlorine. These chlorine addition-products still contain the carbon-atoms combined together in a closed chain; they are very unstable bodies, and are again readily converted into compounds in which the carbon atoms are linked together, as in benzene itself.

Also hydrogen can combine with aromatic hydrocarbons, but only with those which contain alcohol radicals. The number of the atoms of hydrogen combining with such a hydrocarbon, appears to depend, not only on the number of the radicals present, but also on their relative positions. Benzene does not take up hydrogen; methyl-benzene combines with one molecule, dimethyl-benzene (isoxylene) with two, and trimethyl-benzene (mesitylene) with three molecules.

Oppenheim has shown (Deut. Chem. Ges. Ber., v. 94) as I have already mentioned, that oil of turpentine belongs to these addition products. By abstracting two atoms of hydrogen from it, the hydrocarbon $C_{10}H_{14}$ is formed, which must be either diethyl-benzene, or

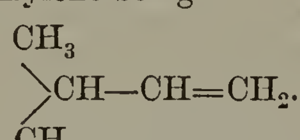
* A lecture delivered before the Chemical Society, April 4th, 1872. Reprinted from the 'Journal of the Chemical Society' for June, 1872.

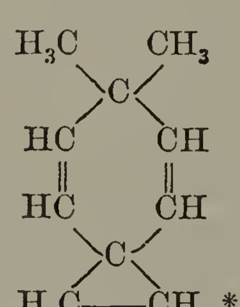
methyl-propyl-benzene, or α-cymene, because oil of turpentine yields terephthalic acid on oxidation. It appears most probable that it is α-cymene, as it has the same boiling point as the latter, and moreover oil of turpentine, as well as α-cymene, occur ready-formed in plants. The constitution of oil of turpentine is therefore probably the following:—



Oil of turpentine, therefore contains the aromatic nucleus, in which the connection between two carbon atoms has been loosened, and thus two combining units, which in the aromatic nucleus were linked together, are now saturated with hydrogen. As Baeyer has shown, such a loosening of the connection between two carbon-atoms takes place most readily between those which are combined with alcohol radicals.

It has been already stated, that by abstracting four atoms of hydrogen from diamylene, a terpene is formed which seems to be identical with terebene. It has, however, not been yet shown whether this artificial terebene yields terephthalic acid on oxidation. If this is found to be the case, the constitution of this hydrocarbon would be as follows, amylene being



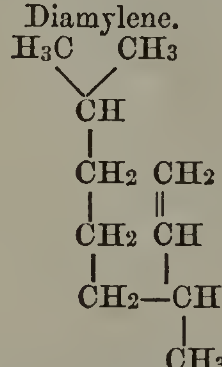


The other isomeric hydrocarbons of the terpene group have, doubtless, constitutions similar to those above given, differing from each other either by containing different radicals, or by the different positions of the latter.

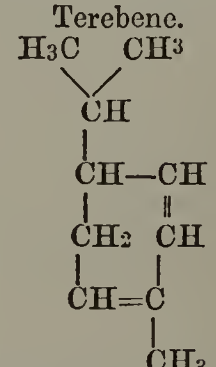
Besides the hydrocarbons containing one aromatic nucleus, there exist also several in which this group occurs twice or more times. As most of these bodies, however, are obtained by well-understood reactions, I need not discuss them here.

* Since the above has been written, von Richter (Deut. Chem. Ges. Ber. v. 334) has published a note on the condensation of diamylene to rutylene and terebene. He thinks that von Schneider's formula of diamylene does not explain either the property of this hydrocarbon of forming additive compounds, or its conversion into rutylene and terebene. He gives the following formulæ as much more probable:—

Diamylene.



Terebene.



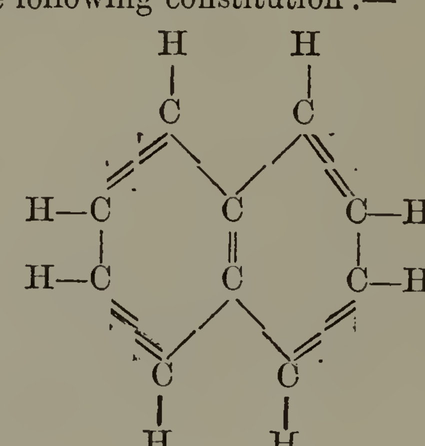
The formula of terebene is, as will be seen, the same as that which Oppenheim has given for oil of turpentine.

I only have to mention a most singular reaction by which some of them are formed, discovered by Zincke (Ann. Chem. Pharm., clix. 367). This chemist intended to obtain dibenzyl by acting with finely-divided copper or zinc-dust upon benzyl chloride. In order to moderate the violent reaction, he diluted the benzyl chloride with ether and with paraffins, but under these circumstances no reaction took place. However, by employing aromatic hydrocarbons as diluents, action set in; but instead of dibenzyl being formed, he obtained a mixture of several other hydrocarbons, in the formation of which the aromatic hydrocarbons, in other respects so stable, take part with great energy. It is not possible to give an explanation of this fact, as all the products of this reaction have not yet been studied. But the fact exists that aromatic hydrocarbons, when heated with zinc-dust and benzyl chloride lose hydrogen and take part in the formation of new hydrocarbons. Thus, on employing benzene, one of the products is *diphenyl-methane* or *benzyl-benzene*, $CH_2{}^{C_6H_5}_{C_6H_5}$, which is formed according the equation—

$$C_6H_5.CH_2Cl + C_6H_6 = C_6H_5.CH_2.C_6H_5 + HCl.$$

Further researches will no doubt throw more light upon this singular subject.

Amongst the products of the destructive distillation of coal and other substances, there always occurs *naphthalene*, $C_{10}H_8$, a hydrocarbon which in its chemical character bears so great a resemblance to benzene that it must have a constitution very similar to the latter. Some years ago, Erlenmeyer pointed out that it had probably the following constitution:—



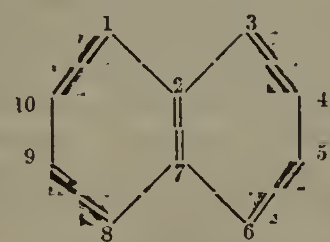
Naphthalene, therefore, would consist of two aromatic nuclei, which have two atoms of carbon in common. Graebe, who adopted this view, has proved the correctness of this hypothesis in a very ingenious way (Ann. Chem. Pharm., cxlix. 21). His reasoning is as follows:—When naphthalene is oxidized, phthalic acid, $C_6H_4(CO_2H)_2$, is formed; this acid can be obtained in two different ways from naphthalene; viz., either by destroying the one or the other aromatic nucleus. Such an experiment cannot, of course, be made with naphthalene itself, because we have no means of distinguishing between the two groups. It appears, therefore, necessary, first, to replace hydrogen in one of the nuclei, and then find out which is attacked and which not.

On oxidizing dichloronaphthaquinone, $C_{10}H_4Cl_2O_2''$, phthalic acid is formed, a fact proving that in this quinone all the oxygen and chlorine are combined with those four atoms of carbon which are oxidized, the formula of dichlornaphthaquinone being, therefore, $C_6H_4.C_4Cl_2O_2''$. By acting with phosphorous pentachloride on this compound, the dyad group, O_2'', is replaced by chlorine, and, at the same time, one atom of hydrogen is substituted, pentachlornaphthalene being formed—

$$C_{10}H_4Cl_2O_2'' + 2PCl_5 = C_{10}H_3Cl_5 + HCl + 2POCl_3.$$

Now, if by the oxidation of pentachlornaphthalene the same carbon-atoms are attacked as in the quinone, monochloro-phthalic acid would be formed; but Graebe has shown that the product is tetrachlorophthalic acid, which proves that the second aromatic nucleus has now been destroyed, a complete proof that naphthalene has really the constitution assigned to it.

Whilst amongst the mono-substituted benzenes, no isomeric forms occur, we find that the monosubstitution products of naphthalene can exist in two isomeric modifications. This can also be easily explained from the constitution of this hydrocarbon. By representing it by two hexagons and numbering the corners, representing the carbon atoms—



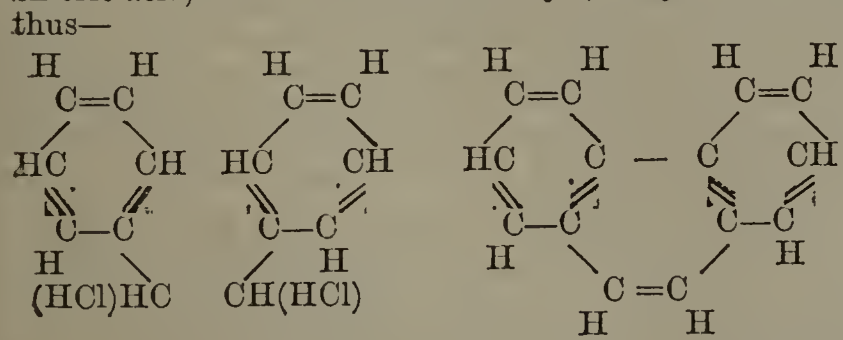
we find that each of the atoms 1, 3, 6, and 8, is combined with another atom (2 or 7) in which all the combining units are saturated with carbon, whilst the atoms 4, 5, 9, and 10 are combined with carbon atoms to which hydrogen is attached. The functions of the atoms 1, 3, 6, and 8 will, therefore, differ from those of the four latter. This also explains the existence of two dinaphthyls, one of which has been obtained by the action of sodium upon monobrom-naphthalene, and the other by passing the vapour of naphthalene through a red-hot tube.

In most kinds of coal-tar containing naphthalene there occurs also *anthracene*, $C_{14}H_{10}$, a body exhibiting in its chemical relations great resemblance to benzene and naphthalene. The constitution of this hydrocarbon has been ascertained by Graebe and Liebermann by their beautiful researches on alizarin (Ann. Chem. Pharm. Suppl., vii. 257).

Baeyer found that by heating phenols and compounds allied to them with zinc-dust, they are reduced to the hydrocarbon from which they are derived. By making use of this reaction, Graebe and Liebermann found that alizarin was a derivative of anthracene, and were thus enabled to effect for the first time the artificial preparation of a natural dye-stuff.

This example shows better than any other the correctness of the definition of organic chemistry "as the chemistry of the hydrocarbons and their derivatives".

The fact that alizarin is a derivative of anthracene enables us, as these chemists pointed out, to discuss the constitution of this hydrocarbon. From Limpricht's synthesis of anthracene from benzyl chloride it might be inferred that it is diphenyl-acetylene, $C_6H_5.C\equiv C.C_6H_5$. But this formula has to be rejected, because on oxidizing alizarin we obtain phthalic acid; and as further benzene, naphthalene, and anthracene form a series, each member of which contains C_4H_2 more than the preceding, it appears most probable that anthracene is built up from three aromatic nuclei in the same way as naphthalene from two. The formation of anthracene from two molecules of benzyl-chloride can now be easily explained. Each benzene nucleus loses one atom of hydrogen, and each of the groups CH_2Cl loses a molecule of hydrochloric acid, and the two residues $C_6H_4.CH$ join together thus—



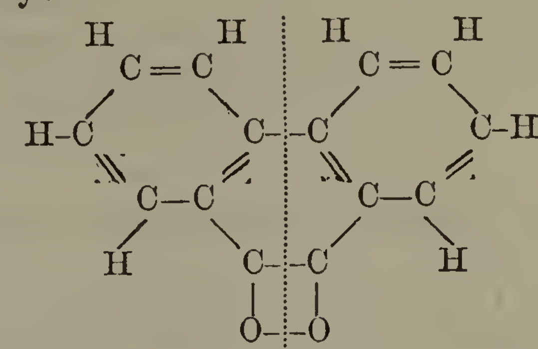
The complete reaction which takes place by heating benzyl chloride with water, takes place according to the equation—

$$4(C_6H_5.CH_2Cl) = C_{14}H_{10} + C_{14}H_{14} + 4HCl.$$

A further proof of the correctness of this view is, that by fusing anthraquinone with caustic potash, benzoic acid is formed.

$$C_{14}H_8O''_2 + 2KOH = 2C_7H_5KO_2,$$

The molecule of anthraquinone splitting up in the following way:—



The highest boiling portions of coal-tar contain, besides anthracene, two other hydrocarbons, *pyrene* $C_{16}H_{10}$, and *chrysene* $C_{18}H_{12}$, which have been also studied by Graebe and Liebermann (Ann. Chem. Pharm., clviii. 285 and 299). They have found that these bodies exhibit in their chemical properties so close an analogy to anthracene, that their constitution must be very similar to that of the latter hydrocarbon. Both yield quinones on oxidation, which proves that they also consist of closed chains of carbon atoms. According to Liebermann, a similar constitution is possessed by *idrialene*, $C_{22}H_{14}$, a hydrocarbon occurring in idrialite, a mineral found in the mercury mines of Idria (Deut. Chem. Ges. Ber., iii. 154). This hydrocarbon forms the last member of a series which are derived from benzene by the successive addition of C_4H_2—

Benzene	C_6H_6.
Naphthalene	$C_{10}H_8$.
Anthracene	$C_{14}H_{10}$.
Chrysene	$C_{18}H_{12}$.
Idrialene	$C_{22}H_{14}$.

Pyrene, which does not belong to these series, is isomeric with *diacetenyl-phenyl*, $C_6H_5.C\equiv C—C\equiv C.C_6H_5$, a hydrocarbon discovered by Glaser, who has pointed out that of all known hydrocarbons it contains relatively the greatest amount of carbon, viz., 95 per cent., or more than coal or anthracite.

I have now finished my task, and have only to regret that the magnitude of the subject did not allow me to dwell longer on certain points, whilst others, such as Berthleot's remarkable researches on the formation of hydrocarbons at a high temperature, and the transformation of all carbon-compounds into hydrocarbons by means of hydriodic acid, could not be mentioned at all. But the latter investigations alone would be sufficient to form the subject of a separate lecture.

There is perhaps no branch of our science which shows better the progress made by chemistry during the last thirty years, than that which I have brought before you to-night. And to what cause do we owe this rapid advance in our knowledge? I think this mainly due to the atomic theory, which found birth in Dalton's speculative mind, and has been gradually expanded and developed to its present state by the efforts of many eminent chemists.

But the atomic theory is generally accepted not only by chemists, but also by physicists, who have thought it of the greatest importance to find out the nature of an atom itself. Sir William Thompson has lately shown us how to solve a problem never dreamt of by chemists, viz., how to ascertain the absolute weight and size of an atom ('Nature,' 1871, nos. 22, 31). Is it not, therefore, strange that we find chemists who desire to kick from under them the ladder by the aid of which, in no small degree, so great a progress has been achieved?

Such attempts are, however, not only of recent date. In opposition to Dalton and Berzelius, Wollaston introduced the term equivalent instead of atom. But whilst

Dalton's original atomic weights were at the same time equivalents, the so-called equivalents of Wollaston's were no equivalents at all. By this a confusion arose between equivalent and atom, which was for a long time very detrimental to the progress of our science. It was only after Liebig had again pointed out the difference between equivalents and atoms, that theoretical chemistry advanced with rapid strides, and amongst those to whom we owe this speedy progress, I can only mention Laurent, Gerhardt, Williamson, Odling, and Kekulé.

NOTE ON SPRENGEL'S MERCURIAL AIR-PUMP.

Professor Dewar recently exhibited before the Royal Society of Edinburgh two modifications of Sprengel's pump adapted to lecture illustration. In both instruments the mercury receptacle is made of iron, and instead of the india-rubber joint of the original, a well-ground iron stopcock is substituted, the portion of iron tube before the stopcock terminating in a Y-shaped piece bored out of the solid. In the one form the drop-tube is of glass, attached by means of marine glue; in the other, of carefully made india-rubber tube four or five millimetres in thickness, of a very small uniform bore made expressly for the purpose by the Edinburgh Rubber Company. The iron funnel-shaped receptacles are ground at the inner apex, so as to fit perfectly finely-ground iron tubes. By means of these tubes the preliminary exhaustions are made by a hand pump, and then they are withdrawn. This device saves a separate joint. The barometer tubes are attached to solid T-shaped pieces of iron tube, and between these pieces and the main tubes each has a small glass bulb. Both forms work for all practical purposes well as glass, and suit admirably for Frankland's water analyses, Professor Graham's experiments, etc.

MODERN CHEMISTRY.

In reviewing the Supplementary Volume to Watts's 'Dictionary of Chemistry' in a recent number of the 'Athenæum,' attention was called to what the reviewer considered to be a great evil in the study of chemical science at the present day, viz., the comparative neglect of analytic in favour of synthetic chemistry. In his opinion the modern chemist has so nearly approached the tempting position of being himself a creator, that he has forgotten his true place is to be the interpreter of Nature. In his opinion the facility with which new combinations are made—by putting C H N and O together, in all possible proportions, and under ever-varying conditions—is not conducive to the advance of chemical philosophy, and he considers the synthesis of our modern schools to be not very different from the empiricism of the alchemists. The opinions thus expressed in the review have been very justly criticized by Mr. Watts in a letter from which we make the following extract:—

"The writer's complaints seem to amount to this: that the chemists of the present day have departed from the safe and philosophical methods pursued by their predecessors, particularly in substituting, to a great extent, the synthetical for the analytical mode of research.

"Now, in the first place, every one acquainted with the actual state of the science, must be aware that analytical chemistry was never more actively cultivated than at the present time. Every new compound produced is carefully analysed; new methods of analysis, and improvements of old ones, are continually appearing; there are journals and numerous manuals specially devoted to analytical chemistry; and the method of volumetric analysis, formerly almost limited to the processes of acidimetry and alkalimetry, has within these last few years, been so far improved and extended as to be applicable to the quantitative determination of almost all the known elements.

"Secondly, with regard to the synthetical method, everybody knows that in inorganic or mineral chemistry, this method is as old as the analytical, the two methods having always gone hand in hand. But in organic chemistry the case is different; and one of the most characteristic features of our modern chemistry is the extension of the synthetical method to the production of a large number of important compounds, which were formerly supposed to be produced only in the bodies of living plants and animals, under the influence of the so-called vital force. The labours of Berthelot, Wurtz, Kolbe, and numerous other chemists in this field, have yielded a rich harvest of the most important and valuable results, which, perhaps, promise more than any others to give us an insight into the structure of the more complex products of the vegetable and animal organisms.

"Now, it is just upon this point that your critic pours out all the phials of his wrath. He says,—

"'*Synthetical* chemistry—that is, the synthesis of the modern chemist—seizes upon those undecomposed bodies to which we have given the name of Elements (we have now upwards of sixty such), and tortures them into combination. The result of this is, the tedious production of an infinite series of intercombinations, which become most bewildering,—which are useless, or only occasionally useful, and which obscure rather than expose the truth,—the admitted aim and the recognized end of science. The Dictionary before us contains a considerable number of examples of this condition of things. The interchanges between CH and NO with Br. Cl., etc., are almost endless.'

"The exact meaning of this last sentence I will not attempt to fathom. *Davus sum, non Œdipus.* But granting that the possible interchanges of elements and compound radicals are endless, and further—to please the critic—that this is a very absurd and reprehensible state of things, I should like to ask, Who is responsible for it? Have the chemists of the present day brought it about by their synthetic machinations? or are they to be blamed for endeavouring, by every possible method, to discover the laws of symmetry which govern these numerous combinations? One really cannot feel anything but pity for a man calling himself a chemist, or pretending to criticize the labours of chemists, who can see no beauty in researches which have enabled us to build up the successive terms of an organic series, step by step, the complex from the simple, and have yielded, amongst others, such magnificent results as the artificial formation of the colouring principles of madder and of the indigo-plant.

"But after all, these lamentations over the supposed decay of science are by no means new, and the cause of them is, perhaps, rather subjective than objective. An elderly gentleman, who in his youth has taken special interest in chemistry or some other science, and followed its results with more or less intelligence, finds at a certain time of life, when the reception of new ideas becomes difficult and troublesome, that his favourite science has outstripped him, and that he no longer feels himself quite at home amongst its cultivators. Of the change in himself which has brought about this somewhat unpleasant result, he is, of course, serenely unconscious: and accordingly he persuades himself, and tries to persuade others, that the existing cultivators of the science in question are a degenerate race, who have sadly fallen away from the glories of their fathers.

"To those who are at present engaged in the active pursuit of chemistry, such criticisms as those to which I have endeavoured to reply must appear simply ridiculous; but as I have before said, they may tend to give a false idea of the actual state of the science to those who receive its results only upon trust; and it is for this reason that I am induced to trouble you with the present communication."

The Pharmaceutical Journal.

SATURDAY AUGUST 10, 1872.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PERFUMED SPIRIT.

WE have recently had for inspection a few samples of spirits of wine which were denominated by the vendor "perfumed spirit," but which in reality contained no flavouring matter at all. The price at which this spirit was sold was very low, and the low price, coupled with the evident misrepresentation as to the character of the spirit, led us to entertain a suspicion that something was wrong. A short time after our examination of the spirit, we were informed that a quantity of spirits of a like kind had been seized in Scotland by the Inland Revenue officers, on the ground that it was ordinary spirits of wine sent out without permit or certificate, and we now find other seizures have been made in London or a similar evasion of the law.

For the information of our numerous readers we have been anxious to obtain a knowledge of the real facts of this interesting case, and inquiries have been set on foot to discover how such spirit could be sent into consumption in large quantities without being accompanied by the usual official documents to show that it had actually been sent from a licensed dealer, and that the full duty of excise or customs had been paid upon it. We have been told that this spirit was formerly perfumed spirit imported at the time when the duty upon such spirit was fourteen shillings a gallon, and that as the quantity of alcohol actually present was sufficient to render it liable to duty at the rate of nearly seventeen shillings a gallon, the difference between these rates afforded an ample margin of profit to admit not only of the spirit being purified, but also sold below the ordinary market price. We were also informed that there was no necessity to issue a certificate to accompany it, as the Customs never issued such a document with perfumed spirit. To business men, not acquainted with some of our laws regulating the importation of goods liable to duty, it will seem incredible that there should ever have been such a difference between the Excise and Customs duty on such spirit, but it is nevertheless true that up to 1870 all perfumed spirits which is usually imported at a strength of 65° over proof, was charged at the rate of fourteen shillings per bulk gallon, whilst spirit made in this country of the same strength was charged sixteen shillings and sixpence. The home manufacturer was consequently placed at a great disadvantage, and we have known cases where spirit was actually exported from this country to the Continent to be perfumed, and then brought back again for the simple purpose of being charged with duty at the lower rate, because it was foreign perfumed spirit. Such a state of things was intolerable to the home manufacturer, but as he could state his grievance in figures as well as words by showing how the intelligent foreigners got the advantage over him, he obtained redress; and the Customs now charge duty on perfumed spirit at the same rate as on plain spirit of home manufacture, but with perfumed spirit they do not issue a certificate to show it has paid duty, as it is considered unfit for use as a beverage. Unfortunately, however, there is no standard as to the constitution of perfumed spirit, and consequently no strong line of demarcation can be drawn between perfumed and plain spirit.

Now the case under consideration affords distinct proof that the present system of sending into consumption perfumed spirit without certificate is unsound, because as soon as the spirit is delivered from the Custom House it comes under the surveillance of the Excise, and if it be not distinctly perfumed spirit, it is seized as illicit, whilst if accompanied by certificate it is not liable to seizure. In the present instance the persons who have purchased the so-called perfumed spirit are made to suffer great inconvenience and loss; for although on satisfactory proof being given that the spirit seized has actually paid duty, it will doubtless be restored, still full proof will have to be supplied by the persons from whom the goods were seized, which in this case may be very difficult, as the spirit has not only passed through several hands, but there is also reason to believe that some of it, at least, is illicit spirit manufactured in London. If this be proved, the whole is liable to forfeiture.

Whilst such a large national income is required the spirit duty must be protected very strictly, and we do not object to necessary regulations. But in a case like the present we have an illustration of how wrong may be inflicted on innocent people, and we consider it our duty to direct public attention to the subject, in the hope that the Customs authorities may alter their present practice and issue certificates to accompany both plain and perfumed spirit. By so doing another obstacle will be put in the way of the illicit distiller getting rid of his spirit, and at the same time the honest and inexperienced trader will be protected.

Whether the spirit has ever been perfumed spirit it is difficult to say; but from information obtained in the course of this investigation, there is reason to believe that much of this spirit has been manufactured at an illicit distillery recently discovered by the Revenue officers in the east of London. It is so unlikely that perfumed spirit should have been purified for sale to manufacturing chemists for their own use, that to believe such a statement stronger proof is required than we have been able to obtain. As, however, truth is sometimes stranger than fiction, the charitably disposed, and those from whom the spirit has been seized, may still cling to the hope that it is perfumed spirit, even though it be in disguise; but we fear that, at no distant day, it will be proved to demonstration in one of our law courts that this cheap spirit is none other than illicit spirit of home manufacture, and that the Customs regulation as to sending into consumption perfumed spirit without certificate has been made a cover for fraud.

We would once more direct attention to the danger there always is in purchasing commodities much below the regular market price. Usually, there is sufficient competition in all branches of trade to keep prices down, and the spirit trade is not an exception to this rule. To be able to purchase spirits of wine of full strength at a little more than the duty is certainly remarkable, and such an offer should always be looked upon with suspicion as not being a legitimate transaction. One of two things must necessarily be the cause, either that there is reckless trading, which must end in ruin, or the revenue is being defrauded of the duty on the spirit.

As we have before stated, we believe in the case of this perfumed spirit the revenue has been defrauded; and if this be so, we should have been glad to have seen proper punishment overtake the real offender only; but we fear innocent persons will also suffer for the faults of others, and the Revenue authorities will probably place the receiver of illicit spirit on the same footing as the actual manufacturer of them.

BRITISH PHARMACEUTICAL CONFERENCE.

There is every indication of a large gathering of members at the Annual Meeting of the Conference on Tuesday and Wednesday next at Brighton. The Executive Committee will assemble in the Conference Meeting-room in the Royal Pavilion at Seven P.M. on Monday. The President will deliver an address on Tuesday at Ten A.M., and the reading of papers will follow. The sittings will be continued from 10 to 4.30 on Tuesday and Wednesday, an adjournment from 12.30 to 2 taking place each day. On Tuesday evening there is to be a supper. We are informed by Professor Attfield that the following papers are in hand or already promised:—

Pharmaceutical Education; Mr. Julius Schweitzer, Brighton. Notes on Education; Mr. B. S. Proctor. Pharmaceutical Education; Professor Attfield. General Discussion on Pharmaceutical Education. Calabrian Manna; Daniel Hanbury, F.R.S. The Occurrence of Manganese in Certain Drugs; Professor Flückiger. *Succus Scapi Taraxaci*; Mr. H. Barton, Brighton. Pill Coatings; Mr. T. Haffenden, Brighton. Notes on Green Extracts; Mr. Richard W. Giles, Clifton. Pharmaceutical Ethics; Mr. S. R. Atkins, Salisbury. Guaiacol; Mr. J. Williams, F.C.S. Laboratory Notes; Mr. Edward Smith, Torquay. Alchemy; Mr. W. D. Savage, Brighton. On Tinctures; Messrs. Stoddart and Tucker. Trade Specimens of Sulphate of Copper; Messrs. Stoddart and Tucker. *Quæ Quondam*; T. B. Groves, F.C.S. On Kamala; T. B. Groves, F.C.S. New Derivatives from Morphia and Codeia; Professor Wright, D.Sc. Orris Root; Mr. Henry Groves, Florence. On Tincture of Perchloride of Iron; Mr. T. Hustwick, London. Koegood; a new Drug from South Africa; Mr. G. A. Keyworth, Hastings. Pharmacy as a Pursuit; Mr. G. A. Keyworth, Hastings. Researches on the Constituents of Aloes: Part I., Dr. Tilden; Part II., Dr. Tilden and Mr. Rammell. A Cheap Disinfectant; Edward C. C. Stanford, F.C.S.

Transactions of the Pharmaceutical Society.

MEETING OF COUNCIL.

August 7th, 1872.

MR. A. F. HASELDEN, F.L.S., PRESIDENT IN THE CHAIR.

Present: Messrs. Atherton, Baynes, Betty, Bottle, Greenish, Hampson, Hills, Owen, Radley, Sandford, Savage, Schacht, Shaw, Stoddart, Sutton, Urwick and Williams.

The minutes of the last meeting were read and confirmed.

A letter from the Privy Council was read approving the appointment of the Boards of Examiners in England and Scotland.

The President read the following letter from Professor Flückiger, of Bern, acknowledging the receipt of his diploma of Honorary Membership of this Society:—

"*Bern*, 22*nd July*, 1872.

"Dear Sir,

"I have for many years attentively noticed the admirable progress of the Pharmaceutical Society of Great Britain, and have been highly satisfied to see how much they have improved the pharmaceutical profession in its scientific as well as in its practical and social direction. No other pharmaceutical association, as far as I know, has succeeded in obtaining so happy and so vigorous an influence on the development, both educational and legal, of pharmacy.

"These considerations have since long led me to devote my full sympathy to your Society. I, therefore, accept with the most grateful feelings the diploma, and beg to inform the Council of them. I am proud indeed to be associated in this way to English pharmacy in addition to personal friendship with several of its members.

"The Society may be sure that I regard the diploma as a permanent stimulus in endeavouring to become more and more a worthy, although a distant, collaborator in their noble work,

"Believe me to remain, dear Sir,

"Yours very sincerely,

"Prof. Flückiger."

"A. F. Haselden, Esq., F.L.S., etc.,
President Pharm. Soc. of Great Britain."

Letters of a similar nature were also read from Professors Balfour and A. Crum Brown, of Edinburgh, acknowledging the receipt of their diplomas of Honorary Membership.

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

Ashworth, Amos ....London.
Badcock, Daniel ....Barnard Castle.
Hick, George..................Bradford.
Metcalfe, Wilson ....Harrogate.
Mills, Robert..................London.
Munro, John Morrison ....Aberdeen.
Parson, Henry James ....Birmingham.
Powell, Thomas Henry ....Hornsey Rise.
Tilden, William Augustus, D.Sc., Clifton.
Walker, Joseph ....Dresden.
Young, John Rymer............Warrington.

Elections.

MEMBERS.

The following *Pharmaceutical Chemists* were elected members of the Society:—

Bradford, Cordley ....Birmingham.
Smart, Alfred ....Steyning.
Tilden, William Augustus, D.Sc. Clifton.
White, William Edwin ....London.

Mr. Urwick suggested that Dr. Tilden might be elected an honorary member in acknowledgment of his past services to the Society.

Mr. Williams said that such a compliment, although very consonant to his own feelings, would have the effect of preventing Dr. Tilden accepting the office of Examiner, which he hoped he might do at some future time.

The following registered *Chemists and Druggists* were elected members of the Society:—

Adlington, William Benjamin London.
Cocking, Frederick John......Teignmouth.
Duncombe, William Pauncefort Wincanton.
Garner, Thomas ....London.
Jenkins, David Morris........Treherbert.

Two gentleman were restored to membership on payment of the subscriptions for the present year, and a fine of one shilling in each case.

ASSOCIATES.

The following, having passed their respective examinations, were elected "Associates in business":—

Minor.

Atkinson, David ....Cullercoats.
Fox, William Albert ....Stratford.
Fuller, John William ....King's Lynn.
Oxley, Herbert Lister ....Palermo.
Redpath, William ....Norwood.

Modified.

Higgins, William............Farnham.
Spalding, William Richard....Walthamstow.

The following, having passed their respective examinations, were elected "Associates":—

Minor.

Baynham, William Bevan ....Bath.
Bowker, William ....Bolton.
Brown, John Ephraim........Grantham.
Cleaver, Edward Lawrance....London.
Cooper, Herbert Hudson......Birmingham.
Davidson, James ....Falkirk.
Edwards, Charles............London.
Ekins, Arthur Edward ......Cambridge.
Findlay, James..............London.
Frowd, Edward Francis ......London.
Hart, Thomas ....Manchester.
Hills, Ernest................Weymouth.
Jackson, Alfred Henrick......Manchester.
Jones, David................Rhyl.
Lewis, Edward ....Sandown.
McJannet, James............North Walsham.
McMillan, James ....Perth.
Minett, Thomas Samuel ......East Grinstead.
Pearse, William Francis......Great Yarmouth.
Rimmington, George ....Bradford.
Rowcroft, Albert Edward ....Gravesend.
Shapley, Charles ....Torquay.
Smith, Charles Clapcott ......Rye.
Sturton, Richard ....Cambridge.
Taylor, Henry Francis ......Exeter.
Thring, Edmund John Henry Trowbridge.
Walton, Major Foulds........Sowerby Bridge.
Williams, William ....Merthyr Tydvil.

Modified.

Bannister, Theophilus Mayo ..Nottingham.
Beattie, Walter..............Portobello.
Fenner, Edwin ....Brighton.
Guest, George Frederick......London.
McKenzie, William..........Glasgow.
Thomas, William............St. Leonard's.

Finance.

The report of the Finance Committee was received and adopted, and sundry payments ordered.

Benevolent Fund.

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

A grant of £10 was made to a former member of the Society, who is at the present time in distressed circumstances; and a grant of £20 was made to the widow of the late Frederick Stockman, of Gosport, the amount to be handed over to the Fund now being raised by public subscription on her behalf.*

Library, Museum and Laboratory.

The report and recommendations of the Library, Museum and Laboratory Committee were received and adopted, and the following books recommended for the library were ordered to be purchased:—

Hassall's Food and its Adulterations (a second copy).
Pharmacopœia Græca, 1868.
Pharmacopœia Fennica, 1863.
Grevillea; by M. C. Cooke.

House.

The report of this Committee was presented. It included an estimate which had been obtained for repainting the outside of the premises, etc., and making certain alterations.

After a brief discussion it was decided that the main portion of the work referred to should stand over for the present, such painting only being done under the direction of the Committee as was requisite for the preservation of property.

Resignation of Dr. Tilden.

The Secretary having read a letter from Dr. Tilden, resigning his office as Demonstrator of Practical Chemistry in the Laboratory,

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* See *ante*, page 36.

It was moved by the President, seconded by the Treasurer, and unanimously resolved:—

That this Council accepts the resignation of Dr. Tilden with regret at the loss of his valuable services, and desires at the same time to express its great satisfaction at the zealous and able manner in which he has for nine years discharged the duties devolving upon him in the Educational Department of the Institution, and its sincere good wishes for his success in the new sphere of duty upon which he is about to enter.

The appointment of a successor to Dr. Tilden was referred to the Library, Laboratory and Museum Committee.

PARLIAMENTARY.

The Report of the Parliamentary Committee was read, the most important item being a paragraph having reference to Vermin Killers, and recommending the addition of some explanatory words to the "Regulations required by the Pharmacy Act, 1868, to be observed in Selling by Retail and Dispensing Poisons," which were issued to the trade about two years since. The additions recommended were as follows:—

In the tabular statement of the "List of Poisons within the meaning of the Act," in Part 1 insert,

"**Vermin Killers.** (Every compound containing a "poison" in Part 1, and sold for the destruction of vermin.)"

In Part 2, the paragraph under the head "Vermin Killers," to read as follows (the addition is in Italics):—

"**Vermin Killers.** (Every compound containing a "poison" *in Part* 2, and sold for the destruction of vermin.)"

The report also stated that the amendments in the Food, Drink and Drugs Bill were satisfactory to the deputation who waited upon Lord Salisbury. The Secretary added that the Bill had now passed the House of Lords.

Mr. BETTY moved the adoption of the report, saying that he hoped this vexed question of vermin killers might be grappled with, and settled at last once for all. The great necessity for it had been shown more fully week by week since it had been first discussed, many reports of poisoning by means of vermin killers having been published in the newspapers. At the time when the letter was drawn up for the instruction of coroners as to the working of the provisions of the Act of Parliament, it was not considered politic to send any official communication on this subject unless the table issued to their own trade, relating to the sale of poisons, were not only complete in itself and easily understood, but so arranged as not to be liable to misinterpretation. He therefore thought it his duty to urge upon the Parliamentary Committee the great necessity of some more explicit directions being given to the trade with regard to the sale of vermin killers. During the last two or three months, the Act of Parliament had been read in a different light by two legal gentlemen, one coroner having laid it down that all vermin killers could be sold under part 2, whilst another was decidedly of a contrary opinion. No doubt, some little misunderstanding existed as to the meaning of the Act of Parliament, and, therefore, he thought it would be a wise thing to issue another table to every member of the trade, in which attention should be especially drawn to the provisions under which these articles might be sold. The alteration or addition which he would make to the table previously issued was simply that described in the report, introducing vermin killers, in both part 1 and part 2, so that by bringing them into juxtaposition, chemists and druggists throughout the country might better see under what restrictions such vermin killers ought to be sold. Thus, in part 1, he would insert after "Strychnine and its preparations," "Vermin killers or compounds containing poisons, in part 1, and sold for the destruction of vermin." He concluded by reading a few lines from the judgment of the coroner at Leeds, in a case in which the chemist pleaded by his counsel that vermin killers could be sold under part 2. The coroner said that the articles came within the 17th section of the Act of Parliament, and the sale of them ought to be conducted under the restrictions provided for the sale of poisons, and if any case of a similar description came before him after that, he should deem it his duty to direct the prosecution of the druggist for acting in contravention to the Act of Parliament. He would therefore move the adoption of the report, and also that the Secretary send a short letter to each member of the trade calling their attention to the matter.

Mr. HAMPSON seconded the motion.

Mr. STODDART thought this action would only lead to more difficulty. If all chemists would do as he did himself, when anybody came to buy a vermin killer treat it as if it were in part 1, there would be no difficulty, and no accident could arise. At any rate they would not be open to such observations on the part of coroners. A chemist might have half-a-dozen kinds of vermin killers in his shop, and he was not supposed to know what they contained until they were analysed. If therefore they could advise every one to enter these articles in their poison books as if they came under part 1, whether they absolutely did so or not, they would be perfectly safe. He had spoken to several coroners on this subject, being somewhat engaged in analytical chemistry, and he found some looked upon it in one light and some in another, but whatever view they took there was no convincing them they were in error.

Mr. WILLIAMS said if the sale of vermin killers could be confined to registered chemists and druggists it would be all right, then there would be no difficulty, but that was not the fact. He should be very glad to do what Mr. Stoddart suggested, but it was impossible to say what a vermin killer was without actual analysis, and the question was, were they to attempt to prohibit the sale of vermin killers by any one who was not a registered chemist and druggist.

Mr. SUTTON thought it would be a good plan if they could get the Government to adopt the French system, and to require the manufacturers of vermin killers to state what was the chief poisonous ingredient in their composition, there would then be no uncertainty as to how they should be dealt with.

Mr. ATHERTON said if the "Regulations" previously issued were indefinite, the sooner the matter was put right the better. No doubt chemists were at the present time running a risk in sending out these poisons under part 2. There would be a great disadvantage in agricultural districts in putting them into part 1, for the sale in such neighbourhoods was enormous, in some cases amounting to hundreds in a day. At the same time it was necessary to be secure, and therefore, at all events, those containing strychnine should be put into part 1.

Mr. HAMPSON said the very fact of vermin killers being sold for the purpose of destroying rats, and being represented as extremely destructive, tended to show that they contained deadly poison, and he thought the majority of chemists would for their own safety treat them as being under part 1. Unless they did so, they might find themselves in a great difficulty. It would no doubt be a good thing if Government passed an Act obliging the makers to state what the constitution of their article was, but still he thought Mr. Betty's resolution was a step in advance, and no doubt would have a beneficial effect.

Mr. RADLEY supported the view of Mr. Stoddart, thinking it would only be perpetuating a difficulty to have the new regulations under both heads, 1 and 2. They must remember that throughout the country there were many persons engaged in the trade who were very imperfectly acquainted with the mode of conducting analysis, and who would not be able to decide under which schedule the vermin killers should be placed. He thought the necessities of the case would be met if all vermin killers were put in part 1, without any reference to part 2 whatever.

Mr. Bottle said it was absolutely impossible for the Council to put articles in part 1 which were not placed there by Act of Parliament, but still he thought that an addition might be made to the note which Mr. Betty had suggested, recommending that in all cases of doubt the poisons should be treated as under part 1.

Mr. Betty said Mr. Stoddart's observations related solely to his judgment in conducting his business, and did not touch the state of the law, which it was the object of the Council to make as clear as possible to chemists and druggists throughout the country. They had no power to put anything either in one schedule or the other which was not there *de facto* by the Act of Parliament; and, therefore, all they could do was to declare how the Act worked. The table was simply explanatory, saying that vermin killers must be sold under part 1 or part 2 according to the poison which they contained. It was quite true that if there should be any doubt in the matter, any chemist who had any judgment would sell it as coming under part 1; but it was no part of their duty to advise him so to do. As to the observation that vermin killers were sold by booksellers, drysalters and others, that was rather an argument in favour of the resolution, because they would thus be drawing attention to the fact that these articles contained poisons, and should only be sold by qualified persons.

Mr. Sandford said he was doubtful how far they were authorized to issue any interpretation of the Act of Parliament. He thought it would be better to let each man interpret it for himself.

Mr. Stoddart said the most popular vermin killers did not always contain the same ingredients.

Mr. Atherton said that one circular having gone out on this subject, which it appeared was not quite clear, it was their duty to do what they could to set it right.

After some further discussion it was resolved—

That the Report of the Parliamentary Committee be received and adopted, and a copy of the revised 'regulations' be sent to every chemist and druggist with a note by the Secretary, by order of the Pharmaceutical Council.

General Purposes.

The Report of the General Purposes Committee on the Reports of the Board of Examiners and Professors on the competition for the Jacob Bell Scholarships and Sessional prizes, was received, and the following awards made.

JACOB BELL MEMORIAL SCHOLARSHIPS.

The Board reported that *three* candidates presented themselves for the Senior Bell Memorial Scholarship, and *nine* for the Junior.

Neither of the candidates for the Senior Scholarship obtained the requisite number of marks for its award.

The Committee therefore recommended that two Junior Scholarships be awarded.

It was resolved "That Junior Bell Memorial Scholarships be awarded to

Sydney Plowman
and
Edward Lawrance Cleaver.

with free laboratory instruction and materials for the Session 1872–73.

SESSIONAL PRIZES.*

The Board reported that during the past Session *fifty-three* candidates had passed the Minor, and *fifteen* the Major examinations in honours, of whom *eleven* competed for the Prizes of Books and four for the Pereira Medal. The Committee recommended, and it was resolved —That the

PRIZE OF BOOKS

be awarded to George Claridge Druce.

That the

PEREIRA MEDAL

be awarded to William Ashwell Shenstone.

On the Reports of the Professors on the results of the competition for the prizes offered by the Council, the Committee recommended, and it was resolved—That the following rewards be made:—

CHEMISTRY AND PHARMACY.

Silver Council Medal	Robert Higgins Davies.
Bronze Council Medal	Edward Rammell.
Certificates of Honour	Joseph Walker. William Ashwell Shenstone.
Certificates of Merit	Frederick Arthur Crisp. Arthur Brownhill Cortis. Martin Luther Hetherington.

BOTANY AND MATERIA MEDICA.

Silver Council Medal	Robert Higgins Davies.
Bronze Council Medal	Edward Rammell.
Certificates of Honour	Frederick Janson Hanbury. William Ashwell Shenstone.
Certificates of Merit	Arthur Brownhill Cortis. Joseph Walker. Charles Harridge Russell.

PRACTICAL CHEMISTRY.

Silver Council Medal	William Ashwell Shenstone.
Bronze Council Medal	Robert Higgins Davies.
Certificates of Honour	Joseph Walker. Richard Trist. Frederick Janson Hanbury.
Certificates of Merit	Daniel Badcock. Walter B. Bishop. James Herbert Midgley. Arthur Brownhill Cortis. David Edwards.

BOTANICAL PRIZE.

Upon the Report of the Professor of Botany the Committee recommended, and

It was resolved—That the Silver Medal be awarded to Frederick Janson Hanbury for his Herbarium.

REPORTS OF THE BOARD OF EXAMINERS.

England and Wales.

July, 1872.

Examinations	Candidates. Examined.	Passed.	Failed.
Preliminary	283	191	92
Minor	78	40	38
Major	17	9	8
	378	240	138

Preliminary.—Certificates received:—

College of Preceptors	1
University of Cambridge	3
	4

* The Sessional prizes and certificates will be distributed at the Evening Meeting on the 2nd October next. Successful candidates will be expected to attend. An address to the students will be delivered by Mr. Stoddart, of Bristol. Ladies are invited to be present.

SCOTLAND.

Examinations.	Candidates. Examined.	Passed.	Failed.
Preliminary	42	18	24
Minor	10	7	3
Major	3	2	1
	55	27	28

Preliminary.—One certificate received in lieu of this examination.

REPORT ON THE EXAMINATIONS BY THE GOVERNMENT VISITOR.

The following letter and report were read:—

Medical Department of the Privy Council Office,
20th July, 1872.

Sir,—I am directed by the Lords of Her Majesty's Council to forward to you, for the consideration of the Council of the Pharmaceutical Society, a copy of the report made by Dr. Greenhow, to the Lords of the Council, on the Society's Examinations in England in the year 1871.

I am, Sir,
Your obedient Servant,
JOHN SIMON.

E. Bremridge, Esq.,
Secretary to the Pharmaceutical Society,
17, Bloomsbury Square.

Report on Examinations of the (No. 12) *Pharmaceutical Society conducted in London during the year* 1871.

During the year 1871, the Board of Examiners of the Pharmaceutical Society held twenty-four meetings for the examinations of candidates, namely,—

Four for the *Preliminary* Examination in Latin, English and Arithmetic, after passing which candidates are registered as apprentices or students; and

Twenty meetings for the Technical Examinations, *Modified, Minor* and Major, qualifying candidates who have passed the Modified or Minor examination to be registered as Chemists and Druggists, and those who have passed the Major as Pharmaceutical Chemists.

Of these twenty meetings (at twelve of which I was present), four were held for the "*Modified*" examination of candidates who had been actually engaged in the dispensing and compounding of prescriptions as Assistants to Pharmaceutical Chemists or to Chemists and Druggists for a period of not less than three years previous to December 31st, 1868. The other sixteen meetings were devoted to the examination of candidates presenting themselves for the Minor or Major qualifications.

At the four *Preliminary* examinations, 1101 candidates presented themselves, of whom 714 passed and 387 were rejected. The proportion of rejections at this first stage of examination has therefore been at the rate of 35 per cent., showing that, as yet, no improvement has taken place in the previous general education of the candidates since the passing of the Pharmacy Act of 1868. The standard of the examination is in no respect too high. It comprises the translation into English of two short sentences from either the first book of Cæsar, Pereira's 'Selecta e Præscriptis', or the last edition of the London Pharmacopœia; four or five simple questions in Latin Grammar; five or six sums in the first four rules of Arithmetic, simple and compound, and in Vulgar Fractions and Decimals; and five or six questions in English Grammar and Composition.

It is certain that no youth who is unable to pass this elementary examination can with safety to the public be allowed to dispense medicines, involving as this does the reading of prescriptions written in abbreviated Latin, and frequently the calculation of the respective proportions of the several ingredients of a prescription, in order to dispense a larger or smaller quantity than that prescribed. Even of the candidates who have passed this Preliminary examination, a considerable proportion subsequently fail to acquit themselves well in reading Latin prescriptions; for I must now repeat what I said in my first report, that many of the candidates coming up for the Minor examination are unable to read with accuracy the Latin prescriptions submitted to them, although these prescriptions have been without exception already dispensed in chemists' shops.

The total number of marks given for the Preliminary examination is 300, allotted in equal proportions to the three subjects, Latin, English and Arithmetic. In order to pass the examination, candidates must obtain a total of at least 150 marks, but a candidate who obtains less than 25 marks in any one of the three subjects is rejected, even though he may have obtained a greater total than 150 marks in the three subjects collectively. A very careful analysis of the numbers of marks obtained by candidates at the Preliminary examinations during the year 1871, has been made by Mr. Haselden, the President of the Pharmaceutical Society, and forms the basis of a special report from the Board of Examiners to the Council of the Society. It appears from this analysis that during the past year no less than 170 candidates obtained less than one fourth of the number of marks for Latin; whilst in English and arithmetic only 64 and 44 candidates failed to obtain one fourth of the marks for those subjects respectively. Again, in Latin, 362 candidates fell below one half the number of marks for that subject, in English 275, and in Arithmetic only 204. These numbers clearly prove exceptional deficiency in knowledge of Latin, and it is in fact stated in the report that arithmetic has been in many cases the means of passing candidates, the large number of marks obtained for it making up for deficiency in the other subjects. Considering, however, the absolute necessity of a sufficient knowledge of Latin to secure the accurate understanding of prescriptions, I am of opinion, with these facts before me, that it deserves consideration whether a higher number of marks should not be given for Latin, or whether a larger proportion than one-fourth of the number now allotted to that subject should not be required for passing both the Preliminary and the subsequent examination.

With respect to the Preliminary examination, I must further observe that at present young men are not required by law to pass this examination before engaging in the responsible duties of dispensing medicines in chemists' shops, in the capacity either of apprentices or assistants. I am indeed informed that many masters, nevertheless, require their apprentices and assistants to have passed it, but the Pharmacy Act not rendering it compulsory on them to do so, a great many youths are at present still employed in chemists' shops who have not given proof of having received even the moderate amount of education implied by their having passed this examination. It would, in my opinion, greatly conduce to the advantage equally of masters and apprentices, if a general understanding could be arrived at, that no young men should enter on employment, either as apprentices or assistants, who had not previously passed the Preliminary examination, and I am glad to observe that this opinion is shared by the Board of Examiners, in whose report, already referred to, it is recommended that indentures of apprenticeship should not be signed until the apprentice have passed either the Preliminary examination of the Pharmaceutical Society, or one of the other examinations approved of in its stead.

At the four meetings held during the year for the *Modified* examination, 163 candidates presented themselves, of whom 103 passed and 60 were rejected; giving a proportion of failures amounting to nearly 37 per cent. This class of candidates will soon cease to exist, and it was, perhaps, to be expected that a larger proportion would year by year be found incompetent; most of those who thought themselves well qualified having probably come up for examination soon after the passing of the Pharmacy Act.

Sixteen meetings were held during the year for the Minor examination, and at these meetings 323 candidates presented themselves, of whom 204 passed, whilst 119, or 36 per cent., were found incompetent. Many of these failures were obviously due to defective early education, especially in Latin; the candidates, although they had passed the Preliminary examination, having failed when required to read Latin prescriptions. Many other candidates failed from ignorance of the elements of chemistry and from inability to recognize the commonest drugs. In my first report on the examinations of the Pharmaceutical Society, I stated that the Minor examination was, in my opinion, as stringent as could with fairness and practical advantage be enforced at that time. Three years have, however, now elapsed since the provisions of the Pharmacy Act came into operation, and there could be no hardship, provided due notice were given beforehand, if at the end of another year candidates for the Minor examination were to be examined practically as to their ability to determine by means of the proper tests the presence of the acid and base in solutions of one or more of the salts commonly used in medicine, or to ascertain the purity and strength of some of those officinal articles most likely to be impure or to vary in strength. This addition to the present subjects of examination seems the more desirable when it is considered that candidates who have passed the Minor examination, and been registered as chemists and druggists, are thereby qualified to keep shops for the retailing and dispensing of medicines, and need not, unless they choose, present themselves for the Major examination; and that, in fact, only a comparatively small number of them do subsequently present themselves for that examination, at which such evidence of practical skill is required as I now consider should be necessary for passing the Minor examination.

At the *Major* examinations which were held on the same days as the Minor, 67 candidates presented themselves during the year, of whom 47 passed, and were registered as pharmaceutical chemists, whilst 20, or nearly 30 per cent., were rejected. In my first report I stated that the examiners intended to require candidates for this examination to determine the strength of one or more given pharmacopœial solutions by volumetric analysis, and in my last report, with the view of assisting the Board to carry out their intention, I suggested that the requirement of this proof of practical skill should be at once enforced. I read to the examiners the passage in my report which contained this suggestion, and from that time I have been gratified to find that volumetric analysis has formed a part of the *Major* examination.

The Major examination occupies two days. On the first day candidates have hitherto been required to write answers to questions in chemistry and pharmacy, and to perform under the eyes of the examiners a certain amount of practical testing, to which I have already adverted. To these subjects has now for nearly a year been added the volumetric analysis of such officinal solutions as hydrocyanic acid, solution of ammonia, etc., the candidates being supplied with the necessary apparatus and tests, and being required to perform the analysis and to work out the calculated results in the presence of the examiner.

It is, perhaps, desirable to explain with reference to the very large apparent numbers of candidates rejected at the examinations of the Pharmaceutical Society, that very many of the candidates rejected in one examination present themselves again on subsequent occasions, and that of these many ultimately pass. Hence the number of the candidates who finally fail to pass each stage of examination is smaller than would appear from the proportions I have given above in analysing the results of separate meetings for the various examinations.

Having given in my previous reports many details respecting these examinations, unnecessary to be repeated here, it only remains for me, in conclusion, to confirm from my observations of the past year the opinion I have given on former occasions, that the examinations of the Pharmaceutical Society are conducted in such a manner as to afford a satisfactory guarantee for the competency of persons admitted to registration under the Pharmacy Act of 1868.

(Signed) E. Headlam Greenhow.

14*a*, *Manchester Square*,
March, 1872.

Mr. Urwick then brought forward the following resolution, of which he had given notice:

> "That all Registered Chemists and Druggists be admitted members of the Pharmaceutical Society on payment of the annual subscription of £1. 1*s*., subject to the same rules that at present govern the election of members, excepting only the entrance fee."

He said he moved this resolution upon policy, self interest, consistency and liberality—liberality to those who were sailing in the same boat with themselves, and who had the same interests to protect and the same rights to defend. With regard to the policy, he was struck with the necessity of it last year when he formed part of a deputation who waited on Mr. Forster on behalf of the trade. He then found there was one weak point about their action, which was that the Pharmaceutical Society did not represent the whole trade, but merely a minority, and a minority which, he was sorry to say, was very small. The whole body on the Register amounted to about 12,000, whilst the members of the Society were only 2466, and it was with a view of inviting, if possible, many of those gentlemen who were now outside the Society to join in promoting the cause of Pharmaceutical Education that he moved this resolution. There might of course be objections to many of these being admitted, on the grounds that they were not fully qualified or eligible in other respects, but these objections would be met by the same rules which at present governed the elections. As to the point of self interest, he believed it would tend to increase their funds and give them a better position generally. In the year 1871 it appeared they were entering on a period of decadence, for while the number of Pharmaceutical Chemists on the Register was 5029, only 2054 of these were members of the Society, showing that those who were admitted did not for some reason or other join the Society, and no longer supported it, either with funds or by their influence. On the ground of consistency, he would only add that they had in many ways done all they could for the benefit of those outside the Society—in the Juries Bill, for instance; and on the same principle, he thought they should use every effort to get these men to join the Society.

Mr. Hampson seconded the resolution, thinking it very important that some attempt should be made to bring the chemists and druggists throughout the country and the Pharmaceutical Society into closer union. From the statistics read by Mr. Urwick, it seemed to be a melancholy fact, that the great majority of chemists could not in any way be identified with the Society, not one-twentieth of them being members, and he could not conceive of the Society being a stable representative institution while such a state of things existed. He did not say whether this resolution would meet the difficulty, but, at all events, it was an attempt to do so; and on those grounds he should support it.

Mr. Atherton suggested that as time was rather limited, and the matter was an important one, it should be adjourned to a future meeting.

The PRESIDENT said the resolution could not be carried, because it would be tantamount to an abrogation of one of the bye-laws, therefore the shortest way to settle the matter would be if they were going to consider the bye-laws in general, to refer this to the same Committee.

Mr. URWICK said of course he had contemplated that if his resolution were carried, the bye-law would have to be amended accordingly. He added, that he had no objection to adjourn the discussion to a future period.

Provincial Transactions.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The Half Yearly Meeting of the above Association was held at the rooms, Halford Street, on Thursday, August 1st, Mr. W. Bradley, President, in the chair. The following report, having been read, was unanimously adopted:—

"The committee, in meeting the members of the Association at the close of the session ask their attention to the following statistics: During the half year meetings have been held twice a week, at which papers have been occasionally read upon subjects of great importance to students, the greater number of evenings having been devoted to the systematic teaching of botany, chemistry, materia medica, and dispensing. The committee take this opportunity of tendering their warmest thanks to the class lecturers for their efficient aid, particularly as the large attendance at these attests the interest taken in them. Whilst giving their hearty thanks to the principals who so kindly promised papers at the beginning of the session, the committee regret that some of these were not read, through the very pressing claims of business upon Leicester chemists during the last few months; in this way some little harm has been done to the Association. During the half year four members have passed the Preliminary examination, and one the Minor; in addition to this, two gentlemen (members of the Association from the formation to the end of the last session) have passed the Major, one of them being first in honours. The classes have met forty-three times, the average attendance at each being 10·5. Seventeen Assistants have been members in the half-year, and sixteen Apprentices; whilst twenty-seven principals have been subscribing honorary members. The committee beg to return thanks to those chemists who have adopted the custom of closing their shops not later than eight o'clock, as on this account the meetings at Halford Street have terminated at an earlier hour than formerly, which has given general satisfaction. Finally, in closing one of the most satisfactory reports ever presented to the Association, the committee beg to draw attention to the balance in the hands of the Treasurer, the expenses of this session of the year being far in advance of the receipts."

A vote of thanks was then passed to the committee for the able manner in which they had discharged their duties during the half year.

The prizes for attendance were then presented by the Chairman to Messrs. Bishop, Butler, and Gray, these having attended every meeting of the Association.

A very hearty vote of thanks was then carried unanimously to the President for his kind and able conduct in the chair during the half year; also for his assiduous attention to the interest of the botany class.

The Secretary having read the names of those nominated to form the new committee, several having declined to stand, the following seven were elected by ballot, who afterwards chose their own officers:—

President, S. H. Cadoux, A.P.S.; *Vice-President*, W. B. Clark, P.C.; *Treasurer*, E. H. Butler, A.P.S.; *Hon. Secretary*, W. Thirlby, A.P.S.; W. T. Elkington; E. J. Bishop; C. Raynor.

A Programme of Classes, meeting twice a week, till February, 1873, has been issued by the Society.

Parliamentary and Law Proceedings.

HOUSE OF LORDS.

ADULTERATION OF FOOD, DRUGS, ETC., BILL.

Thursday, August 1st. This Bill, as amended, was read a third time and passed.

THE PUBLIC HEALTH BILL.

Friday, August 2nd. On the motion of Lord Ripon, this Bill, brought up from the Commons, was read a first time.

On Monday, August 5th, the Bill was read a second time, and on Tuesday it passed through Committee.

On Wednesday, on the motion for the third reading, Lord Buckhurst expressed a regret that so important a Bill should have been sent up to their Lordships at a period of the session when it was impossible to discuss it. The complaint was concurred in by Lord Redesdale.

After a few words of explanation from Lord Ripon, the Bill was read a third time and passed.

HOUSE OF COMMONS.

THE PUBLIC HEALTH BILL.

Thursday, August 1st. On the motion for the consideration of this Bill as amended, Mr. Knight moved that it be considered that day month. He said that, although not quite so objectionable as when it was first introduced, the Bill formed part of a scheme to subject the whole of the local government of England to a central board in London. Of the clauses of the Bill, 18 might be classed under the head of "tyranny" and 23 under the head of "Taxation."

Mr. Gregory, Mr. Corrance, Mr. Hurst and Mr. Newdegate spoke against the Bill, but after a short reply from Mr. Stansfeld, the amendment of Mr. Knight was negatived by 168 to 16.

Various amendments were then proposed by Mr. Stansfeld and agreed to,—the Bill was reported to the House, and ordered to be read a third time on Friday, Aug. 2.

On Friday, August 2nd, the Public Health Bill was read a third time and passed.

THE PETROLEUM BILL.

Thursday, August 1st. Lord Sandon asked the Secretary of State for the Home Department whether at this period of the session it was his intention to proceed with the Petroleum Bill.

Mr. Bruce said the only point in the Bill which was opposed was that relating to the testing of petroleum. Opposition to the Bill, he was aware would disappear if the testing clause were withdrawn; but the Government could not consent to that alteration consistently with a regard for public safety. It would therefore be impossible to proceed with the Bill if the opposition to that part of it were continued.

On Friday the Bill was read a second time and withdrawn.

SUICIDES BY VERMIN KILLERS.

At Chorlton-on-Medlock, an inquest has been held on William Patch, aged 20. It appeared that the deceased, who had been some time depressed in his mind, from a fear that he was insufficiently educated for his calling as an accountant's clerk, took a portion of a packet of vermin killer in some water. A verdict of suicide while in an unsound state of mind was returned.

Another inquest was held at Hackney, on Thursday, to inquire as to the cause of the death of Sarah Chandler. Evidence was given that the deceased, who was a married woman, had complained of pains in her head, and on Sunday was found in a dying state. In reply to questions, she said she could bear them no longer, so she had taken poison; and it was subsequently ascertained that she had taken a large quantity of Battle's Vermin Killer. A verdict was returned of "Suicide whilst of unsound mind."—*Echo.*

Poisoning by Barium Compound.

An inquest has been held at Salford on the body of Patrick Kennedy, a dyer. It appeared that the deceased was employed at the works of Messrs. Walker and Norris, Adelphi, and after complaining of a pain in his chest, went to the storeroom, in which was kept a supply of sago and several kinds of salts, and obtained about three ounces of a whitish powder, which he supposed was "heavy salts." He made a solution of this in a small vessel, and drank it. The powder was in reality compounded of several drugs used in the dyeing process, and its principal ingredient was chloride of barium. This compound had recently been introduced into the works, and the foreman stated at the inquest that every *employé* had been warned of its poisonous nature. The deceased went to the dispensary and told the house surgeon that he had taken "heavy salts." An emetic was given him; but he died. Mr. H. Latham, house surgeon at the Dispensary, said he had made a *post-mortem* examination of the deceased, and was convinced that he had died from the effects of poison. He added that a much smaller quantity of chloride of barium than the deceased was said to have swallowed was sufficient to cause death. Other witnesses said that the deceased had no business in the storeroom whatever. The jury returned a verdict of poisoned by chloride of barium taken in mistake.

Conviction of a Begging Impostor.

At the Police Court, Cardiff, on Friday, August 2nd, William Mackley, formerly a chemist's assistant, was charged with begging and being an impostor. Mr. F. W. Joy, chemist, Duke Street, said that the prisoner came to his shop on Wednesday, and said he was a Mr. Teear, a chemist, of Leicester, and that he had been broken down by ill-health. He was making his way down to Neath to his wife's relations. Witness believed the story, and gave him 1*s.*, and also recommended him to a house for a night's lodging. He came again on Thursday, and said he had seen Mr. Kernick, who had proposed, amongst the members of the profession, that his (the prisoner's) wife should have her railway fare paid to Neath, and that they would pay the fare between them. Witness then went to two or three chemists in the town soliciting their contributions. He had previously told the prisoner that if he found everything right, he would give him the tickets for the journey to Neath. Witness could not find the address of the prisoner's brother-in-law at Neath in any directory as given by the prisoner, and telegraphed to the Local Secretary of the Pharmaceutical Society at Leicester, and got a reply, in consequence of which he gave the prisoner in custody. The prisoner said he was formerly an assistant in the employ of Mr. Teear, a chemist, of Leicester, and previously to that time he was four years in the British service. He had since been very unfortunate, which had led him to falsify his name and to tell lies. He was down in the world and could not get into his profession again. He had even tried to get an honest living by hay-making, but he could only earn 1*s.* 8*d.* a day. He was sentenced to seven days' imprisonment with hard labour.—*Western Mail.*

Embezzlement by Wholesale Druggists' Clerk.

Frank Gypson, 36, a respectable looking man, was placed at the bar before Mr. Benson, at the Southwark Police Court, for final examination, charged with embezzling about £160, received by him for and on account of his employers, Messrs. Yates and Co., wholesale chemists, Park Street, Southwark.

Mr. Redpath appeared for the prosecutors, and said the prisoner had been in their employ as ledger clerk at a salary of £150 a year. It was not his duty to receive money; in fact, he was forbidden to do so. Notwithstanding, he had collected various sums from customers; in one instance intercepting a letter enclosing a cheque for £9. 18*s.*, and converting it to his own use. They had discovered deficiencies amounting to upwards of £160, which had been going on for three years past.

Mr. Yates was called, and said the prisoner had no right to receive any moneys, and whatever he may have taken he should have paid over immediately to the cashier. He had gone through the books, and found the deficiencies to amount to above £160.

Three witnesses were called, who proved paying the prisoner various sums which he had not accounted for. The landlady of the Queen's Head Tavern, in the Borough, produced the cheque for £9. 18*s.*, which she cashed for the prisoner and paid into her bankers.

The prisoner here said he pleaded guilty, and threw himself on the mercy of the court and the prosecutors. He trusted they would deal leniently with him for the sake of his wife and family.

The prosecutors wished his worship to deal with him, and not send him for trial.

Mr. Benson told the prisoner he had a good situation and a good salary, and that ought to have kept him honest. He sentenced him to six months' hard labour. —*Echo.*

BOOKS RECEIVED.

Science and Commerce: Their Influence on Our Manufactures; A Series of Statistical Essays and Lectures Describing the Progressive Discoveries of Science, the Advance of British Commerce, and the Conditions of Our Principal Manufactures in the Nineteenth Century. By P. L. Simmonds. London: Hardwick. 1872.

Magnetism and Deviation of the Compass. For the Use of Students in Navigation and Science Schools. By John Merrifield, LL.D., F.R.A.S. London: Longmans. 1872.

A Letter to the Most Noble the Marquis of Salisbury on the Public Health Bill. By Gilbert W. Child, M.A., M.D. London: Longmans. 1872.

Notes and Queries.

NUTS.—I must remind Mr. Simmonds that the *Tung-shu* tree of the Chinese Mat. Med., is an *Elæococcus* or a *Jatropha* according to the province. The *Paulownia imperialis* (which yields no oil) is called the *Tung* tree. The *Aleutrites triloba*, or "Stone Chestnut," is called *Shih-lih* in Chinese. The Buddhist creed, which teaches compassion for human and *animal* life, has induced the Chinese to work up the vegetable sources of oils and fats to an enormous extent.—F. Porter Smith.

*** The following is Mr. Simmonds' reply to the above note:—

"I thank Mr. Porter Smith for his corrections and suggestions as to the brief allusion which I made in my lecture "On Nuts" to the Tung-shu or Jung-shu. The name seems to have an extended signification to several plants in China I took my information from one of our Consular Reports, but am quite aware that *Elæococcus verrucosus* is the recent botanical name of Brown's *A. cordata*.—P. L. Simmonds.

Correspondence.

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

Provincial Education.

Sir,—Allow me to make a few remarks on the question of spending a portion of the funds of our Society in the provinces, a subject which has been, and now is, very properly occupying the attention of the Council and other parties interested in the result.

Certain principles have been enunciated, and more than one scheme proposed, in order that action may be taken and money grants made.

With very few exceptions, a feeling has been expressed that the Society should become more an educating body, or, in other words, pay sums of money to lecturers in certain districts of the country.

Another feature, apparently gaining favour, is that of local examinations, competition for prizes, and payment for results.

Believing that it is alike the duty and privilege for all who are interested in the well-being of the Society to offer opinions or make suggestions, I beg to submit the following, premising that, being alone responsible, I trust, however much I may disagree with others on some points, I will receive credit for honestly stating my views in regard to the advancement of young pharmacists at present existing, and even looking forward to those of the future.

I therefore at once affirm that as a Society we ought not to pay lecturers, or even supplement salaries by payment to teachers. We are not in a state of pauperism, and I fail to see the necessity of spending money in that direction. No college, so far as I know, pays its professors with the view of enabling students to attend classes at a low or reduced rate, and if we are to be placed and kept in our proper position, I think that all who join our ranks ought to be able to pay a fair sum for the knowledge they derive in the lecture-room or the laboratory. It is true there are endowed professorial chairs, but the funds necessary for such endowments have not been drawn from the pockets of past or present pupils, but have been obtained from different sources altogether.

I do not therefore think that even in London there should be paid teachers,—in order that those wishing to attend such prelections might do so, at a price far below what the teaching is really worth. More than one has remarked that our school as at present existing, has been, and really is, supported more by young men from the country than from London and the neighbourhood. Still so far from such a statement weakening my argument, I conceive it rather strengthens it. Take the number of young pharmacists in England, Scotland and Wales, and think how exceptional is the case of students appearing to study at Bloomsbury Square. We have in the metropolis a museum, library, laboratory, and lecture-room. Of these we may be fairly proud. I cannot see why the Council should not appoint professors, one for chemistry and pharmacy, one for botany and one for materia medica, and another for practical chemistry and pharmacy, giving to each the name and free use of rooms, museum and apparatus. But by all means allow these gentlemen to charge a fair remunerative fee for their tickets of attendance. Surely the labourer is worthy of his hire here as elsewhere. But I go further, and suggest that the opportunity now proposed, coupled with the recommendation of the Society, might induce a system of teaching so much superior to that carried out elsewhere in the same branches, that students ought to be attracted to the benches in Bloomsbury Square, in preference to going anywhere else. I also believe that the present system of sessional teaching might be improved. At present the period is ten months, commencing in October and finishing the end of July. Now I ask would one hour a day for chemistry and pharmacy, and the same for botany and Materia Medica, extending over five months, not be an improvement over the present system? Indeed, if required, two courses instead of one might be accomplished each year. If this were done, it becomes a question as to how many more might be able to arrange for a five months' residence in London, who find it impossible to extend their stay during the present lengthened term of ten months.

Our present professors are, in their various departments, clever and highly scientific men, and, from the time they have held their position, may be said to hold vested interests. In this case, it might be left to the Council to determine whether past services ought to be recognized, and if so, to what extent and in what form such recognition might be made.

It will be at once evident that I object to the money payment of teachers in London or out of it. But I would be willing to extend to the provinces the same privileges, but on a smaller scale, which our London friends are supposed to enjoy. I would be glad that our Society assisted in paying for a place of meeting, museum, library, and even apparatus, if the circumstances of the district warranted such a grant. Local effort might form a guide as to the money to be given, while such a system would bring within its scope the smallest town or village where a few of our members were in earnest in carrying out the good work.

We ought never to forget that we as pharmacists differ in many respects from the requirements of those who study at universities. The Pharmaceutical Society does not exact attendance in certain classes and for certain periods. The young man in the country, who by reading, study, and application fits himself for examination, is just as certain to pass the Board of Examiners in London or Edinburgh, as the candidate who may have studied in the larger towns, or even in London itself. A case in point occurred here this spring, where a young man from a town in the far Highlands, not only passed his Major examination, but did so in Honours, while he had never attended a single lecture of any kind in his life. This I had from his own lips.

What the operation and result of local examinations may be is doubtful; but I think they deserve a fair trial, as it is a healthy thing to make it an open competition where prizes are to be gained. Medals or books ought, I think, to be awarded; but in no case should money be competed for, as has been proposed.

The question of lessening examination fees and annual subscriptions has been opened up; but I have a strong feeling that such a proceeding would at the present time be premature. The time may come when such a course might be deemed advisable for the interests of the Society; but a change such as this would require very great consideration before a step so serious could be safely taken.

I feel certain that every existing chemist and druggist would do the right thing if he determined not to bind an apprentice till he had passed his Preliminary examination. He would also be doing an equally just and right thing if he gave the same apprentice time and opportunity to attend classes on chemistry, materia medica and botany, or where such did not exist, to give him time to carry on his studies in these sciences. In such cases, library and museum would be excellent adjuncts to those young men; and by the aid of ordinary perseverance and study, be the means of frequently enabling many of them either at the termination of their apprenticeship, or very soon after, to pass the Minor examination with some degree of satisfaction to their masters and themselves.

In conclusion, I would simply add that if the Council shall so arrange that grants of money are to be spent in paying lecturers, then it will be felt in many places that they have been unjustly dealt with, while past experience has proved the fact that, when the admission to excellent scientific lectures has been reduced to a minimum, few have been found to take advantage of the opportunity so offered, the paucity of attendances, I am sorry to say, being attributable either to disinclination on the part of the students themselves or to the employers declining to give the requisite time.

John Mackay.

Edinburgh, July 31st, 1872.

Sir,—It is to the dogged perseverance of the British soldier that we are indebted for the names of victories which shine so resplendently on the pages of our country's history. It was the same dogged perseverance which wrung from the lips of the great Napoleon the exclamation that a British soldier never knows when he is defeated. I desire to be animated with something of the same spirit, that I may be able to continue the discussion of Provincial Pharmaceutical Education, and to do my share towards bringing it to a successful termination. In my previous letters to you I have endeavoured to prove that it is the duty of the Pharmaceutical Society to promote and to assist in providing an uniform system of education of those practising pharmacy. I think I have conclusively shown that they have done neither one nor the other, for the country members of the trade. I cannot agree with you, in your leading article in the Journal for July 20th, where you say, "it may fairly be said that the Society, as a voluntary association, has already completed its labour in the cause of education, and that, in having succeeded in making education compulsory, it has done the work it originally projected." In my last letter to you, I said that in my next, "I will endeavour to show why the Council should assist Provincial Pharmaceutical Education, and how they can do it."

Thirty years ago the Society obtained a charter of incorporation from the Queen, the first clause of which states that it was granted for this special purpose. Subsequent Acts of Parliament have rendered still more imperative their duty in this respect. It will be a breach of faith, both towards the Queen and towards Parliament, if they do not do so. Nothing can be more unsatisfactory than the present position of pharmaceutical education in the provinces. In truth, there is no such thing as a regular system of scientific education existing there. Nothing has been done by the Society for this purpose. What little has been done, has been by the unaided efforts of its country members. Had Jacob Bell lived, the pioneer of pharmaceutical education and progress, this subject would have received a satisfactory solution long since. It is no argument at all, because the Institute in Bloomsbury Square has not proved the success which it could have been wished (and it reflects no credit on the town members of the trade that such should be the case), that no effort should be made to assist scientific education in the country. A residence of six months in London, to attend a full course of lectures at the Institute, means an expenditure of £100. When you consider the circumstances of the parents from whom the supply of country apprentices are obtained, it is an expenditure which very few can afford. Our apprentices are not drawn from the wealthy members of Society, but are the sons of people of moderate means.

The Society has established compulsory registration and compulsory examination. I think it has started at the top of the tree, instead of the bottom. Had it first provided a universal system of education for a few years, and then made it compulsory, together with examination, it would then have acted in a fairer spirit towards the country members of the trade. What has been the effect of the Act passed in 1868 rendering examination compulsory? Nothing can be more unsatisfactory. Young men who cannot afford a prolonged residence in London, are driven to take advantage of the institutions advertised in the Journal, where the information necessary to pass the Minor is blown into them in a month, and by the same mysterious process for the Major, in three months. Can anything be more unsatisfactory than this? The result of it is seen in the case of the young man, twenty-six years of age, a Minor Associate, reported in last week's Journal, who translated "si opus possit" to be taken "with posset." I think my case is now complete.

I will now endeavour to show how the Society may promote scientific education in the country. My views on this subject have been expressed in a paper on Provincial Pharmacy Schools, read before our local association, and which appeared in the Journal on April 13th; in the few remarks which I made at the Annual Meeting of the Society in May; and in my letters which have appeared in the correspondence columns of the Journal. I advocate the establishment of a number of pharmacy schools in some of the large towns of the kingdom. I would take the provincial medical schools as a standard to go by in founding the schools of pharmacy. These schools ought to be affiliated with the parent Society. A complete curriculum of education satisfactory to the Council, on chemistry, materia medica, practical pharmacy and botany should be required from them. Every lecturer ought to be a certified teacher approved of by the Council. I also think that it would be a great advantage if the Council would prepare a syllabus of the lectures to be delivered each session in every school. No student should be permitted to attend a course of lectures on these subjects until he has first passed his Preliminary examination. No student ought to be allowed to present himself for the Minor examination without producing a certificate signed by a certified teacher that he has attended regularly a certain number of courses of lectures on the above subjects. The number of courses to be determined hereafter by the Council; at the same time he shall also produce satisfactory evidence that he has served an apprenticeship of a certain number of years to a member of the trade. This system, if faithfully carried out, would in a short time produce a body of educated pharmacists. No person should be allowed to present himself for the Major without producing the certificate of a certified teacher that he has attended a further course of lectures on the subjects required for that examination.

I am well aware that pharmacy schools cannot be established in every town in the kingdom. In those cases where they cannot, I think assistance may be rendered to promote class-teaching. After a young man has served an apprenticeship in a town where no such school exists, he should endeavour to obtain a situation in one where he can have these privileges.

The question will now be raised, how are these schools to be supported, museums formed, laboratories established, prizes given and payments for results provided for? I repeat, what I have stated on previous occasions—by liberal grants from the parent Society; by subscriptions from the local members; and by fees from the students. This is the scheme that I submit for the Society's consideration. It would probably have been more satisfactory to the members of the Society in general had the Council, who have seen for many years past the working of their school, been prepared with a scheme of their own.

It may be urged against this scheme that it would revolutionize the trade. I think it is very probable that it would eventually have that effect, and I think it is extremely desirable that it should. The present position of pharmacy in this country, both in its relation to the medical profession and to the public, is in a very unsatisfactory condition. I forbear from entering upon a discussion of it now, for it would open too wide a question for discussion, and reserve my remarks on it for a future occasion.

Atkinson Pickering.

Hull, August 6th, 1872.

Payment by Results and its Working.

Sir,—In order that I may give, as I promised in my last letter, an ideal representation of the Society, local committee, teacher and student, under Mr. Schacht's scheme, I will begin with the Society.

The Society must be like the Committee of "My Lords" of the Science and Art Department, which bestows money grants, gives prizes to students, appoints teachers, and sees that the money in hand is properly expended, the classes properly conducted, and that certificated teachers are appointed to the classes.

The Local Committee.—In order that the designs of the Society may be carried out, it will be necessary that the Society be in correspondence with the local committee, consisting of several responsible persons. Many communications will pass between the two; from the local committee, on the wants of a town or neighbourhood of a school; from the Society on the approving or negativing a demand. The Society will of course have certain plans or regulations laid down for their guidance which every local committee must adhere to.

At the outset these communications will be tedious to each party. The regulations respecting the obtaining of apparatus have been before us some time. A complaint arose that the stipulations or regulations to be gone through made the gift hardly worth the getting.

The Teacher must be an examined pharmaceutist; he must be considered the servant of the committee, although he must, in the first place, be approved of by the Society, and his certificates forwarded to London to know if he be duly qualified to teach a class. In the event of the teacher not being duly qualified, no class can be held, since, it will not have a pharmaceutical teacher.

There is no sweetness in being a servant of a committee; for generally the committee-men know little or nothing of the subjects taught, and, on the teacher asking even for a slight favour, he meets with a "snubbing."

The teacher must adhere to a syllabus of instruction, which the Society will draw out. He must keep a register of attendance, or payments for results cannot be obtained. The number of lessons having been given, the time comes when the students will sit for examination. The teachers will not be allowed to be present at the examination; the other etceteras according to the 'Directory.'

Then the teacher will claim payments according to the positions the students take in the examination. The plan he will adopt in teaching will be this: Knowing that the "stock" questions are printed ('Examination Papers'), and that there is little variation year by year, he will especially dwell upon such subjects as are likely to be involved in such examination —the "vital points" of the examination. He will, moreover, "coach up" the student night by night on anticipated questions. Those questions which are likely to be put to the pharmaceutical student may be obtained from the PHARMACEUTICAL JOURNAL of past years. The professional "crammers" in London, understanding this matter, adopt the same principle. Moreover, the teacher of the class will adopt this principle in order to confine the student's attention to the assailable points, and, prevent the student wasting time in reading upon subjects which may not be wanted in the examination, and, also, to obtain a larger return for himself on the scheme of payments for results.

I am sorry to acknowledge my practical acquaintance with this system. While a teacher I was obliged to adopt it, or my students could not have passed. The keeping the register of attendance, the marking all who have attended 25 lessons, the making of claim for payment and a few other ceremonies, may be considered minutiæ, but they are in practice so tedious that a £10 gratuity to the teacher would not be improperly bestowed. Mr. Schacht is imitating a perishable system, for the 'Directory' says, "Payments to teachers must not be looked upon as perpetual; the amount given is likely to be decreased or eventually withdrawn."

Perhaps the Pharmaceutical Society will consider themselves authorized to do as the Government does, viz., send down an inspector to see that the students are properly instructed, and the examination properly conducted—who may drop in any moment.

The Student.—He will, it is presumed, accept the invitation to attend instruction. He will rejoice that he can obtain instruction with the minimum of expense to himself, and if it be the son of a policeman, coast-guardsman, artisan, or small shopkeeper whose income is under £100 a year, he will have the more occasion to rejoice.

There is a real likeness on this point to the Government system. The Government system aids the lowest class of the people. Mr. Schacht's system will aid, or it is intended to aid, the lowest class of chemists. What a consolation that our responsible profession is to be recruited from the lower orders! That we are even low in the world!

Will Mr. Schacht's scheme do the trade any good? I rather think it will prove very lowering to it. Our Society would be a refuge to all—even to the sons of sweeps and scavengers. Oh, Jacob Bell! Would that thou wert with us. Wouldst thou sanction a scheme like this?

In the Bristol Association report, I read, "The results are most encouraging," I wish I could think so. They will not be encouraging if based on the Government system; but lead to disappointment, for it is very unstable. Mr. Schacht in the same report especially dwells upon the success of the young men the last session,—so they ought to have been; for the examination papers of last session were ridiculously easy; whereas the papers the year before were ridiculously difficult. That is just the way with our government—there is either a loophole or no loophole. "A Queen's medal will be awarded to one of the students," so the report says. This Queen's prizeman, sir, must be a working man's son; he must be the son of some one who has under £100 a year. He may be the son of an ostler!

Will Mr. Schacht kindly tell us if it be his ambition to see our profession ornamented by the sons of such men?

Another association thinks that £1 and £2 payments on results as fixed by Mr. Schacht, "to be insignificant and totally inadequate." Mr. Schacht will see that that was my opinion many week's since. The same association thinks that the Society "should pay all the teacher's fees"! What next? Apparently the whole scheme will be debasing to the Society. It will be disliked by the honest teacher. It cannot be adopted, inasmuch as the Society must have a back-bone of gold—the calls upon it will be unlimited; the demands most extortionate; and the country associations will be further from being satisfied than ever they were.

A COUNTRY MAJOR ASSOCIATE.

August 3rd, 1872.

EXAMINATION FEES.

Sir,—The letter of 'H. B.' in last Saturday's Journal induces me to ask you to publish in an early number the following motion, which, after offering some explanatory remarks, I laid on the Council table on the 3rd of July last:—

"That this Council, fearing that the present rate of examination fees forms an obstacle to many young men entering on the studies necessary for passing these, hereby appoint a special committee to examine into the whole question, and this especially, as to the propriety of reducing the fee for the Preliminary examination by one-half; and also as to giving all candidates for the different examinations who fail to pass the first, to have two other opportunities of passing without the necessity of making any further payment.

"The committee will further consider the question of giving all candidates who have passed the Preliminary the opportunity of passing the Major, or such a modification of it as will embrace all the essential features of the Minor, at once and without the necessity of passing the Minor also.

"But it is to be understood that, in the event of these changes being adopted, there shall be no portion of any of the examination fees returned to the non-successful candidates on their failing to pass the various examinations.

Hoping to move the adoption of these resolutions at the September meeting of the Council, I will only at present add that, should they be adopted by the Council, I propose to modify them so as to secure that all who shall have passed the Preliminary examinations before they come into force shall be admitted to pass the Minor on payment of two guineas, and all who have passed the Minor shall be admitted to pass the Major on the payment of one guinea; thus securing that all Minors shall pass for four guineas, and all Majors for six guineas, instead of, as at present, five and ten guineas respectively.

Glasgow, August 6th, 1872. DANIEL FRAZER.

INEFFICIENT MINORS.

Sir,—The Pharmaceutical Society would have us believe that the Minor Associate is authorized to apply for an assistant's situation, his certificate being his recommendation and qualification. But that it is occasionally neither a qualification nor a recommendation Mr. Ekin shewed last week, by an example, and I also beg leave to show it in a similar manner.

I engaged an assistant a short time ago, whom I discharged because he could not wrap up an eight-ounce mixture *clearly* and *neatly*. This young man then made his way to London; put himself under a "crammer," and in a very few weeks passed his Minor. So far as I could judge this candidate had seen little or no dispensing, and for a certainty he had never been taught to wrap up! If more exercises were set the candidates at the dispensing counter than are set at present, —not with the intention of making the Minor much more difficult than it is, but on purpose to notice the habits conducing to cleanliness, neatness, accuracy and despatch,—masters might not have occasion to look with suspicion on a Minor's degree.

I forget how the Society awards marks on the Examination. If there be any "averaging" of marks obtained in all the subjects, this at once will explain the slipping through of inefficients. The plan adopted by the London University is worth consideration. It is, I believe, this: "That if any candidate do not obtain the maximum number of marks in any subject, he will not be passed by obtaining the maximum numbers in the other subjects." The inefficient minors I need hardly state are not a credit to the Society which granted the degree.

August 3rd, 1872. A MASTER.

F. D.—The latest edition with which we are acquainted was published in 1857, by Messrs. Longmans.

"Oxonian."—The price is absurdly low. It must surely have been a mistake on the part either of the purchaser or dispenser.

James Houlton.—We regret to say that the writer is on the Register, by virtue of having been in business before the passing of the Pharmacy Act, 1868.

C. J. Bell.—Hydrochloric acid is undoubtedly intended.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Moss, Mr. D. Hanbury, Mr. Simmonds, Mr. Gerrard, Mr. Balchin, Mr. Mason, C., R. and J., M., "Inquirer," Syrupus."

THE DUBLIN EXHIBITION.

(*Concluded from page 62.*)

Messrs. J. C. and J. Field, London.—The above firm have many novelties of a mechanical nature. They exhibit in the soap line spermaceti and paraffin soaps. The paraffin tablet must be a mechanical mixture of soap and paraffin, as perfect saponification of the paraffin is out of the question. They also state that the paraffin tablet has a special efficacy in rendering the hands unusually soft and pliant after its use.

The special celebrity at present, however, of this firm is the production of candles from the mineral (if we may use the term) ozokerite. It will, perhaps, not be out of place to give here a short outline of this curious product. This natural hydrocarbon is found in Galicia, in the Carpathian Mountains. The name means a "wax-like smell," which, however, we have failed in perceiving; in fact, the natural product in smell is like some of the liquid hydro-carbons of the higher boiling-points, whilst the purified product is almost devoid of smell. The natural specimens melt from 60° to 80° C.; those of paraffin being about 50°.

It, however, bears a considerable resemblance to paraffin in composition, thus—

	Paraffin.	Moldavian Ozokerite.
Carbon . . .	85·1	85·75
Hydrogen . .	15·1	15·15

Nothing could be more beautiful than the candles made from this unpromising-looking brown ozokerite.

Soaps, candles and perfumery are frequently connected together thus: the soap manufacturer is generally a candle-maker, whilst the perfumer, if not actually a manufacturer, is generally a refiner and maker of the toilet varieties. In candles and soaps the British and Irish manufacturers are before any country as regards cheapness combined with quality, and, as a rule, it will be found that foreign soaps possess a causticity which is most objectionable. We have already referred to Price's Patent Candle Company, and have merely to state further that their case, as an exhibition of these articles, is, if not the finest, one of the handsomest in the building. This, however, is saying a great deal as there are really some very fine cases of this class.

Mr. J. S. Rathbone, Dublin.—Mr. Rathbone's case is full of general interest, and contains a handsome show of candles; but what renders his show of particular interest to us is the fact that he is a refiner of sperm, or, in other words, a manufacturer of spermaceti, and refines sperm oil. He is also a bleacher of wax. The crude sperm oil, as obtained from the head of sperm whale, is at ordinary temperatures semi-solid, from the separation of the cetin. This oil is separated at as low a temperature as possible, because on its freedom from this cetin, depends afterwards the purity and beauty of the refined sperm oil. The cetin, which is essentially the spermaceti, is then submitted to pressure to arrive at the requisite degree of purity. Frequently, on placing two specimens of spermaceti beside each other, a considerable difference in shade will be observed; this is not generally due to dirt mechanically suspended, but to the remains of the oil still present. The specimens of this article shown are beautiful in the extreme, particularly a crystallized pillar of it in the centre of the case. It is curious to observe that really *pure* white wax would in nine cases out of ten be scouted. The appearance is so distinct from the article called *Cera alba*, which is made up of paraffin, spermaceti, or anything you like but white wax.

The General Mining Company of Ireland exhibit some chemicals of considerable interest. Their staple commodity is oxide of zinc. This Company possesses at Silvermines, in the county Tipperary, the largest deposit of calamine ore in the United Kingdom. It is of a red or ochrey character, and from this ore they manufacture oxide of zinc directly in the furnaces. The oxide is generaly made from spelter. By their process, which is a patent, the Company can make oxide of zinc cheaper than most of the other makers; but being made directly from the ore, it contains a trace of lead, which vitiates to a certain extent its value as a pigment, as it gives a yellow hue. The Mining Company are anxious to prevent this by some modification of their process, because if such a change could be brought about they would command the market. The Company exhibit sulphite of zinc, and sulphite of zinc wool for disinfecting purposes, as originally prepared by Mr. Tichborne, of Dublin. Also caustic soda made by a patent process in which the inferior brands of oxide of zinc are utilized for the production of this article. In the ores obtained at Silvermines the zinc is more or less replaced by iron or lead.

Ireland used to be celebrated for making mustard and starch, and the latter article is particularly well represented in the present exhibition both by British exhibitors and the Irish manufacturers. The starch is most generally manufactured in a laundry form in "crystals," as it is technically called. These so-called crystals are simply a prismatic kind of pipe produced by the splitting up of the mass of starch as it dries, and the peculiar way in which the starch breaks. Laundry starch is generally slightly tinted with some blue colouring matter. Most of the starch manufacturers prepare some of it specially for dietetic purposes.

Mr. J. Kelly, Graigue.—The starch manufacturers seem to prefer rice starch. In the first place the cereal is so cheap and contains such a large percentage (Patna rice 78 per cent.) of starch. Secondly, when boiling water is poured upon the rice granules the starch is made; this is not the case with wheat starch, which requires some boiling to bring it to perfection. It is, however, doubtful if the rice starch possesses the same amount of stiffening properties as the old wheaten starch. The sample shown by Mr. J. Kelly is beautifully white.

Messrs. Alex. Crawford and Son, Belfast.—This firm shows starch made for laundry purposes from wheat starch, and they also, under the name of "Irish Corn Flour," prepare a starch of a very good quality for dietetic purposes.

Messrs. Coleman and Son, London, also show their beautiful "crystals" of rice starch. Rice starch is also the constitution of their now well-known "Corn Flour," prepared by them for dietetic purposes.

The other exhibitors of interest, from a chemical, scientific, or pharmaceutical point of view, are as follows:—

Yeates and Son, Dublin.—Astronomical telescopes and philosophical instruments, spectroscopic prisms and microscopes. A very good collection.

J. Spencer and Son, Dublin.—Philosophical instruments.

O'Neill and Thompson, Dublin.—Surgical instruments and appliances.

M'Adam and Corcoran, Dublin.—Surgical appliances.

Dublin Glass Bottle Company.—Bottles and specimens of glass.

Haines' Patent Lead-Encased Block Tin Pipe.—Walker, Campbell and Co., Liverpool. For preventing lead-poisoning. Said to be the same cost as lead pipe of equal bore and strength.

W. Rumsey, London.—Non-mercurial plate powders, chemical polishing paste, detergent powder, etc.

Mr. G. P. Dodge, Dublin (Bermondsey India Rubber Works).—India-rubber in its various raw and manufactured states.

Mr. A. Reekie.—Various polishes.

Mr. D. Tallerman, London.—Various preserved meats, meat extracts, essences, etc.

Mr. J. Tennant, Junior, London.—Specimen of minerals from Nova Scotia, St. Helena, and Algoa Bay, collected during the exhibitor's travels in South Africa and other parts of the world.

Anti-Adulteration Society, Dublin.—Specimens chiefly of substances used for adulterating, and some adulterated manures, etc.

Mr. Thomas White, Dublin.—Charcoal "Pyrolignite" acetates of lime and soda, acetic acids, etc., produced from Irish grown timber.

Mr. Wm. Martin, Dublin.—Various coloured inks.

Messrs. Boyd and Alexander, Dublin.—Chloride of lime, salt-cake, sulphate of soda, commercial acids, and artificial manures. A good display.

Dublin and Wicklow Manure Company.—A very fine case, similar to the above.

Messrs. Cantrell and Cochrane.—Mineral and medicinal waters.

Messrs. McMasters and Hodgson, Dublin.—This firm is chiefly celebrated as oil crushers and refiners. They show fine specimens of linseed and rape oils, also the respective cakes and meals, fluid annatto, and some other proprietary articles.

Mr. Marcus Tertius Moses, Dublin, shows a really fine collection of 60 different kinds of teas, with the locality marked. The teas of China, India, Assam and the Himalayas, Japan and Java, are shown, including even the Brick tea.

JAPANESE WAX AND ITS EMPLOYMENT IN PHARMACY.

BY DR. C. ROUCHER;

Pharmacien Principal de Première Classe.

The vegetable wax, known under the name of Japanese or Chinese wax, is produced by the *Rhus succedaneum.* It is harder than ordinary wax, but much more fusible; the point of fusion indicated by various authors varying from 40° C. to 42° C. It is white, with a slightly yellowish tint, has a feebly rancid smell, and is more friable than beeswax.

As this vegetable wax is now much used in pharmacy, the author has sought to determine the exact point of fusion, and for this purpose examined two specimens, which yielded exactly similar results. This he did by using very thin closed tubes, 15 millimetres wide, in the lower third of which the substance was spread in a uniform layer. The tubes were then plunged into water at various temperatures, and the points noted of opacity, semi-transparence, complete transparence and running against the sides of the glass.

The results obtained with the Japanese wax were as follows:—At from 40° C. to 45° C. the wax remained opaque, provided that the temperature was raised one degree at a time; from 45° C. to 50° C. it became more and more transparent, without becoming mobile; at 53° C. it was transparent and nearly melted; at 54° C. it was completely fused. If the wax be rapidly raised to a temperature sufficiently above its melting-point, and, after cooling, be plunged into water at 42° C., it melts into a transparent liquid. So that this wax has two melting-points—42° C. and 54° C.—separated from each other by twelve degrees; the highest being attained when the temperature is slowly and progressively raised.

Japanese wax is not the only substance presenting such anomalies in fusion and solidification, since, according to M. Duffy, natural stearine under the influence of heat undergoes three distinct modifications, which are produced in a similar manner by heating it beyond the melting-point and then cooling it. The same phenomenon is noticed in monomargarine and the palmitines.

To ascertain whether the wax operated on was constituted by a mixture of two or more substances, the separation of which might influence the phenomenon of fusion, the author dissolved a portion of it in boiling 90° alcohol. Upon cooling, the greater part of the wax separated; this, dried for some days in the open air, still contained a considerable quantity of water, which could be driven off by heat. Deprived of its water, it presented exactly the same points of fusion, 42° C. and 54° C., and comported itself between these two extremes in the same manner as that which had not been treated with alcohol. Beeswax offers nothing similar: two specimens, one white and the other yellow, melting at the single temperatures respectively, of 62·5° C. and 64° C.

The introduction of Japanese wax into pharmacy, and its substitution for bees wax, suggested the following experiments as to the relations of the points of fusion of cerates prepared with these two substances, both being used in the proportion of ten parts of wax to thirty-five parts of olive oil.

(1) *Japanese Wax and Olive Oil.*—At 30° C. it commenced to melt, but quickly stopped and became opaque and solid on the sides of the tube. From 32° C. to 45° C. the cerate, semi-transparent, ran slowly and sluggishly. At 46° C. it melted easily into a transparent mobile liquid. In this state if heated to 50° C., and after allowing it to spread in a thin layer and cooled, it was plunged into water at 32° C., it melted into a transparent syrupy liquid, accumulating at the bottom of the tube. Raised again to 50° C. and placed in water at 30° C. it became transparent, but only ran slowly. Upon repeating the operation with water at 28° C. it became transparent, but did not run, and gradually resumed its opacity. This showed that by the addition of the above proportion of olive oil to Japanese wax, its highest melting-point was lowered

eight degrees—from 54° C. to 46° C.—and its lowest ten degrees—42° C. to 32° C.—the cerate, like the wax contained in it, having two melting-points which are separated by fourteen degrees.

(2) *White Beeswax and Olive Oil.*—At 39° C. it commences to lose a little of its opacity; from 42° C. to 52° C. it becomes more and more translucent; at 54° C. transparent; at 56° C. runs slowly; at 57° C. it runs easily. So that a mixture of olive oil with beeswax in the proportions indicated, lowers the melting-point seven degrees. Just as there is a difference of ten degrees between one of the melting points of Japanese wax and that of beeswax, there is a difference of ten degrees between those of the two cerates.

The observation of the melting-point alone would not be sufficient to distinguish between cerate made from vegetable wax and that from beeswax, as the melting-point might depend upon the proportion of olive oil present. But the existence of only a single point of fusion in beeswax might be a useful indication as to the presence or absence of Japanese wax, or probably of margarine or stearine. A cerate made with beeswax may also be distinguished from one made with Japanese wax by the action of a strong alcoholic solution of caustic potash, which dissolves entirely, even in the cold, a cerate made from the vegetable wax, but only dissolves very incompletely one made from beeswax.

It will thus be seen that from a pharmaceutical point of view the effect of substituting Japanese for beeswax, in medicaments having wax for their base, is a notable lowering of their melting-point; and a cerate made of the proportions indicated above would melt at the temperature of the human body, the mean of its two melting points being about 37° C. or 38° C. It will, therefore, be evident that such a substitution should not be made without the greatest care.—*Journal de Pharmacie et de Chimie,* [4] vol. xvi. p. 20.

ACTION OF PEPSIN ON THE FIBRIN OF BLOOD.*

BY VON WITTICH.

A number of the experiments related in this paper were made by Grünhagen's method, but as the time when the first drop falls from the filter is influenced by the thickness of the paper employed, etc., the author prefers to take the amount of filtrate in a given time as a measure of the activity of digestion. He determines the total amount of the products of digestion by the lævo-rotation of polarized light in a Soleil-Ventzke's apparatus, and the amount of peptones formed, by neutralizing the liquid so as to precipitate para-peptones, and again noting its rotatory power. He assumes that one division of the scale represents 1 per cent. of peptones, or other albuminous substances in solution, with sufficient exactness for comparative experiments. In preparing a glycerin solution of pepsin from the mucous membrane of a stomach, he recommends that the pyloric part should be rejected entirely, as the mucus it contains hinders the filtration of the glycerin extract; and he finds, in accordance with Friedinger and Fick, but in opposition to Haidenhain and Ebstein, that it contains little pepsin. He now finds that pepsin may be extracted from gastric mucous membrane after it has been steeped in alcohol, or from the precipitate which is produced in glycerin extract of fresh mucous membrane by the addition of alcohol. The glycerin must, however, be allowed to remain in contact with the mucous membrane or precipitate for several days, and the negative results which the author formerly obtained were due to his having tested the peptic properties of the glycerin after 24 hours instead of after several days. He is not certain whether pepsin is albuminous or not, for though it does not give the reactions of albumen, this might be due to the excessively small quantity of it present. It differs from albuminous substances in resisting putrefaction; it agrees with them in being almost entirely indiffusible into distilled water. It diffuses, however, very rapidly into dilute hydrochloric acid of 2 per thousand. He thinks this is due to the formation of a diffusible compound with the acid. Fibrin absorbs pepsin most energetically. When put into water into which pepsin can dialyse, it causes it to pass through the parchment more quickly. An excess of fibrin will absorb from artificial gastric juice all the pepsin which has already digested a part of it, and when the undissolved fibrin is taken out and put into fresh acid, the pepsin it contains is generally sufficient to dissolve both it and additional fibrin added to it, while the liquid from which it has been removed has lost all peptic properties. When, however, fibrin is digested upon a filter, the pepsin runs from the filter together with the products of digestion, so that the amount of pepsin remaining with the fibrin on the filter gradually diminishes, and its digestion consequently becomes slower. This circumstance, as well as the fact that the pepsin becomes diffusible in presence of free acid, causes him to believe that the process of digestion begins by pepsin forming a loose chemical compound with the acid, and that this compound is the active agent in the process. He considers that they combine in definite proportions. Deficiency of acid will stop digestion although pepsin be present.

When fibrin is digested with pepsin, not on a filter but in a glass, so that they remain in contact during the whole time of digestion, the amount of fibrin digested is in proportion to the amount of pepsin added. The rapidity with which digestion begins is dependent in the first place on the amount of pepsin. The rapidity with which digestion is performed increases with the temperature up to about 50° C. It goes on, though very slowly, even at such a low temperature as 3° C., attains its maximum rapidly between 35° and 50°, and above this becomes slower. Schiff's statement that the activity of pepsin is suspended at temperatures under 13° is inaccurate. Exposure to 5° for some hours does not destroy the activity of pepsin. The activity of a dilute solution of pepsin is destroyed by exposure for two minutes to 70°, while that of an undiluted glycerin solution was retained after exposure for the same time to 80°.

When digestion stops before all the fibrin in a digestive solution has been dissolved, the arrest of the process is not due entirely to the accumulation of products of digestion, as the amount of those at the time of arrest is found to vary considerably, but is partly due to the want of free acid. His explanation of this is that a definite amount of pepsin and of acid is requisite for the digestion of a given quantity of fibrin. The fibrin which remains undissolved in an otherwise active digestive fluid, has part of the acid which it has absorbed withdrawn from it during the process of digestion, so that the quantity it retains is too small for its digestion, although it has absorbed all the pepsin which has finished digesting the rest of the fibrin. The presence of water is necessary to digestion, and an insufficient quantity of it retards the action of pepsin.

The proportion of the products of digestion which is necessary to stop digestion in a solution increases with the amount of pepsin present.

The relation between the para-peptones and peptones is not constant, and the former are present only at a preliminary stage in the production of the latter, and are

* (Pflügers Archiv. für Physiologie, v. 435–469).

converted into them by an additional amount of pepsin. The amount of peptones formed at the expense of parapeptones increases with the amount of pepsin present.

Digestion is arrested by accumulation of products of digestion, and especially of peptones in the digestive fluid. It is impeded by the presence of 4·3 per cent. of peptones, and probably stopped by 6 or 8·6 per cent.

Dilute acid alone will convert fibrin into peptone, even at ordinary temperatures, but much more slowly than when pepsin is present.

Fibrin soaked in dilute hydrochloric acid till it formed a stiff jelly, and placed in an air bath at 30°–40° C., became fluid in 24 hours, and contained 1 per cent. of peptone.—*Journal of the Chemical Society.*

THE BOTANY OF 'LOTHAIR.'

A remark in 'Lothair' "that all head gardeners are opinionated" appears to have aroused the wrath of one of the readers of the *Gardeners' Chronicle*, and upon the principle that one good turn deserves another, he criticizes some of Mr. Disraeli's references to plants in that celebrated book, and suggests that the talented author should be a little less inexact when he writes on botanical subjects. He commences with a description of Belmont:—"'The last saloon led into a room of smaller dimensions opening on the garden, and which Lothair at first thought must be a fernery, it seemed so full of choice and expanding specimens of that beautiful and multiform plant,' and says, "I would recommend the perusal of this paragraph to those interested in the origin of species, for it clearly assumes that all the species of ferns that go to make up a fernery are multiforms of one plant. The talented author no doubt did not mean it to be in that sense, but he has said it; and those who know ferns—from the tiny filmy fern of Tunbridge Wells (Hymenophyllum tunbridgense), which, when grown to perfection, attains only the height of a bronze penny piece, and weighs when dried about a drachm, to the tree-ferns of Australia, which look so like palm-trees that one has to come near before the difference is seen—well know that these and a legion of others are verily of the fern family, certainly not multiforms of the same plant. The author is very chary of botanical names. The only one I remember to have seen in 'Lothair' is Stephanotus [Stephanotis]—he only gives the generic and not the specific name; and although a proper name, and entitled to a capital letter, it is written stephanotus. Now, if London or Athens were written london, athens, few readers would recognize the capitals of the two kingdoms. Our greatest authors of romance—Disraeli, Dickens, Scott—have all treated horticultural subjects lightly; and the mere labourer unlettered is held up as a gardener. Disraeli's "Hawkins," a nobleman's head gardener, is represented as disobedient to his employer, a dogged hanger on, that only kept his situation by the chaplain's advice and assistance; but if Father Colman is no better informed than the author of 'Lothair' on the subject of the fern family, I fear that 'Hawkins' will not get rich by prizes for his skill in cultivating that multiform tribe of plants. At p. 63 there is a struggle to describe a pinetum—a plantation of spruce firs, but planted wide apart, every tree perfect, huge, and complete, full of massy grace; wondrous groups of juniper, green and spiral—does any one know a spiral juniper? 'The cypress and her spire,' we read of in the poets; does our author mean spire when he writes spiral for a flame-shaped bush? And the whole of Abies and Picea would pass for spruce firs to many observers—

'A spruce fir by the river's brim
Was just a spruce fir unto him
And nothing more.'"

METEORIC STONES.*

BY NEVIL STORY-MASKELYNE, ESQ., M.A., F.R.S..

The substantial unity of the celestial objects distinguished in common language by the names shooting or falling stars, fire-balls, and meteorites, and further the coincidence in many important respects of these with comets, and possibly with the zodiacal light, were suggestions made by Humboldt in the 'Cosmos,' which have received much confirmation from the subsequent advance of science.

The greater apparent velocity with which the ordinary meteors traverse the atmosphere as compared with that with which the less frequent larger bodies are seen to move, the marked periodicity that attends the recurrence of the former in several, and espcially in two, notable cases of meteor-showers, offer an apparent contrast between these classes of meteors; it is not, however, in all probability, a real contrast, for the one class passes into the other by every gradation in the magnitude of the mass or masses of which the meteor consists, and consequently in the grandeur of the phenomena which accompany its advent. If of the material composing the ordinary falling star we have never yet been able to recognize any vestiges as reaching the earth; of the meteorite, on the other hand, the mineral collections of Europe contain numerous carefully collected specimens, which are the fragments that have escaped the fiery ordeal of the transit through our earth's atmosphere, and in these we recognize masses composed either of iron (siderites), or of stone (aerolites), or of a mixture of the two (siderolites). The phenomena associated with such falls of meteoric matter have been described in very similar language by those who have witnessed them in various parts of the world, and these accounts, whether coming from European observers or from Hindoo herdsmen (of which some were read by the lecturer), concur generally in the approach of the meteorite as a fiery mass, emanating from a cloud when seen by day, and exploding often with successive detonations that are heard over a great extent of country, even in certain cases at points more than 60 miles distant, but finally reaching the earth with a velocity little higher than what might be due to the motion of a falling body. Externally these meteoric masses are generally hot when they fall; sometimes, however, they are not so: the discrepancies in the accounts being explained by one authenticated case in which the mass was internally intensely cold, though at first hot externally. The fallen meteorite is invariably coated with an incrustation, sometimes shining as an enamel, generally black, but occasionally colourless where the aerolite is free from ferrous silicates; and this incrustation is seen to have been formed in the atmosphere, since it is found coating surfaces of fragments that have been severed by the explosions in the air.

Aerolites frequently fall simultaneously in large numbers, many thousands of them being in such cases spread over a surface of the country some miles in extent; and such showers of stones seem to have entered the atmosphere as a group, though their numbers must subsequently have been greatly increased by the division accompanying their detonation.

The explanation of the incrustation and of the cloud left by the meteorite, or out of which it seems to emerge, is found in the transformation into heat of the energy actuating a body that enters our atmosphere with a motion of 12 to 40 miles in a second. The velocity of the body is almost instantaneously arrested by the atmospheric resistance, and in a very few seconds the mass becomes, comparatively speaking, stationary. Its surface must, as a consequence, be immediately fused, and the melted matter would be flung off from it into the surrounding air, fresh surfaces continually affording

* A Paper read at the Royal Institution, May, 10th, 1872.

new fused material to form the cloud of, so to say, silicious spray that lingers along and around the path of the meteorite.

When the mass is small,—and in the case of meteoric showers and ordinary falling stars it cannot exceed a few ounces, and may often be but a few grains,—the whole material is thus consumed, and must ultimately fall as an unperceived, because widely-scattered, dust. The meteorite is the residue that survives this wasting action where the magnitude of the mass is more considerable. The cause of the violent and often successive explosions is probably to be sought in the expansion of the outer portions of the mass, while the interior retains the contracted volume due to the intense cold of space with which the meteorite enters the atmosphere.

From time to time these contending conditions of volume may, as in a Prince Rupert's drop, produce explosion, the heated shell in the case of the meteorite flying off in fragments from the internally cold inner core, which, if sufficient velocity remain to the mass, will undergo a recurrence of the same conditions of surface fusion and explosion. The loudness of the detonation is also probably enhanced by the simultaneous collapse of the air on the vacuum that would follow the rapidly moving mass.

The pitted surface characteristic of meteorites probably bears witness to a similar effect of unequal dilatation operating more especially in the freshly-broken surfaces of the mass, small fragments splintering off in this way from the cold and brittle stone under the sudden influence of intense heat.

A remark made by Humboldt, that light and meteorites are the only sources of our knowledge regarding the universe external to our world, points to the true ground for our interest in the waifs and strays of extratelluric matter that thus fall upon our globe.

In physical as well as in chemical characters aerolites resemble at the first aspect some terrestrial volcanic rocks.

The minerals of which they are composed are nearly entirely crystalline, as is evidenced by the colours in polarized light of such as are transparent. These minerals are usually aggregated with slight cohesion, and they present in by far the greatest number of cases a peculiar spherular or "*chondritic*" structure.

In these the spherules are composed of similar minerals to those which enclose them, and even contain metallic iron sometimes in microscopically fine grains disseminated through them.

A section of an aerolite was exhibited by the microscope in which some of the spherules had been broken before being cemented by the surrounding mass, and in another fissures were seen which had been filled with a fused material after one side of the fissure had slidden along the other; facts pointing to events in the history of the meteorite subsequent to its first formation.

The chemical composition and the mineral constitution of aerolites were illustrated by tables showing the elements met with in these bodies, and the minerals in which they were distributed. The former comprised about one-third of the known elements; among them magnesium, iron, silicon, oxygen, and sulphur were conspicuous; calcium, aluminium, nickel, carbon, and phosphorus coming next in importance, the basic elements of most importance by their amount being the same as those which are found by spectroscopic analysis is to be present in the sun—and in those stars which have been the best examined.

The minerals most frequent in aerolites besides nickeliferous iron or troilite (iron monosulphide) and graphite, are bronzite (a ferriferous enstatite) and olivine, both the latter being essentially magnesium silicates. Augite and anorthite also occur (more particularly in the eukritic aerolites of Rose) and some minerals unknown in terrestrial mineralogy have also been met with; such are the different varieties of Schreibersite (phosphides of iron and nickel): calcium sulphide, asmanite (a form of silica crystallizing in the orthorhombic system and having the specific gravity of fused quartz), and a cubic mineral with the composition of labradorite. The crystalline form of bronzite was first determined from the crystals in a meteorite, and was found to confirm the conclusion Descloizeaux had arrived at as regards its system from observations on the distribution of the optic axes in the terrestrial bronzite and enstatite.

The question as to whence the meteorites come is one that we are not yet in a position to answer with certainty. The various hypotheses which suppose for them an origin in lunar volcanoes, or in our atmosphere, or again in a destroyed telluric satellite, or that would treat them as fragments of an original planet of which the asteroids are parts, or as masses ejected from the sun; all these hypotheses seem to be more or less precluded by the known velocities, the retrograde motion so frequently characterizing meteors and meteorites, or else by the chemical conditions that, for instance, are involved in the passage of the meteorite through the sun's atmosphere. Whether meteorites move or do not move in circumsolar orbits is at present impossible to say; because, while with our incomplete knowledge we cannot to-day attach the character of periodicity to any known class of meteorites, we are not justified in founding any conclusion on a negative result with so limited a foundation.

But even if all or some of them may have been, on their encountering the earth, members temporarily or permanently of the solar system, we may with considerable probability consider them as having originally entered our system from the interstellar spaces beyond it. Such at least must be our conclusion if we are to admit the unity of the whole class of phenomena of meteorites and falling stars. For, since the orbits of the two best-known meteoric streams, those namely of August and November, have been identified with the orbits of two comets, and since in regard to one of these (that of November) Leverrier has shown, with great probability, that as a meteoric cloud it entered and became a member of our system only some 1700 years ago in consequence of the attraction of Uranus, while the August meteoric ring only differs in this respect from it, that it had at a much more remote period found an elliptic orbit round the sun; we are constrained on the assumption with which we started to recognize also in a meteorite a visitor from the regions of remote space. And so far as it goes, the observation by Secchi that the November falling stars exhibit the magnesium lines is in harmony with this view.

It may, however, further be said, that the tendency of scientific conviction is in the direction of recognizing the collection towards and concentration in definite centres, of the matter of the Universe, as a cosmical law, rather than the opposite supposition of such centres being the sources whence matter is dispersed into space. In the meteorites that fall on our earth (certainly in considerable numbers) we have to acknowledge the evidence of a vast and perpetual movement of matter in space, about which we can only reason as part of a great feature in the Universe which we have every ground for not supposing to be confined within the limits of the solar system.

That this matter, whether intercepted or not by the planets and the sun, should to an ever-increasing amount become entangled in the web of solar and planetary attraction, and that the same operation should be collecting round other stars and in distant systems such moving "clouds" of star dust as have been treated by Schiaparelli, Leverrier, and other astronomers, or individual masses of wandering stone or iron is a necessary deduction from the view that we have assumed regarding the tendency of cosmical matter to collect towards centres. But in order to trace the previous stages of the history of any meteorite, and, in particular, to determine the conditions under which its present constitution as a rock took its origin, we have only for our guide the actual record written on the meteoric mass itself; and it is in this direction that the mineralogist is now working.

But the progress is necessarily a gradual one. We may indeed assert that the meteorites we know have, probably all of them, been originally formed under conditions from which the presence of water or of free oxygen to the amount requisite to oxidize entirely the elements present were excluded; for this is proved by the nature of the minerals constituting the meteorites and by the way in which the metallic iron is distributed through them.

And one suggestive and significant fact remains to be alluded to; the presence, namely, in some few meteorites of combinations of hydrogen and carbon, which, if met with in a terrestrial mineral, would with little hesitation be assigned to an organic origin. A few grains were exhibited to the audience of such a body, crystallized from ether, which solvent had extracted it to the amount of about 0·25 per cent. from six ounces of the Cold Bokkveldt meteorite.

Similar substances have been extracted by Wöhler, Roscoe, and other chemists from this and other meteorites. It was, however, observed, as pointing to the probability of the comparatively porous meteoric stone having in this case taken up the hydrocarbon as a substance extraneous to it (possibly when in the state of a vapour), that ether extracted it entirely from the solid lumps of the meteorite; pulverization not in any way adding to the amount obtained, or facilitating in any appreciable degree the separation of the substance.

ANALYSIS OF WOMAN'S MILK.

BY A. SCHUKOFFSKY*

The author shows that most methods employed for the analysis of milk do not give correct results, especially in the case of woman's milk.

The casein of woman's milk differs from that of other milk in that it is not curdled thoroughly (if at all) by carbonic and acetic acids. The method of precipitating the casein by magnesium sulphate also gives unsatisfactory results.

The methods in use for the estimation of fat are also imperfect, *e. g.*, those in which gypsum or chalk is added to the milk, the resulting mixture dried, and the fat extracted by exhausting with ether; the presence of fat in the residue may be indicated by the microscope. Apparently the ether is prevented from acting on the fat by the casein envelopes which surround the globules.

Hoppe-Seyler has remedied this source of error by adding caustic potash to the milk, whereby the casein is decomposed. The potash however acts on the milk-sugar, forming decomposition products, which dissolve in the ether together with the fat, and so vitiate the result.

When a sufficient quantity of ether is added to woman's milk, and the mixture is allowed to stand at rest for some days, two layers are formed—an upper one, thick and starch-like, and a lower, which is transparent. Strong alcohol (90–96 per cent.) added to this curdles it and precipitates the casein, whilst the fat floats on the top.

The author, having studied these reactions, recommends the following method for the estimation of fat in woman's milk:—20 c. c. of ether are added to 20 c. c. of the milk; the mixture is stirred, and to it 30 c. c. of strong alcohol are added. This mixture is allowed to stand for about 24 hours, in which time the milk-sugar separates in crystals on the sides of the vessel. The sugar and casein are filtered off and washed with anhydrous ether and strong alcohol; the filtrate and washings are evaporated on a water bath till free from alcohol; and the residue is again treated with ether, then allowed to evaporate spontaneously, and finally dried at 100° and weighed.—*Journal of the Chemical Society.*

* Deut. Chem. Ges. Ber., v., 75–77.

BRITISH PHARMACEUTICAL CONFERENCE.

THE SUPPER.

On Tuesday evening, August 13, the members of the British Pharmaceutical Conference were entertained at supper by the Brighton local members at Brighton, in the Banqueting Room at the Royal Pavilion. The chair was taken by Mr. W. D. SAVAGE.

The usual loyal toasts were proposed and duly honoured.

The CHAIRMAN then gave "Continued Prosperity to the Pharmaceutical Conference." He said: Gentlemen, the toast that I am now about to propose is one of especial interest, and it is one that I am sure you will drink in a bumper. We all, and especially those connected with the Pharmaceutical Conference, have heard a great deal in its praise to-day. Nothing has been said, and nothing can well be said, in dispraise of an institution that has done so much good. It is not so many years since the Conference was first projected. Certain sage individuals, some of whom are present with us to-night, shook their heads very ominously, and said that the Conference would possibly, nay, very probably do a great deal of injury to the Pharmaceutical Society. It was said that if the Conference went up, the Pharmaceutical Society would go down. What has the result been? Has the Pharmaceutical Society gone down? Has not the Conference gone up? Still these predictions had weight at one time, and that shows how important it is that we should weigh in all its bearings the consideration of a question of so much importance. We might have rested perfectly satisfied that with Dean and Hanbury and my friend Brady and others, we were in good keeping, and that the Conference would merit support. It has merited that support, and what has been the result? I have gone with it from town to town for several years, and in the various towns it has had a most beneficial local influence. Men have been brought together who never would have thought of meeting under other circumstances. As to us at Brighton, we are certainly not antagonistic. There is nothing antagonistic about us, but we are something like the two poles,—we keep very far asunder. Now, the Conference has had the desired effect of bringing us all together. I express the feeling of the Local Committee when I say that we are delighted to see so many of our friends present to-night.

Mr. BRADY, in reply, said:—

I feel it to be a very great honour to be called upon to reply to a toast like this that has been proposed by my friend the chairman, and so very kindly received by you—the toast of success to the British Pharmaceutical Conference. It is always a pleasant recollection to me that the Pharmaceutical Conference was established in my own native town; and although then as now, and on some former occasions, I have had my name associated prominently with its foundation, I have felt in a guilty sort of way that I was accepting honours that did not belong to me,—that practically I was but the bellows-blower, and I was taking the credit of the organ-player. For what was the origin of the Conference? Was not the original idea of a provincial meeting of pharmaceutists eliminated from the fertile brain of your present treasurer? Did he not first—how many years ago I scarcely know—suggest that the Pharmaceutical Society should hold a meeting annually somewhere in the provinces? Well, Sir, that idea was never acted upon, but in due time there were not wanting those who thought that it was too good to be let drop entirely; and to Mr. Reynolds, far more than to myself, and to the able executive assistance of Dr. Attfield, this Conference owes its origin. It was a mere chance that I happened then to be local secretary of the Pharmaceutical Society in Newcastle; a mere chance, I may say, that Newcastle happened to be the place that year at which the British Association held its meeting, and, therefore, I was the victim, practically, of circumstances, and no credit or the very least belonged to me. Hence I always feel to a certain extent guilty when placed in the prominent position which I have occupied through your favour in past years, and especially through your favour now, in connection with the history of the Conference. Well, sir, we met firstly at Newcastle. We had a little meeting; and it gives me great pleasure to see some here now who were present at that meeting. I see Mr. Dean, Dr. Edwards, Dr. Attfield, Mr. Reynolds, and some one or two others. Our first meeting was a very little one held in the parlour of an hotel, and we have gone on growing ever since. We grew enormously by the time we got to Bath. We went on growing till we went northward again, firstly to Birmingham, and then to Nottingham, and then to Dundee, and then to Norwich, Exeter, Liverpool, and Edinburgh, and now again here. Really I don't know what we shall grow to! When a society beginning with twenty members reaches two thousand, what may it not become in another ten years? I take it that this is simply an evidence that the views of Mr. Schacht, Mr. Reynolds, Dr. Attfield, Mr. Dean, and the rest were emphatically those which fitly met the circumstances of the case, and provided for what was a real and true and veritable want. And we are now at Brighton. We owe much to Brighton. Brighton is vindicating its claim upon the consideration of all scientific men, not only in the reception which the British Association is about to receive, not only in the splendid reception which we, the British Pharmaceutical Conference, have received, but in many other ways is Brighton showing evidence of its regard for science. You cannot look at the great aquarium which they have just built without feeling that, although there may be some slight commercial element concerned in it, there are in that aquarium the elements of what may bring about an enormous advance of science. We have but to refer to the debates in the House of Commons last week; for, was it not the Member for Brighton who brought forward certain resolutions in the House, showing how a poor ill-used man, unable to protect himself, a very sucking dove of a statesman, the present Chief Commissioner of Works, had been violently attacked and scarcely allowed his life, by a ferocious savage from the Himalayas? Was it not shown on that occasion that science was a very small thing when compared to the law? Was there not shown the superiority of forensic considerations wherever questions of the material and immaterial world were concerned? It was left for Brighton, or the Member for Brighton, to unhouse all the disastrous consequences of the savage attacks of scientific men upon statesmen in general, and the present docile and mild Chief Commissioner of Works in particular. Well, gentlemen, I trust I have said enough to vindicate the claims of Brighton to the especial consideration of scientific men; and I am quite sure that we who have occupied the whole day in education have at least been educated up to that point that we are prepared to add our testimony to the claims which Brighton has to the consideration of not only the Pharmaceutical Conference, but of science in general. I can only, sir, in conclusion, thank you most heartily on behalf of the Conference for your reception of us here to-day, for the kind way in which you have spoken of the Conference and that which pertains to it, and for the prosperity which you have wished it. I must also, on my own account, thank you for the kind way in which you have associated my name with the toast.

Mr. Brew proposed "The President and Council of the Pharmaceutical Society," and, in doing so, contrasted the smallness of the Society at its beginning with its present status. He said that there had been many difficulties to contend against, but the persevering efforts which had been made had been rewarded. Much had been done, but much still remained to be done. The interest of the Society depended upon the President and Council; and gentlemen more competent than those now occupying those positions could not be found. The President was a teacher of pharmaceutists, and many of the Council had been pupils of the Society. Though there might be differences of opinion existing in the Council, the sole aim of them all was the advantage and benefit of the Society.

Mr. Haselden, President of the Pharmaceutical Society, acknowledged the toast. He said that he did so with great pleasure, and, although many gentlemen who made after-dinner speeches said that they wished that the duty had fallen into better hands, he himself wished no such thing, for wherever he made his appearance among pharmaceutists he was always received with kindness and favour. A few years ago he became an associate of the Pharmaceutical Society, because he believed it was the right thing to do, and he then made up his mind to follow out a course which would one day, if his life were spared, place him in the presidential chair. He could not claim Bloomsbury Square as his *alma mater*, but he had, nevertheless, attended the lectures of Mr. Fownes at that place at a cost of 10*s.* 6*d.*, and he could say that he had been a student at Bloomsbury Square ever since his connection with the Society, for he never left one of the evening meetings without being a wiser if not a better man. He felt that in his long-coveted capacity of President he had many shortcomings, but he was always well received, and more than well received. At the time the Pharmaceutical Conference was first started he felt that it was a step in the right direction; and although he had some suspicion that it would take away certain papers which ought to be read at the Society, he nevertheless approved of it. It brought the country members into close association with the London members, and such an effect would promote science and promote organization. He believed that he was the first member of the Council of the Society who put his name down as a member of the Conference. He must not conclude without adverting to the kindness with which the Conference had been received at Brighton. Circumstances had prevented his attending any previous Conference, but he had said that when they came nearer to London he would attend, and he now had great pleasure in doing so. He must speak honestly and freely of the kindness which he had received on all hands in this town.

Mr. Stoddart said that he had to propose the health of the officers of the Pharmaceutical Conference. He said that the Conference had led to many friendships. Happy was the man who possessed the friendship of such men as Dr. Attfield, Mr. Benger, Mr. Schacht, and Mr. Reynolds. The success which the Pharmaceutical Conference had met with in its whole circuit was something marvellous. He joined it at Bath; and he could only say that everybody who had derived the same advantage from the companionships to which it led as he had done must be glad of having joined it. He trusted that the success would never be less than it was in the present year. The time might come when the members of the Conference would meet at Bristol. He was sure that Mr. Giles and Mr. Schacht would join with him in promising that when that happened they would try to emulate what their Brighton friends had done. In every place which the Conference had visited they had left nothing but good fellowship behind, and he should be sorry ever to see any record of their having failed to do so. He trusted they would never leave a place without leaving there some little root from which might spring some benefit to the Pharmaceutical Society of Great Britain—an institution which he venerated, and with which he was proud to be connected. He had correspondents in all parts of the world, and they all expressed cordial friendship with that organization. He most heartily proposed the toast which had been put into his hands, because he believed that the success of the Conference had been brought about by the perseverance of the gentlemen mentioned.

Dr. ATTFIELD, in responding, said that as he had told them year after year, it was with very great pleasure that he did anything in support of the Conference. He could give an illustration of the excellent effect which the Conference produced by its various meetings. When it was proposed to visit Dundee, a gentleman who knew Scotland well, said, "I hope you won't go to Dundee. I know the members of the trade there are ready to cut one another's throats. They dare not do that, but depend upon it they will do what they can to cut yours." However, the Conference went to Dundee, and on the second day an excursion was organized for the following day. The excursion took place, and by that time the chemists of Dundee had learned what a pleasant thing it was to shake hands with one another. All the chemists closed their shops on the occasion of the excursion, and spent a jolly day in the Highlands. As regarded his duties as secretary, he had many things to do which might be done by an ordinary clerk. He had no objection to perform such duties, but he believed that if a paid officer could be kept, he himself could serve the Conference more usefully by original research. He had thought that another thousand members would enable that plan to be carried out, but now his hopes had been dashed to the ground by that dreadful rise in the prices of everything, including the printing and publishing of the Year Book. The change, however, might be effected by a still greater accession to the number of members. Next year the Conference might come to some conclusion on this subject.

Mr. BENGER also returned thanks. He said that hitherto his duties had been only nominal, as no work had been sent to him to do; but it would give him the greatest satisfaction to perform any work for the Association which was placed in his hands.

Mr. SCHACHT said that his office was a post of honour devoid of all danger. He hoped that the meeting of the Conference would lead to the formation of a local association in Brighton, that town being eminently qualified for such a purpose. Young men would find the duties of local secretary to be of a most pleasant character.

Mr. REYNOLDS also joined in the acknowledgment of the toast. He said that it was a great gratification to him to know that the chairman of the evening, who had been a warm friend of the Conference from the first, represented the town of Brighton in the magnificent reception which had been accorded to them. He was quite sure that in the records of the Association no meeting would be recorded as a more complete success than the present one. They were under the greatest obligation to the gentlemen of the town.

Mr. CORNISH said that the pleasing duty devolved upon him of proposing the toast of the honorary and other officers of the Pharmaceutical Society, in conjunction with the names of Mr. T. H. Hills, and Mr. E. Bremridge. Every one must be aware that the success of such an association depended in a great measure upon the efficiency of its officers. Mr. Hills had frequently resorted to his purse for the benefit of the Society, and amongst the various treasurers none deserved higher esteem and honour. As to Mr. Bremridge, he had said when Mr. Bremridge was appointed to succeed the late Mr. Smith as secretary, that he would be the right man in the right place, and that had proved to be a right opinion. He had always had faith in the officers of the Society.

Mr. T. H. HILLS, in returning thanks, said that in coming down to Brighton he felt quite at home, for he was apprenticed at Brighton five-and-thirty years ago, and he had many pleasing associations connected with it. The Prime Minister said at the Mansion House the other day that the longer he lived the more he felt convinced that local institutions were very desirable. He (Mr. Hills) was of the same opinion; and he believed that where local institutions existed there were fewer jealousies and imaginary differences. Every town ought to have a local association, and he believed that from this day one would be established at Brighton. He also hoped that the gentlemen from various parts of the country would upon going home organize local associations in their own towns. That would be a first step towards pharmaceutical education. The Council of the Pharmaceutical Society would do all in their power to help such associations. The question of founding lectureships could then be entertained.

Mr. BREMRIDGE said that he fully appreciated the honour which had been paid him and his fellow-officers, but he felt unable to express himself in a satisfactory manner. He might say that each officer had in his department done his best *con amore* for the benefit of the Society.

Mr. R. W. GILES proposed "The Pharmaceutical Associations of America and Canada." He said that he could declare, without the slightest affectation, that he deeply regretted that he was unable to do honour to a toast which he was sure the company would wish to be presented in the best possible form. They might feel some amount of shame when they saw the brilliant examples of research and laborious work which had been performed by their brethren across the Atlantic in the path of pharmaceutical science. The feelings of the two nations were cordial and kind, and although there had been differences in the political horizon, the hearts of the people were united. He would associate with the toast the names of Professor Markoe and Professor Wayne.

Professor MARKOE said that the reception which had been given to him was quite overwhelming. His visit to England had been one of the greatest pleasures of his life. Spite of the newspapers and political hucksters, there was a hearty sympathy between the great masses of the people of the two countries of England and America. Especially was there sympathy on the subject of pharmacy. He had scarcely set foot on English soil before he received attentions of the most marked and flattering kind. Great interest was taken in pharmacy in America, and pharmacists travelled immense distances to attend conferences. The next meeting of the American Pharmaceutical Association would take place in the city of Cleveland, Ohio, in the second week in September. As a Vice-President he invited all the pharmacists in Great Britain to attend that convention, and he would assure those who might be disposed to venture so far that they would receive the heartiest possible welcome from the American pharmacists.

Dr. J. BAKER EDWARDS also responded to the toast in a short speech.

Mr. S. C. BETTY then proposed the "Pharmaceutical Press," coupling with it the name of Dr. Paul. He remarked upon the importance of the services rendered to the pharmaceutical body by the press, both in conveying information and acting the part of mentor, and expressed a belief that it would always be found of great service in assisting them to attain any object they had in view for the furtherance of pharmacy.

The toast having been responded to, the company next drank the health of the Town Council and Pavilion Committee, who had kindly placed the banqueting-room at the disposal of the local committee free of expense. The remaining toasts were "The Visitors," "The Chairman" (Mr. W. D. Savage), and "The Vice-Chairmen" (Messrs. Cornish, Brew, and Schweitzer).

The Pharmaceutical Journal.

SATURDAY AUGUST 17, 1872.

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

THE BRITISH PHARMACEUTICAL CONFERENCE.

EVERY well-wisher to the progress of pharmacy will be glad to learn that the Ninth Annual Meeting of the British Pharmaceutical Conference, which during the present week has been held in the Royal Pavilion at Brighton, has been a very successful one. Whether regard be had to the number of leading English pharmacists who attended it, the ability displayed in the papers read, the interest attached to the gorgeous building in which the meetings were held, or the splendid hospitality extended by the local pharmacists to their visitors on Tuesday evening, it may at least be said that the meeting at Brighton has not been surpassed by any previous gathering of this now eminently successful organization.

The subject of education, as might have been expected, occupied a prominent position in the business. Forming no small portion of the subject-matter of the presidential address, which is printed on another page, it was also dealt with in papers by Professor ATTFIELD, Mr. SCHWEITZER and Mr. B. S. PROCTOR, and in letters which Professor ATTFIELD had received from Mr. G. W. SANDFORD, Mr. JOHN MACKAY, Mr. GILMOUR, Mr. PETER SQUIRE and Mr. EDWARD SMITH. The reading of the above was followed by a long discussion, lasting the remainder of the day, and only terminated by the necessity for adjournment.

Professor's ATTFIELD's paper, which formed the principal topic of the discussion deprecated the present prevalence of superficial teaching, and advocated that sound education would be best guaranteed by making the examinations more thorough, and supplementing them by demanding from a candidate for the Minor certificates that he has worked for a certain time at practical pharmacy, and that he has attended certain courses of instruction in a recognized school of pharmacy.

But nothing is more remarkable in this discussion than that, with one object in view, scarcely two are agreed as to the best mode of attaining it. As was truly said by one speaker, "*Quot homines tot opiniones.*" This lends weight to the opinion that the question of Provincial Pharmaceutical Education is not yet ripe for settlement. In the meantime, each day brings us nearer to the goal, and it is probable that the real solution of the difficulty of providing Pharmaceutical Education in small towns will, in Mr. ATKINS's words, in the main be found in the slow but certain advances in technical knowledge amongst pharmaceutical employers. This is an opinion which has been before uttered in these columns, and one that is shared by many well qualified to judge. Every perfectly trained pharmaceutical student who leaves the metropolitan or any other school and commences business, himself becomes an important medium for disseminating sound pharmaceutical education.

Wednesday was devoted to the reading of several valuable papers of a more particularly technical character; in several cases the subjects of the papers were discussed with great interest, but the remaining time was too short to allow of this being done to any great extent. The papers read were, Calabrian Manna, by Mr. DANIEL HANBURY, F.R.S.; Occurrence of Manganese in Certain Drugs, by Professor FLÜCKIGER; *Succus Scapi Taraxaci*, by Mr. H. BARTON; Pill Coatings, by Mr. T. HAFFENDEN; Tinctures, by Messrs. STODDART and TUCKER; Guaiacol, by Mr. J. WILLIAMS, F.C.S.; Laboratory Notes, by Mr. EDWARD SMITH; Kamala, by Mr. T. B. GROVES, F.C.S.; New Derivatives from Morphia and Codeia, by Professor WRIGHT, D.Sc.; Orris Root, by Mr. HENRY GROVES; Tincture of Perchloride of Iron, by Mr. T. HUSTWICK; Koegood, a new Drug from South Africa, by Mr. G. A. KEYWORTH; Researches on the Constituents of Aloes, by Dr. TILDEN and Mr. RAMMELL; Notes on Green Extracts, by Mr. RICHARD W. GILES; A Cheap Disinfectant, by Mr. EDWARD C. C. STANFORD, F.C.S.

ADULTERATION OF FOOD, DRUGS, ETC., ACT.

THE Bill to prevent the adulteration of food, drink, and drugs, to which we have before alluded, has become law, with its most objectionable features removed. It will be remembered that originally the wording of Sect. 2 was so ambiguous that it was uncertain whether a man who sold an impure article in perfect innocence might not be liable to severe penalties. We have no sympathy either with the wilful adulterator or with the retailer who, for the sake of a little extra profit, buys an article so much below the market value that common sense must point to adulteration; but when we think of the terrible difficulty which a druggist finds in procuring some drugs positively pure,—notably, scammony, opium and musk,—we cannot but consider that the Deputation from the Pharmaceutical Society which waited on Lord SALISBURY did good service in inducing him to provide that the man, who knowingly and fraudulently sells adulterated articles, *and no other*, shall be deemed guilty of offence. This seems to us to be in the true spirit of English law.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

The Ninth Annual Meeting of the British Pharmaceutical Conference was commenced on Tuesday, August 13, 1872, at the Royal Pavilion, Brighton, under the Presidency of H. B. Brady, Esq., F.L.S., F.C.S. (Newcastle-on-Tyne).

After the reception of delegates, the town of Bradford, in Yorkshire, was fixed upon as the place of meeting for the year 1873.

The following report of the Executive Committee and the Treasurer's account were then read and agreed to:—

Report of the Executive Committee.

During the past year your Committee has held three meetings. On November 1st, 1871, final arrangements for the publication of the Year Book were made, and the position of the Conference in relation to towns proposed to be visited was discussed. On July 2nd, 1872, a report of the work done by the Senior Secretary and Assistant Secretary during the year was received and adopted; the financial condition of the Conference was considered, arrangements for the meeting at Brighton were made; and there was read an important letter from Thomas Hyde Hills, Esq., respecting a munificent gift of £200, to be expended for the advancement of Pharmaceutical education and research, under the direction of the Executive Committee of the British Pharmaceutical Conference. Last evening (August 12th, 1872) the Committee transacted the details of business connected with the present meeting.

The Year Book is an established success. In publishing it the Conference meet a want on the part of pharmacists for an annual *résumé* of all that is new in pharmacy; and, judging from the unanimous public and private expressions of opinion, the want is now satisfactorily supplied. With the continued assistance of the present Editor and of the Secretaries, who edit the Transactions bound up with the Year-Book, your Committee believes that in succeeding issues the high character of the volume will be maintained.

The Committee congratulates the Conference on the continued success of the annual meetings. The combined efforts of the members have extended the field of Pharmaceutical Research, and more thickly peopled it with workers, while in no way impoverishing other organizations for the ingathering of its harvests. For the means of communicating to each other and discussing the results of investigations much credit is due to the Local Committees in the towns visited. To excite in resident pharmacists interest in the objects of the Conference, assist the Secretaries to hire rooms in which to hold the meetings, and to contrive opportunities for public discussion and conversation, are the three ways in which Local Committees can effectively promote the objects of the Conference.

The financial condition of the Conference is satisfactory. From the following statement it will be seen that there is a balance in hand, and that it is about the same in amount as at the end of the previous year:—

The Treasurer in account with the British Pharmaceutical Conference, 1871–72.

Dr.

	£	s.	d.
To cash in hand, June 30, 1871	50	0	0
,, Sale of 61 Year Books by Publisher	15	5	0
,, ,, 54 ,, ,, Secretary	13	12	6
,, Advertisements in Year Book	81	8	6
,, Subscriptions from Members	473	10	9
	£633	16	9

Cr.

	£	s.	d.	£	s.	d.
By expenses connected with Year Book—						
Butler and Tanner, for printing and binding	£327	7	1			
Postage of Year Book	68	15	10			
Salary to Editor	100	0	0			
J. and A. Churchill, 25 per per cent. commission on advertisements	20	7	0			
Nutt, for Foreign Journals	9	12	6			
Advertising Year Book	2	6	0			
				528	8	5
By General Printing—						
Taylor and Co.	7	2	6			
Butler and Tanner	5	15	0			
				12	17	6
By Advertising				0	15	0
,, Directing Circulars and Correcting Proofs				3	16	9
,, Assistant-Secretary's Salary and expenses at Edinburgh				25	17	0
,, Reporting Edinburgh Meeting				2	13	6
,, Postage				17	0	0
,, Sundries				3	14	6
,, Balance				38	14	1
				£633	16	9

1872.	£	s.	d.
June 30. Cash in hand	38	14	1
Postage-stamps in hand	8	10	0
	£47	4	1

Bell and Hills' Library Fund.

	£	s.	d.
To balance in hand, June 30, 1871	31	10	0
,, Russian Bonds, received from T. H. Hills, Esq.	200	0	0
	231	10	0
By Grant for Books to Edinburgh	10	10	0
Balance in hand	£221	0	0

Examined and found correct—

H. C. Baildon, Julius Schweitzer } Auditors.

The President then delivered the following address:—

The President's Address.

It seems to have become a recognized duty of your President to open the general proceedings of the Conference by a review, from one standpoint or another, of the progress of pharmacy during his year of office; and when I look back to the addresses that have on such occasions emanated from my predecessors, I may well have misgivings of most serious nature as to my ability to follow in their footsteps without discredit to myself and disappointment to you. Happily, however, there is no necessity strictly to follow precedent, for the duty of summarizing periodically the results of pharmaceutical research, is now undertaken by one far better fitted for the task,—with larger opportunities for its right performance, and not bound by the restraints and limitations incident to a general address,—I allude to the accomplished editor of your 'Year Book.' Concerning his work I will say no more at this moment than to point to it as an explanation of my decision to speak of the present and future, rather than of the immediate past of pharmacy. And I am the more impelled to follow the course thus open to me, for alas! circumstances unforseen when I accepted the post I have the honour to hold, and altogether beyond human control, have placed it out of my power to follow closely the advance either of those branches of science which directly concern us or of the manipulative arts which enter into our daily employment. The report which you have just heard read will satisfy you, as it well may, of the flourishing condition of the Conference. Thanks to recent agitation in the pharmaceutical world, and to the feeling of safety in union engendered thereby,—to the ample return in kind members now receive for their small annual contribution,—thanks, above all, to the energy of your indefatigable secretaries,—the Conference has attained a position in point of size, influence and power for good, which was never dreamt of by those who assisted at its foundation. In so far as the general history of the Conference is concerned, I might have addressed you in terms of simple congratulation; but other questions arise, and I should have been disturbed, whilst dilating on the augmented power and importance both of our own body and of the parent society, by the lurking consciousness that, notwithstanding increased disposition to united action, somehow or other, pharmacy in this country was not so prosperous,—that its higher aspirations were not so vigorous—as the numerical strength and popularity of its representative associations might lead one to suppose. I confess, too, that I am impressed with a fear that had I in preparing my address sought for worthy material of purely scientific sort in the journals, proceedings, transactions, and the like, which have appeared since our meeting in Edinburgh a year ago, I must have relied to a far greater extent on the records of foreign than of home research. The President of the Chemical Society in a recent discourse, adverts in striking terms to the lethargy which has enveloped original chemical investigation in this country; and the words spoken, demonstrably true as to pure chemistry, might be applied with almost equal emphasis to other branches of scientific knowledge bearing on pharmacy. To judge by our publications for the past year or two, pharmaceutical energy in this country has been directed almost exclusively into two channels; firstly, the relations of pharmacy to the State, and, secondly, the more wide-spread provision of facilities for that rudimentary scientific education which recent enactments impose on the pharmacist of the future—both of them difficult, but altogether momentous questions.

It is needless to narrate the process by which the present satisfactory condition of legislation, in respect to pharmacy, has been arrived at. The patient thirty years' labour originated by a few earnest, far-sighted men, seconded, gradually perhaps and not without a safe amount of hesitation and doubt, but in the end, as the subject came to be understood, ably seconded by the body at large, and in due time supported by public opinion—has led at length to the carefully devised and thoroughly practical law which we now enjoy. In a survey of the State relations of pharmacy in the various continental countries, I know not where we should look for a broader or more satisfactory basis of legislation or one so suited to the genius of our institutions, than exists at home. The protection of the public from errors arising out of incapacity and ignorance, is, prospectively speaking (for a generation must pass before the full effect of the law is seen), as nearly complete as legal enactments can ensure, and this is effected without excessive interference with the jealously guarded rights of property or with that exercise of individual judgment which the members of an educated body may justly claim. I allow that the present educational status of pharmacy might have justified greater legislative stringency, but the very basis of the law is *improved education*, and we are, it is admitted, in that transition stage which demands provision for the future rather than the immediate present; behind us is the chaos of chance—before, the substantial guarantee of the Pharmaceutical Society that order shall reign. A Government granting the privileges of the latest Pharmacy Act, could demand no less than this guarantee for the future; respect for the circumstances of those whose means of livelihood depended on the business in which they were already engaged admitted no more. How vexatious and unprofitable any interference with what we call "vested interests" would have been, we may see from the experience of our brethren in New York. The chemists of that city, by an arbitrary police regulation, were, a year ago, compelled, old men and young to come up for examination before a Board constituted on principles that astonish Englishmen; an imposition so onerous and oppressive that pharmacists of all conditions were compelled to unite to obtain its repeal. Herein we find a sufficiently practical reply to those who look no further than the present. If I introduce another point in which circumstances have favoured us, it is only because its importance may have been too little appreciated,—I allude to the practical unity of the examining board, and the practical uniformity of the examinations for diplomas in all cases in England and Scotland. Happily we have not been beset with the complexities that have attended all attempts for the better regulation of the issue of licences in medicine; complexities depending on the rights hitherto enjoyed by a large number of historic corporations, and hitherto exercised without reference to any uniform standard. This want of recognized standard exists in the United States, not only in medical, but in pharmaceutical degrees, with an additional element of confusion in the fact, that except in one or two cities, pharmacy is under no compulsory regulation. There the diplomas, medical and pharmaceutical, of the colleges of the various States are of the same legal value (in so far as they have legal value at all), and as examination fees are a considerable source of income, other inducements must be held out where scholastic advantages are not of the highest sort to ensure full classes. Hence the prospect of a diploma on easy terms is a not unnatural counter attraction. I heard an eminent professor in a New England university lament that, owing to these causes, medicine had ceased to be a learned profession in his country. I do not wish to dwell on these considerations further than is necessary to demonstrate at the outset that the great end of recent political agitation is gained; that pharmacy is now regulated by a law affording sufficient protection to the public by the compulsory education it necessitates, giving larger privileges to those practically engaged in it, free on the one hand from the looseness of voluntary provisions, and on the other from the excessive interference and inspection in vogue in many continental States,—hence that we are in a condition in which we may turn our attention to advancement *from within* rather than to those political topics which have so exclusively occupied the thoughts of our members for the past two or three years. This may fairly be expected of us, and that it is expected I do not hesitate to say.

The address of Professor Huxley, a year or more ago, when distributing the sessional prizes at University College, will be in the recollection of most of you, especially certain passages in which he condemned Materia Medica (apart from therapeutics) as a subject of medical study—a dictum which fell like a thunderbolt in the camp of those who are doing to-day, and will do to-morrow, what they did yesterday, because they did it yesterday. The extraordinary development of some all-important divisions of medical science, notably of physiology and minute human anatomy, renders it impossible to cram into the few brief years of collegiate training a satisfactory amount of knowledge in the whole of the long list of subjects which it has been the custom to embrace in the curriculum of medical study.

It is no part of my business to discuss the relations of inorganic chemistry, materia medica, and botany, to the scheme of medical education; but words uttered in public, by a leader in science, affecting us so closely in their indirect bearing, can hardly be dismissed without a glance at the issues they involve. It is true enough, as was stated by Professor Huxley, that the standard British work on Materia Medica is a treatise *de omnibus rebus*; that, in point of fact, "materia medica" is a mere *nom de convenance* for a heterogeneous mass of facts, referable mainly to biological (chiefly botanical) and chemical science, and whether its details might not be advantageously taught in their natural places, instead of sifting them out for separate treatment, is quite open to debate. But whatever the manner of treatment, the subjects involved must be taught—if not to students in medicine and surgery, then the more certainly to students in pharmacy; and thus a double responsibility rests upon us in respect to these important sections of medical knowledge.

I hold that this utterance of Professor Huxley's contains by inference a fresh and most important recognition of the fact that the scientific attainments of the pharmaceutist must be complementary to those of the medical practitioner, separated only by that sort of line which marks all division of human labour; that, prospectively, the two avocations must be more and more dependent upon each other, the physician looking to the pharmaceutist not merely as the compounder of his prescriptions, but as to one on whom he can rely for assistance in scientific subjects closely allied to those which are his own more immediate concern.

You will ask whereto these reflections lead. In endeavouring to answer the question, I desire before all things to bear in mind that pharmacy from our point of view does not represent a fanciful experimental form of science, meet for the amateur, but primarily, a means of earning a subsistence; and I hope I shall be preserved from making a single remark inconsistent with this fundamental consideration. I trust, also, that I give due weight to the fact that pharmacy only began to assume a definite position in this country with the passing of the Pharmacy Act four years ago. Before that time whatever was done in Great Britain to advance pharmaceutical science—and much was done—was accidental rather than the result of system. It is essential that we keep the past very clearly in view in our endeavour to trace the requirements of the present.

Questions affecting the training of the rising generation of pharmaceutists, pertain to the functions of the Pharmaceutical Society rather than directly to the Conference, as do those also which concern the opportunities which exist for prosecuting pharmaceutical research. But this need not preclude their free discussion here, indeed, they force themselves upon our notice at a time like the present, when educational problems are uppermost in the public mind. The papers promised to the Conference on the former of these subjects will be received with interest, and their discussion may clear the way of some of the difficulties which, though they undoubtedly exist, are unnecessarily magnified by those who would "rest and be thankful" rather than commit themselves to any new exertion.

That the Board of Examiners of the Pharmaceutical Society is fully alive to the importance of a higher standard of preliminary education, we see frequent evidence, but its action has been very properly influenced by consideration for the position of youths who had chosen their vocation before it could be said with any certainty that their future must depend on their ability to pass examinations. But the time when leniency on this ground can be extended without discredit to the Society is rapidly drawing to a close, and an increase in the scope and stringency of the demands on youths entering the profession ought at once to receive serious attention. Neither could there be any complaint of hardship in the adoption of a higher standard if due notice were given of the intention of the Board to raise their minimum requirement. It cannot be too prominently kept in view that the Preliminary examination is not of itself pharmaceutical; that it is but the means of assurance that a youth has sufficient general knowledge to give him the best chance of pursuing the vocation he has chosen, with success to himself and with credit to the body at large. Such examination ought, therefore, to follow immediately on leaving school, so that the mind may be at liberty from the commencement of the term of pupilage for the acquirement of technical and scientific knowledge. It is no part of the duty of a principal to do the work of a schoolmaster. A youth who cannot pass a good examination in the branches of learning comprised in what is usually understood as a liberal education, is not fit to commence his apprenticeship as a pharmaceutist; and a principal who at the present time takes an apprentice without reference to his preliminary training, does a direct injury to the body at large, and performs no kindness to the youth himself. Supposing a boy has to remain a year longer at school, can that be regarded as any real hardship, or is he likely, in after life, ever to regret the slight initiatory delay? Can he possibly, in the long run, be a loser by it? I am far from asserting that our middle-class schools are what they ought to be, however much they may have been improved of recent years; but taking them as they are, it cannot be urged that there is any serious difficulty in obtaining a fair English education, together with instruction in the rudiments of Latin, French, and German. If, as Mr. Benger hinted in his suggestive paper, read before the Conference at Liverpool, our ranks are likely to be recruited from a wealthier stratum of society than hitherto, there is still less excuse for laxity and indulgence. This subject of preliminary education now needs plain speaking; it lies at the root of the whole question of the advancement of pharmacy. Without a wider and deeper foundation than is at present secured no worthy superstructure can be raised.

It appears to me that the liberty to proceed to the "Minor" examination immediately on passing the "Preliminary" is a grave mistake. We have done away with the necessity of apprenticeship, and no longer require the guarantee of practical experience and teaching that the old system of indentures afforded; *perhaps* this is as it should be, but we ought at least to be clear that sufficient time has elapsed after the youth has been able to devote his energies to pharmacy pure and simple, whether bound as an apprentice or not, to enable him to acquire, leisurely and systematically, the knowledge necessary for his technical examinations, and I do not think that an interval of three or four years is too much to insist upon, in order to secure this end.

The Minor Examination demands a moment's notice because, under the present Act, it is the Registration test. The efforts which have been made to render it thoroughly practical would receive fresh support by the adoption of the course I have ventured to suggest. The bane of all examinations is the temptation to "cram"—you will excuse the word, I know of no better—but I conceive that it is very much in the power of the examiners to render mere "cramming" almost or entirely ineffective. No candidate pretends to cram for the dispensing examination, and I speak with some experience when I say that it would be easy to make the botanical section as completely practical as the dispensing. I cannot doubt that the examination in chemistry might in the same way be supplemented by tests to which crammed knowledge would furnish no reaction.

The diploma of the Major Examination ought to be regarded very much in the same light as the Fellowship of the College of Physicians or the College of Surgeons is in their respective bodies, and the value of the degree it confers ought to be as jealously guarded. There can be no reason why the Society should be satisfied with a lower standard that that which has long been in vogue for the "Pharmacien de la Première Classe" in France.

It has been suggested by one whose opinion carries weight with it, that the occasional presence during the examinations of a non-pharmaceutical assessor—say, a scientific chemist of eminence not belonging to our own body—would be in many ways an advantage. The mere "looker-on sees most of the game," and the suggestions of an independent observer could not fail to be of service to the examiners. His criticism would diminish the tendency of the examinations to settle into particular grooves, and would help to give them a wider scope and higher significance. The moral effect would be to increase the confidence of the examiners themselves when obliged to act as their judgment rather than their will might dictate, and to support their decisions in the eyes of the public.

In these observations I know I shall not be understood to express any distrust of the Board of Examiners. My object is to strengthen their hands in the performance of laborious and thankless duties; and I gladly, from knowledge, bear testimony to the ability, and conscientious care, and self-sacrifice which are the very atmosphere of the Board-room.

There is still another subject closely connected with the foregoing, upon which I would say a few words.

I cannot regard with any satisfaction the large unused balance of income which the Pharmaceutical Society has of recent years annually funded. The day is gone by for laying up talents in napkins. A professional or business man is morally bound to put aside part of his income, so that he may rest in after life when his capacity for toil is lessened; but for a public body, no such plea will hold. So long as the Society was on a voluntary basis, and doubt might be supposed to exist as to its pecuniary stability, the executive was bound to provide against many contingencies, and our thanks are due to those who then so economically administered the funds placed in their keeping. But we are no longer beset with the dangers of that period, and beyond an investment sufficient to guarantee the means of carrying out the examining and governing functions entrusted to the Society by Government—a limit long since passed —there can be no excuse for the accumulation of wealth. These constantly recurring investments under our present circumstances represent good left undone—opportunities unaccepted. Nor in this hoarding of money instead of science is the Pharmaceutical Society true to the spirit of its founders. The Society was formed to do in a collective capacity what could not be done by individuals. The chance of recognition by the Legislature, the efficient organization of chemists as a body, the establishment of a central library and museum, are, for instance, all matters depending on the co-operation of numbers. The laboratory and lectureships may be included in the same category, but are only right objects for corporate provision, in so far as they bring what could not otherwise be obtained. But the relation of the Society to these latter departments has entirely changed, and their existence in the old form is becoming, if it has not already become, an anomaly. What they provide, as at present constituted, might even now in great measure be safely left to private enterprise. Far be it from me to underrate what the laboratory instruction and lectures at Bloomsbury Square have been to the Society. The founders saw clearly, that without giving facilities for education which did not previously exist, the establishment of examinations whilst the Society was on a voluntary basis, could meet with no general response. Now the response is certain because it is supported by compulsory powers—hence the co-existence of other schools of pharmacy with that in Bloomsbury Square.

Your excellent Treasurer makes a strong claim in behalf of organization and subsidies for local schools. Such establishments, even in the larger provincial centres, are not likely, at first, to be entirely self-supporting, any more than was that in the Metropolis thirty years ago, and the demand for assistance is nothing more than the maintenance of our first principle—that the corporate Society should help forward Pharmaceutical Education when individual effort is insufficient. The subject is one which may be safely left in the hands of those who have already given so much time and thought to it. I need not here pass any opinion on the relative merits of the various systems which have been proposed for the regulation of money-grants, and I would not willingly weaken the claim of any by my less mature suggestions. One thing, however, must be borne in mind, namely, that the very fact of requiring assistance is an evidence of weakness, and that no school can be said to exist on a permanent or satisfactory basis until it is self-supporting. We must be careful to do nothing to place further away the time when science-teaching amongst us shall be a properly remunerative occupation, and it can only become so when those who reap its benefits are content themselves to pay a remunerative price for it. There is already far too great a disposition to regard education as a thing that should be supplied for nothing, or at least that an increased amount should be obtainable without increased cost. A physician or a lawyer spends his money and time cheerfully upon his technical education, regarding the outlay as capital invested in business; and the pharmaceutist, until he does the same thing in like spirit, has not established his title to professional status or remuneration.

But there is another claim which must be made, not stronger than that which has been alluded to, but one which may well coexist without interfering with it—namely, the provision for higher training, and for scientific research of unremunerative nature. Every one here will, I am sure, support the proposition, that the larger the amount of scientific culture possessed by pharmaceutists, the higher must be the general status of the profession, and, even in a pecuniary sense, the better their position as a body. The recognition of this, to us, new field of usefulness need not imply any neglect of the duties at present recognized as pertaining to the Pharmaceutical Society. Without materially interfering with its existing functions in respect of rudimentary education, a great deal more might be done than has yet been attempted in the encouragement of higher training, and in affording facilities for original investigation. It has seemed to me that the most substantial aid which could be rendered in the direction alluded to would be the setting apart of a number of free benches in the Society's laboratory for students who, having passed the Major examination with credit, might desire to continue their studies. These should even be endowed with a small annual income, under certain conditions, if found necessary. The only primary stipulation should be that, possessing the requisite preliminary knowledge, the recipient should be ready to work for the advancement of pharmacy under the direction of the professor. The Bell Scholarships will, I know, be pointed to as an effort in the direction indicated, but these have failed materially to influence the body, firstly, from their insufficiency, and secondly, from the conditions properly associated with them. They would be more likely to answer a good purpose if they were both applied as the Junior Scholarship now is. In the present state of pharmacy we require not the stringent conditions of competitive examinations to prevent men from carrying forward their studies, but rather the open-handed liberality that will induce students to consider whether they cannot give up another session or two, before commencing business, to that higher sort of education which is not immediately remunerative. The effect of half-a-dozen or a dozen men so trained, sent out annually from Bloomsbury Square, would be to make a British school of pharmacy, the like of which has never existed; and were this carried out, the most serious difficulties in the way of provincial education would resolve themselves in a few years. It may be urged that no demand for a higher scientific culture exists; I reply, how do you know? But if it be so, the sooner you create the demand—and you will inevitably create it if you are in earnest in offering the means of supply, and have the necessary patience—the better for the interests of pharmacy and those who follow it. I do not suppose that a crop of brilliant discoveries would immediately follow the adoption of such a scheme, but we might surely calculate on additions to our knowledge of pharmaceutical subjects, such as have never emanated from the students of the metropolitan laboratory of recent years; and in any case the prestige of the Society must be increased, and the status of pharmacy correspondingly advanced. You will at least have made the laboratory something more than a forcing-house for pass-examinations.

Nor do these proposals represent new or untried modes of fostering research. The present position of Germany in the scientific world is due to nothing so much as the opportunity and encouragement afforded to young men. Laboratories for purposes of research are there open on terms that can debar no one from entering who desires to work in them. In some cases they are absolutely free, not only to Germans, but to students from other countries; and their classes composed of men engaged in similar subjects, in friendly rivalry and emulation, are the seminaries of new aspects of scientific inquiry and of fresh lines of philosophic thought. I am far from wishing to exalt our neighbours at our own expense, but we are bound to read the lessons which their success inculcates. The Pharmaceutical Society has means enough at its disposal; surely it would be better that its pride should rest on constant investments in science and intellectual wealth than in the perpetually swelling assets of its annual balance-sheet.

I have endeavoured to point out that the parent Society is the source whence we have a right to look for the provision to a great extent of *opportunity* for pharmaceutical investigation, and I must now as pointedly allude to the Pharmaceutical Conference as possessing the machinery, easily extended to meet increased requirements, for organizing and systematizing research. In its very first programme the Conference was defined as "an organization for the encouragement of pharmaceutical research," nor can it be said that the means which have been adopted from time to time in furtherance of this purpose have been altogether unsuccessful. The circulation periodically of a carefully revised list of subjects, concerning which further investigations are required, is a plan originally borrowed from the American Association, and is probably as good a means as could be devised for preventing waste of labour. The number of valuable contributions to knowledge which have resulted from suggestions contained in this annual circular, sufficiently attest its positive as well as its negative advantages. But to be entirely successful such a method requires the more general cooperation of the members than it has yet received. The duty of compiling the list ought not to be left to the very few who have hitherto, in default of general assistance, undertaken its revision, still less that of accepting and working out the subjects comprised in its queries.

The Conference too may be made serviceable in collecting information from different portions of the kingdom, and in special cases our members residing abroad might be made use of to similar ends.

In many branches of science difficulties occur in respect to publication, but herein we have no lack. If our own "Proceedings" are too tardy a medium, the Pharmaceutical Society is ready with its weekly "Journal."

Methods other than those roughly indicated for the promotion of scientific culture will, doubtless, present themselves as the subject receives the increased attention it demands. Collective thought and associated action are alike needed to attain the first step—the provision of opportunities. But there is much to do beyond merely clearing the path of external impediments. Year by year some of us have more and more to confess, that it is to younger men with increased advantages, that we must look to take the scientific position we have desired and do but see afar off; and under these circumstances, the attitude of the older to the younger is one of paramount importance. I am reminded of a passage in one of Mr. Ruskin's books containing a powerful statement upon the duties of criticism, and encouragement and guidance, which, though written of and for artists, hardly needs the alteration of a word to make it equally applicable to all who have intercourse with students in the early stages of their career. The mental condition in which right intellectual labour is accomplished is much the same whatever the object in hand; and I need scarcely apologize for quoting the paragraphs as they stand, although the introductory portion may not be exactly to our present purpose.

"What we mainly want, is a means of sufficient and unagitated employment: not holding out great prizes for which the young are to scramble; but furnishing all with adequate support, and opportunity to display such power as they possess without rejection or mortification. . . . . But a more important matter even than this of steady employment, is the kind of criticism with which you, the public, receive the works of the young men submitted to you. You may do much harm by indiscreet praise and by indiscreet blame; but remember, the chief harm is always done by blame. It stands to reason that a young man's work cannot be perfect. It *must* be more or less ignorant; it must be more or less feeble; it is likely that it may be more or less experimental, and if experimental, here and there mistaken. If, therefore, you allow yourself to launch out into sudden barking at the first faults you see, the probability is that you are abusing the youth for some defect naturally and inevitably belonging to that stage of his progress; and that you might just as rationally find fault with a child for not being as prudent as a privy councillor, or with a kitten for not being as grave as a cat. But there is one fault which you may be quite sure is unnecessary, and, therefore, a real and blamable fault: that is haste, involving negligence. Whenever you see that a young man's work is either bold or slovenly, then you may attack it firmly; sure of being right. If his work is bold, it is insolent; repress his insolence; if it is slovenly, it is indolent; spur his indolence. So long as he works in that dashing or impetuous way, the best hope for him is in your contempt: and it is only by the fact of his seeming not to seek your approbation that you may conjecture he deserves it.

"But if he does deserve it, be sure that you give it him, else you not only run a chance of driving him from the right road by want of encouragement, but you deprive yourselves of the happiest privilege you will ever have of rewarding his labour. For it is only the young who can receive much reward from men's praise: the old, when they are great, get too far beyond and above you to care what you think of them. You may urge them with sympathy, and surround them with acclamation; but they will doubt your pleasure, and despise your praise. You might have cheered them in their race through the asphodel meadows of their youth; you might have brought the proud, bright scarlet into their faces, if you had but cried once to them 'Well done,' as they dashed up to the first goal of their early ambition. But now, their pleasure is in memory, and their ambition is in heaven. They can be kind to you, but you never more can be kind to them. You may be fed with the fruit and fulness of their old age, but you were as a nipping blight to them in their blossoming, and your praise is only as the warm winds of autumn to the dying branches." *

I must now turn to matters which you will be disposed to remind me should have occupied a more prominent place in my discourse, but in reality the proceedings of the Conference for the past year seem to call for little comment. The most notable point is doubtless the publication of the second 'Year Book.' This volume, issued with commendable promptitude after the last meeting, has long

* 'Political Economy and Art,' p. 34.

been in the possession of the members; it has been freely criticized by the scientific press, both at home and abroad, and so far as I have been able to gather has been received with unanimous favour. How much of its excellence is due to the gentlemen who constitute the Committee of Publication, how much to the able Editor, it is needless to enquire—my office is rather to congratulate the Conference on being enabled by their exertions to perform so great and so permanent a service to pharmacy, and to express a sense of obligation in which every member of the body will join, to Editor and Committee alike, for the spirit with which they have entered into and carried through a laborious undertaking.

We have again to acknowledge the thoughtful liberality of one of our members who is ever ready to render material aid when the interests of pharmacy may be furthered thereby. Mr. Hills's last gift puts the Conference in possession of funded property, yielding a permanent income similar in amount to the annual instalments of his previous benefaction. To what your Executive Committee has already said in this matter I need add little. The gift has been accepted on behalf of the Conference, and with it the responsibility of its right application, conscious the while, that result rather than words would form the expression of thanks most congenial to the donor.

You will expect a few words from me on another topic of more personal nature. In fulfilment of a long-projected plan, I last year took a somewhat extended holiday in North America. The meeting of the American Pharmaceutical Association was the focus of my travels; and, as I held your commission to represent the Conference as far as circumstances might admit at the St. Louis Convention, I am in some sort bound to report the reception accorded to me on that occasion. In doing so, I need not occupy you at any great length; indeed, I can scarcely add to the little I have already said in public without going into details of greater extent than seems desirable. The hospitality of the American people towards strangers—especially towards travelling Englishmen—is universally recognized, and their desire to stand well in the hearts and esteem of our countrymen exists everywhere, so far as I could find, except in their newspapers. But it needs more than this general acknowledgment of kindly feeling to explain the sort of welcome I received amongst their pharmacists and the attention they so liberally bestowed. That I was with them as your representative may be held to account for the rest. The most hearty reciprocation of your message of good will and friendship has dwelt in my mind whilst the horizon has been clouded by the political strife engendered by clumsy diplomacy—strife which I am pursuaded has no existence, save perhaps in moments of passing irritation, in the hearts of either people.

The American Pharmaceutical Association was accepted as a model when our Conference was founded, and its proceedings, therefore, cannot be uninteresting to us.

Without legal status or recognized powers, the Association exercises a sort of moral influence throughout the country, which is of great importance where there is no control emanating from a central authority—an influence which in ethical questions can scarcely be overvalued.

An illustrative case occurred last year at St. Louis. When the credentials of the various delegates to the Convention were considered, the question was raised whether the kind of pharmaceutical instruction afforded by one of the bodies claiming to send a representative, and the nature of their examinations, were such as the Association could approve and recognize, and it was eventually decided that the delegate from the body in question (the University of Michigan) could not be admitted in an official capacity, and he was was, therefore, debarred from exercising any representative functions.

Another case showing similar care for the true interests and standing of the profession occurred a year or two ago, and will be in the recollection of many of you. An eminent pharmacist prepared and advertised largely an article which he termed "Sweet Quinine." The character of the man was sufficient to disarm suspicion, and an enormous sale for his nostrum was a practical certainty. Circumstances led to an examination of the medicine, and it was found to be a compound containing cinchonine only as an active ingredient. Neither the standing of the pharmaceutist, his activity as a member, his scientific attainments, nor his personal popularity amongst his associates could save him from expulsion. He was one whose co-operation the body could ill afford to lose, but duty to themselves and the public was paramount.

The report of the meeting at St. Louis has already been published, and those who have seen it will hold me excused from making any detailed review of the proceedings, and will be content with the record of general impressions.

Notwithstanding the enormous distances from each other of the chief American cities, the gatherings of the Association are very largely attended, and the number of members who participate actively in the business of the meetings is much greater than I anticipated, judging from our own experience; indeed the amount of scientific matter usually brought forward is such as we could not attempt to grapple with at these brief Conferences. This scientific work consists in great measure of reports on subjects selected from the annually-published list of queries, and is, therefore, directed to points concerning which information is really wanted. The papers were much more satisfactory to my mind than the discussions they evoked, though the latter often made up in spirit what they lacked in order. The custom of reporting in full, and not always very correctly, mere conversational remarks, can hardly be regarded as a happy one.

Altogether, the meeting of the Association is a larger affair than anything we attempt. The sessions extend over about four days, which are very fully occupied, the evenings being generally devoted to social gatherings in one form or other. The frequent presence of ladies at the sittings was a feature that struck me forcibly and favourably. Often when subjects of general rather than purely technical interest were under consideration, the aspect of the assembly was brightened by this absence of exclusive rule. I am sure I need not add that no interruption to the course of business was thereby caused, or that the fairer were models of attention to the sterner portion of the assembly.

The fearful disaster at Chicago, which occurred just as I was leaving America, brought to the surface the deeper seated feelings of our countrymen. The opportunity afforded to pharmaceutists in this country to express in substantial form their sympathy with those of like profession in the far West was not disregarded. Distance is no barrier when common interests are concerned—interests are never more rightly felt to be in common than when one portion of the body is under the cloud of misfortune and suffering.

And now, gentlemen, it is time I released you to attend to the real business of the meeting. In the remarks which it has seemed to me a duty to make, I have spoken with equal freedom of our own body and of the Society from which we sprung. There is no difference in the objects of the two institutions; they are and must be perfectly harmonious and complementary to each other. The particular methods open to them to attain the same end—*the advancement of pharmacy* differ considerably but only as different roads to one goal. Without the Pharmaceutical Society the Conference could never have been; with the establishment of the Conference, the best day of the Society dawned. The success of each must be the chief delight of the other. This is my defence if it be needed for the order in which I have placed my thoughts before you.

One word more. I have spoken of the Conference and its duties, of the Society and what I believe to be incumbent upon it, but let us bear in mind that Society and Conference alike are composed of members, and that no individual member of a body corporate is excused from his share of work. Let me put it rather in the words of Lord Bacon—

"I hold *every man* to be a debtor to his profession; from the which, as men of course do seek to receive countenance and profit, so ought they of duty to endeavour themselves by way of amends to be a help and ornament thereunto."

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The first General Meeting of the members of this Association was held in the Royal Pavilion at Brighton on Wednesday evening, August 14th. The following inaugural address was delivered by the new President, Dr. Carpenter, F.R.S.:—

Address.

Thirty-six years have now elapsed since at the first and (I regret to say) the only meeting of this Association held in Bristol,—which ancient city followed immediately upon our national Universities in giving it a welcome,—I enjoyed the privilege which I hold it one of the most valuable functions of these annual assemblages to bestow; that of coming into personal relation with those distinguished men whose names are to every cultivator of science as "household words," and the light of whose brilliant example, and the warmth of whose cordial encouragement are the most precious influences by which his own aspirations can be fostered and directed. Under the Presidency of the Marquis of Lansdowne, with Conybeare and Prichard as Vice-Presidents, with Vernon Harcourt as General Secretary, and John Phillips as Assistant Secretary, were gathered together Whewell and Peacock, James Forbes and Sir W. Rowan Hamilton, Murchison and Sedgwick, Buckland and De la Beche, Henslow and Daubeny, Roget, Richardson, and Edward Forbes, with many others, perhaps not less distinguished, of whom my own recollection is less vivid.

In his honoured old age, Sedgwick still retains, in the academic home of his life, all his pristine interest in whatever bears on the advance of the science he has adorned as well as enriched; and Phillips still cultivates with all his old enthusiasm the congenial soil to which he has been transplanted. But the rest,—our fathers and elder brothers,—"Where are they?" It is for us of the present generation to show that they live in our lives; to carry forward the work which they commenced; and to transmit the influence of their example to our own successors.

There is one of these great men, whose departure from among us since last we met claims a special notice, and whose life—full as it was of years and honours—we should have all desired to see prolonged for a few months, could its feebleness have been unattended with suffering. For we should all then have sympathized with Murchison, in the delight with which he would have received the intelligence of the safety of the friend in whose scientific labours and personal welfare he felt to the last the keenest interest. That this intelligence, which our own expedition for the relief of Livingstone would have obtained (we will hope) a few months later, should have been brought to us through the generosity of one, and the enterprising ability—may I not use our peculiarly English word, the "pluck"—of another of our American brethren, cannot but be a matter of national regret to us. But let us bury that regret in the common joy which both nations feel in the result; and while we give a cordial welcome to Mr. Stanley, let us glory in the prospect now opening, that England and America will co-operate in that noble object which—far more than the discovery of the sources of the Nile—our great traveller has set before himself as his true mission—the extinction of the slave trade.

At the last meeting of this Association, I had the pleasure of being able to announce that I had received from the First Lord of the Admiralty a favourable reply to a representation I had ventured to make to him, as to the importance of prosecuting on a more extended scale the course of inquiry into the physical and biological conditions of the Deep Sea, on which, with my colleagues Prof. Wyville Thomson and Mr. J. Gwyn Jeffreys, I had been engaged for the three preceding years. That for which I had asked was a circumnavigating expedition of at least three years' duration, provided with an adequate scientific staff, and with the most complete equipment that our experience could devise. The Council of the Royal Society having been led by the encouraging tenour of the answer I had received, to make a formal application to this effect, the liberal arrangements of the Government have been carried out under the advice of a scientific committee, which included representatives of this Association. Her Majesty's ship 'Challenger,' a vessel in every way suitable for the purpose, is now being fitted out at Sheerness; the command of the expedition is entrusted to Captain Nares, an officer of whose high qualifications I have myself the fullest assurance; while the scientific charge of it will be taken by my excellent friend Prof. Wyville Thomson, at whose suggestion it was that these investigations were originally commenced, and whose zeal for the efficient prosecution of them is shown by his relinquishment for a time of the important academic position he at present fills. It is anticipated that the expedition will sail in November next; and I feel sure that the good wishes of all of you go along with it.

The confident anticipation expressed by my predecessor, that for the utilization of the total eclipse of the sun then impending, our Government would "exercise the same wise liberality as heretofore in the interests of science," has been amply fulfilled. An eclipse-expedition to India was organized at the charge of the Home Government, and placed under the direction of Mr. Lockyer; the Indian Government contributed its quota to the work; and a most valuable body of results was obtained, of which, with those of the previous year, a report is now being prepared under the direction of the Council of the Astronomical Society.

It has been customary with successive occupants of this chair, distinguished as leaders in their several divisions of the noble army of science, to open the proceedings of the meetings over which they respectively presided, with a discourse on some aspect of nature in her relation to man. But I am not aware that any one of them has taken up the other side of the inquiry,—that which concerns man as the "interpreter of nature;" and I have therefore thought it not inappropriate to lead you to the consideration of the mental processes, by which are formed those fundamental conceptions of matter and force, of cause and effect, of law and order, which furnish the basis of all scientific reasoning, and constitute the *Philosophia prima* of Bacon. There is a great deal of what I cannot but regard as fallacious and misleading philosophy—"oppositions of science falsely so called"—abroad in the world at the present time. And I hope to satisfy you, that those who set up *their own conceptions* of the orderly sequence which they discern in the phenomena of nature, as fixed and determinate *laws*, by which those phenomena not only *are* within all human experience, but always *have been*, and always *must be*, invariably governed, are really guilty of the intellectual arrogance they condemn in the systems of the ancients, and place themselves in diametrical antagonism to those real philosophers, by whose comprehensive grasp and penetrating insight that order has been so far disclosed. For what love of the truth as it is in nature was ever more conspicuous, than that which Kepler displayed, in his abandonment of each of the ingenious conceptions of the planetary system which his fertile imagination had successively devised, so soon as it proved to be inconsistent with the facts disclosed by observation? In that almost admiring description of the way in which his enemy Mars, "whom he had left at home a despised captive," had "burst all the chains of the equations, and broke forth from the prisons of the tables," who does not recognise the justice of Schiller's definition of the real philosopher, as one who always loves truth better than his system? And when at last he had gained the full assurance of a success so complete that (as he says) he thought he must be dreaming, or that he had been reasoning in a circle, who does not feel the almost sublimity of the self-abnegation, with which, after attaining what was in his own estimation such a glorious reward of his life of toil, disappointment, and self-sacrifice, he abstains from claiming the applause of his contemporaries, but leaves his fame to after ages in these noble words: "The book is written; to be read either now or by posterity, I care not which. It may well wait a century for a reader, as God has waited six thousand years for an observer."

And when a yet greater than Kepler was bringing to its final issue that grandest of all scientific conceptions, long pondered over by his almost superhuman intellect,—which linked together the heavens and the earth, the planets and the sun, the primaries and their satellites, and included even the vagrant comets, in the *nexus* of universal attraction—establishing for all time the truth for whose utterance Galileo had been condemned, and giving to Kepler's laws a significance of which their author had never dreamed,—what was the meaning of that agitation which prevented the philosopher from completing his computation, and compelled him to hand it over to his friend? That it was not the thought of his own greatness, but the glimpse of the grand universal order thus revealed to his mental vision, which shook the serene and massive soul of Newton to its foundations, we have the proof in that beautiful comparison in which he likened himself to a child picking up shells on the shore of the vast ocean of truth; a comparison which will be evidence to all time at once of his true philosophy and his profound humility.

Though it is with the intellectual representation of nature which we call *science*, that we are primarily concerned, it will not be without its use to cast a glance in the first instance at the other two principal characters under which man acts as her interpreter,—those, namely, of the artist and of the poet.

The artist serves as the interpreter of nature, not when he works as the mere copyist, delineating that which he sees with his bodily eyes, and which we could see as well for ourselves; but when he endeavours to awaken within us the perception of those beauties and harmonies which his own trained sense had recognized, and thus impart to us the pleasure he had himself derived from their contemplation. As no two artists agree in the original constitution and acquired habits of their minds, all look at nature with different (mental) eyes; so that to each, *Nature is what he individually sees in her*.

The poet, again, serves as the interpreter of Nature, not so much when by skilful word-painting (whether in prose or verse) he calls up before our mental vision the picture of some actual or ideal scene, however beautiful; as when, by rendering into appropriate forms those deeper impressions made by the nature around him on the moral and emotional part of his own nature, he transfers these impressions to the corresponding part of ours. For it is the attribute of the true poet to penetrate the secret of those mysterious influences which we all unknowingly experience; and having discovered this to himself, to bring others, by the power he thus wields, into the like sympathetic relation with nature,—evoking with skilful touch the varied response of the soul's finest chords, heightening its joys, assuaging its griefs, and elevating its aspirations. Whilst then, the artist aims to picture what he *sees* in nature, it is the object of the poet to represent what he *feels* in nature; and to each true poet, *Nature is what he individually finds in her*.

The philosopher's interpretation of nature *seems* less individual than that of the artist or the poet, because it is based on facts which any one may verify, and is elaborated by reasoning processes of which all admit the validity. He looks at the universe as a vast book lying open before him, of which he has in the first place to learn the characters, then to master the language, and finally to apprehend the ideas which that language conveys. In that book there are many chapters, treating of different subjects; and as life is too short for any one man to grasp the whole, the scientific interpretation of this book comes to be the work of many intellects, differing not merely in the range but also in the character of their powers. But whilst there are "diversities of gifts," there is "the same spirit." While each takes his special direction, the general method of study is the same for all. And it is a testimony alike to the truth of that method and to the unity of nature, that there is an ever-increasing tendency towards agreement among those who use it aright;—temporary differences of interpretation being removed, sometimes by a more complete mastery of her language, sometimes by a better apprehension of her her ideas;—and lines of pursuit which had seemed entirely distinct or even widely divergent, being found to lead at last to one common goal. And it is this agreement which gives rise to the general belief—in many, to the confident assurance—that the scientific interpretation of nature represents her not merely as she *seems*, but as she *really is*.

When, however, we carefully examine the foundation of that assurance, we find reason to distrust its security; for it can be shown to be no less true of the scientific conception of nature, than it is of the artistic or the poetic, that it is *a representation framed by the mind itself* out of the materials supplied by the impressions which external objects make upon the senses; so that to each man of science, *Nature is what he individually believes her to be*. And that belief will rest on very different bases, and will have very unequal values, in different departments of science. Thus in what are commonly known as the "exact" sciences, of which astronomy may be taken as the type, the data afforded by precise methods of observation can be made the basis of reasoning, in every step of which the mathematician feels the fullest assurance of certainty; and the final deduction is justified either by its conformity to known or ascertainable facts,—as when Kepler determined the elliptic orbit of Mars; or by the fulfilment of the predictions it has sanctioned,—as in the occurrence of an eclipse or an occultation at the precise moment specified many years previously; or, still more emphatically, by the actual discovery of phenomena till then unrecognized,—as when the perturbations of the planets, shown by Newton to be the necessary results of their mutual attraction, were proved by observation to have a real existence; or as when the unknown disturber of Uranus was found in the place assigned to him by the computations of Adams and Le Verrier.

We are accustomed, and I think most rightly, to speak of these achievements as triumphs of the human intellect. But the very phase implies that the work is done by mental agency; and the coincidence of its results with the facts of observation is far from proving the intellectual process to have been correct. For we learn from the honest confessions of Kepler, that he was led to the discovery of the elliptic orbit of Mars by a series of happy accidents, which turned his erroneous guesses into the right direction; and to that of the passage of the Radius Vector over *equal areas in equal times*, by the notion of a whirling force emanating from the sun, which we now regard as an entirely wrong conception of the cause of orbital revolution.* It should always be remembered, moreover, that the Ptolemaic system of astronomy, with all its cumbrous ideal mechanism of "centric and excentric, cycle and epicycle, orb in orb," did intellectually represent all that the astronomer, prior to the invention of the telescope, could see from his actual standpoint, the earth, with an accuracy which was proved by the fulfilment of his anticipations. And in that last and most memorable prediction which has given an imperishable fame to our two illustrious contemporaries, the inadequacy of the basis afforded by actual observation of the purturbations of Uranus, required that it should be supplemented by an assumption of the probable distance of the disturbing planet beyond, which has been shown by subsequent observation to have been only an approximation to the truth.

Even in this most exact of sciences, therefore, we cannot proceed a step without translating the actual phenomena of nature into intellectual representations of those phenomena; and it is because the Newtonian conception is not only the most simple, but it is also, up to the extent of our present knowledge, *universal* in its conformity to the facts of observation, that we accept it as the only scheme of the universe yet promulgated, which satisfies our intellectual requirements.

When, under the reign of the Ptolemaic system, any new inequality was discovered in the motion of a planet, a new wheel had to be added to the ideal mechanism,—as Ptolemy said, "to save appearances." If it should prove, a century hence, that the motion of Neptune himself is disturbed by some other attraction than that exerted by the interior planets, we should confidently expect that not an *ideal* but a *real* cause for that disturbance will be found in the existence of another planet beyond. But I trust that I have now made it evident to you, that this confident expectation is not justified by any absolute necessity of Nature, but arises entirely out of *our belief* in her uniformity; and into the grounds of this and other primary beliefs, which serve as the foundation of all scientific reasoning, we shall presently inquire.

There is another class of cases, in which an equal certainty is generally claimed for conclusions that seem to flow immediately from observed facts, though really evolved by intellectual processes; the apparent simplicity and directness of those processes either causing them to be entirely overlooked, or veiling the assumptions on which they are based. Thus Mr. Lockyer speaks as confidently of the sun's chromosphere of incandescent Hydrogen, and of the local outbursts which cause it to send forth projections tens of thousands of miles high, as if he had been able to capture a flask of this gas, and had generated water by causing it to unite with oxygen. Yet this confidence is entirely based on the assumption, that a certain line which is seen in the spectrum of a hydrogen flame, *means* hydrogen also when seen in the spectrum of the sun's chromosphere; and high as is the probability of that assumption, it cannot be regarded as a demonstrated certainty, since it is by no means inconceivable that the same line *might* be produced by *some other* substance at present unknown. And so when Dr. Huggins deduces from the different relative positions of certain lines in the spectra of different stars, that these stars are moving from or towards us in space, his admirable train of reasoning is based on the assumption that these lines have *the same meaning*—that is, that they *represent the same elements*—in every luminary. That assumption, like the preceding, may be regarded as possessing a sufficiently high probability to justify the reasoning based upon it; more especially since, by the other researches of that excellent observer, the same chemical elements have been detected as vapours in those filmy cloudlets which seem to be stars in an early stage of consolidation. But when Frankland and Lockyer, seeing in the spectrum of the yellow Solar prominences a certain bright line not identifiable with that of any known Terrestrial flame, attribute this to a hypothetical new substance which they propose to call Helium, it is obvious that their assumption rests on a far less secure foundation; until it shall have received that verification, which, in the case of Mr Crookes's researches on Thallium, was afforded by the actual discovery of the new metal, whose presence had been indicated to him by a line in the spectrum not attributable to any substance then known.

In a large number of other cases, moreover, our scientific interpretations are clearly matters of *judgment*; and this is eminently a *personal act*, the value of its results depending in each case upon the qualifications of the *individual* for arriving at a correct decision. The surest of such judgments are those dictated by what we term "Common Sense," as to matters on which there seems no room for difference of opinion, because every sane person comes to the same conclusion, although he may be able to give no other reason for it than that it appears to him "self-evident." Thus while philosophers have raised a thick cloud of dust in the discussion of the basis of our belief in the existence of a world external to ourselves,—of the Non Ego, as distinct from the Ego,—and while every logician claims to have found some flaw in the proof advanced by every other,—the common sense of mankind has arrived at a decision that is practically worth all the arguments of all the philosophers who have fought again and again over this battle ground. And I think it can be shown that the trustworthiness of this common sense decision arises from its dependence, not on any one set of experiences, but upon *our unconscious co-ordination of the whole aggregate of our experiences*,—not on the conclusiveness of any one train of reasoning, but on *the convergence of all our lines of thought towards this one centre*.

Now this "Common Sense," disciplined and enlarged by appropriate culture, becomes one of our most valuable instruments of scientific inquiry; affording in many instances the best, and sometimes the only, basis for a rational conclusion. Let us take as a typical case, in which no special knowledge is required, what we are accustomed to call the "flint implements" of the Abbeville and Amiens gravel-beds. No logical proof can be adduced that the peculiar shapes of these flints were given to them by human hands; but does any unprejudiced person now doubt it? The evidence of *design*, to which, after an examination of one or two such specimens, we should only be justified in attaching a probable value, derives an irresistible cogency from accumulation. On the other hand, the improbability that these flints acquired their peculiar shape by *accident*, becomes to our minds greater and greater as more and more such specimens are found; until at last this hypothesis, although it cannot be directly disproved, is felt to be almost inconceivable, except by minds previously "possessed" by the "dominant idea" of the modern origin of man. And thus what was in the first instance a matter of discussion, has now become one of those "self-evident" propositions, which claim the unhesitating assent of all whose opinion on the subject is entitled to the least weight.

We proceed upwards, however, from such questions as the common sense of mankind generally is competent to decide, to those in which special knowledge is required to give value to the judgment; and thus the interpretation of Nature by the use of that faculty comes to be more and more *individual*; things being perfectly "self-evident" to men of special culture, which ordinary men, or men whose training has lain in a

* See Drinkwater's 'Life of Kepler,' in the Library of Useful Knowledge, pp. 26-35.

different direction, do not apprehend as such. Of all departments of science, geology seems to me to be the one that most depends on this specially-trained "common sense;" which brings as it were into one focus the light afforded by a great variety of studies,—physical and chemical, geographical and biological; and throws it on the pages of that Great Stone Book, on which the past history of our globe is recorded. And whilst astronomy is of all sciences that which may be considered as most nearly representing Nature as she really is, Geology is that which most completely represents her as seen through the medium of the interpreting mind; the meaning of the phenomena that constitute its data being in almost every instance open to question, and the judgments passed upon the same facts being often different according to the qualifications of the several judges. No one who has even a general acquaintance with the history of this department of science, can fail to see that the geology of each epoch has been the reflection of the minds by which its study was then directed; and that its true progress dates from the time when that "common sense" method of interpretation came to be *generally* adopted, which consists in seeking the explanation of past changes in the Forces at present in operation, instead of invoking the aid of extraordinary and mysterious agencies, as the older geologists were wont to do, whenever they wanted——like the Ptolemaic astronomers—"to save appearances." The whole tendency of the ever-widening range of modern geological inquiry has been to show how little reliance can be placed upon the so-called "Laws" of Stratigraphical and Palæontological succession, and how much allowance has to be made for local conditions. So that while the astronomer is constantly enabled to point to the fulfilment of his predictions as an evidence of the correctness of his method, the geologist is almost entirely destitute of any such means of verification. For th e value of any prediction that he may hazard—as in regard to the existence or non-existence of coal in any given area,—depends not only upon the truth of the general doctrines of geology in regard to the succession of stratified deposits, but still more upon the detailed knowledge which he may have acquired of the distribution of those deposits in the particular locality. Hence no reasonably-judging man would discredit either the general doctrines or the methods of geology, because the prediction proves untrue in such a case as that now about to be brought in this neighbourhood to the trial of experience.

We have thus considered man's function as the scientific interpreter of nature in two departments of natural knowledge; one of which affords an example of the strictest, and the other of the freest method, which man can employ in constructing his intellectual representation of the universe. And as it would be found that in the study of all other departments the same methods are used, either separately or in combination, we may pass at once to the other side of our inquiry,—namely, the origin of those primary beliefs which constitute the groundwork of all scientific reasoning.

The whole fabric of geometry rests upon certain axioms which every one accepts as true, but of which it is necessary that the truth should be *assumed*, because they are incapable of demonstration. So, too, the deliverances of our "common sense" derive their trustworthiness from what we consider the "self-evidence" of the propositions affirmed.

This inquiry brings us face to face with one of the great philosophical problems of our day, which has been discussed by logicians and metaphysicians of the very highest ability as leaders of opposing schools, with the one result of showing how much can be said on each side. By the *intuitionalists* it is asserted that the tendency to form these primary beliefs is inborn in man, an original part of his mental organization; so that they grow up spontaneously in his mind as its faculties are gradually unfolded and developed, requiring no other experience for their genesis, than that which suffices to call these faculties into exercise. But by the advocates of the doctrine which regards *experience* as the basis of all our knowledge, it is maintained that the primary beliefs of each individual are nothing else than generalizations which he forms of such experiences as he has either himself acquired or has consciously learned from others; and they deny that there is any original or intuitive tendency to the formation of such beliefs, beyond that which consists in the power of retaining and generalizing experiences.

I have not introduced this subject with any idea of placing before you even a summary of the ingenious arguments by which these opposing doctrines have been respectively supported; nor should I have touched on the question at all, if I did not believe that a means of reconcilement between them can be found in the idea, that *the intellectual intuitions of any one generation are the embodied experiences of the previous race*. For, as it appears to me, there has been a progressive improvement in the *thinking power* of man; every product of the culture which has preceded serving to prepare the soil for yet more abundant harvests in the future.

Now, as there can be no doubt of the hereditary transmission in man of acquired constitutional peculiarities, which manifest themselves alike in tendencies to bodily and to mental disease, so it seems equally certain that *acquired mental habitudes* often impress themselves on his organization, with sufficient force and permanence to occasion their transmission to the offspring as *tendencies to similar modes of thought*. And thus, while all admit that *knowledge* cannot thus descend from one generation to another, an increased *aptitude* for the acquirement, either of knowledge generally, or of some particular kind of it, may be thus inherited. These tendencies and aptitudes will acquire additional strength, expansion, and permanence, in each new generation, from their habitual exercise upon the materials supplied by a continually enlarged experience; and thus the *acquired* habitudes produced by the intellectual culture of ages, will become a "second nature" to every one who inherits them.*

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* I am glad to be able to append the following extract from a letter which Mr. John Mill, the great master of the experiential school, was good enough to write to me a few months since, with reference to the attempt I had made to place "common sense" upon this basis ('Contemporary Review,' Feb. 1872):—"When states of mind in no respect innate or instinctive have been frequently repeated, the mind acquires, as is proved by the power of habit, a greatly increased facility of passing into those states; and this increased facility must be owing to some change of a physical character in the organic action of the brain. There is also considerable evidence that such acquired facilities of passing into certain modes of cerebral action can in many cases be transmitted, more or less completely, by inheritance. The limits of this power of transmission, and the conditions on which it depends, are a subject now fairly before the scientific world; and we shall doubtless in time know much more about them than we do now. But so far as my imperfect knowledge of the subject qualifies me to have an opinion, I take much the same view of it that you do, at least in principle."

The following journals have been received:—The 'British Medical Journal,' August 10; the 'Medical Times and Gazette,' August 10; the 'Lancet,' August 10; the 'Medical Press and Circular,' August 10; 'Nature,' August 10; the 'Chemical News,' August 10; 'English Mechanic,' August 10; 'Gardeners''s Chronicle,' August 10; the 'Grocer,' August 10; the 'Journal of the Society of Arts,' August 10; 'Grocery News,' August 10; 'British Journal of Dental Science' for August; the 'Milk Journal' for August; Longman's Notes on Books' for July 31; 'Florist and Pomologist' for August; 'Practitioner' for August; 'Educational Times' for August; 'Food, Water, and Air' for August; the 'Doctor' for August.

Correspondence.

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

Provincial Education.

Sir,—It is with no small amount of hesitation that I enter the lists on this question, knowing full well that it will receive thorough discussion at Brighton during the week. And I verily think that had not two of your last week's correspondents made certain statements in their letters, I should have been more than content to have held my peace upon the matter.

For my own part, while fully recognizing the great importance of provincial education, I trust that the Council will not during the present financial year adopt any resolution for the furtherance of any scheme whatever. The subject is not yet ripe for settlement. Let the suggestion which has so frequently appeared in the pages of your Journal, and which is now adopted by Dr. Greenhow in his able report, be carried out, namely, that it shall be compulsory for every youth to pass the "Preliminary" previous to his apprenticeship; then we should obtain a revolution in provincial education, and one of a much more satisfactory and permanent character than that revolution which Mr. Pickering so eloquently advocates, and so complacently contemplates in his quixotic and impracticable details. After the lapse of a few years it would then be quite time enough to consider what further was necessary, should the "individual effort" of the educated apprentice of that period be not found sufficient. My firm opinion is that the scheme of Mr. Schacht, admirable as it is in theory, will fail in practice.

One of the strongest reasons for provincial education, however, is the assistance of those apprentices whose parents have not means sufficient to allow such apprentices to pursue their studies at Bloomsbury. To Mr. Schacht I would wish to convey my warmest thanks for having in his scheme so considered the requirements of that class. Such suggestions can only emanate from a cultivated mind and a generous heart, and contrast mightily with the narrowness of the ideas expressed by a 'Country Major Associate.' The latter gentleman is evidently one of those who, in their advocacy of certain crude notions of professional status, labour under the dismal hallucination that we are a profession, and that the public ought to see it. I wish that such as he could be made to see that we are rendered a laughing stock to our professional brethren by the presumption and ignorance displayed in such correspondence as he has indulged in. But 'Country Major Associate,' carries his views even beyond many of his compeers. He has such high and mighty notions of what he calls our "responsible profession" as to contemplate with virtuous horror the admission of the sons of policemen, ostlers, etc., within the pale of the fold of the disciples of the late lamented Jacob Bell, and fears the disturbing influence of such an accession upon the manes of our noble founder. I have yet to learn that pharmaceutical aptitude and commercial honour and integrity are to be sought for and found only within a certain social line of demarcation, the limits of which 'Country Major Associate,' in his own peculiar wisdom, is alone to define. After this it will scarcely surprise me to see added to our already strange advertisements, which specify stature and gentility, "pedigree required, respectability of collateral relatives absolutely necessary, any connection with sweeps most undesirable."

Mr. Atkinson Pickering, with wonderful pertinacity, gives us further valuable information. Mr. Pickering must be aware that the country cannot be composed of Kingston-upon-Hulls. He must also possibly be aware that there are certain towns in the United Kingdom whose populations are exceedingly limited, but where, nevertheless, druggists may be found, although lectures may be unknown. I cannot comprehend, therefore, why Mr. Pickering, whose liberal notions and proffers of assistance to his benighted and uneducated country brethren are notorious, would place such a tax upon "individual effort" as to exclude young men brought up in the last named class of towns from passing the Minor and Major without certificates of attendance at Mr. Pickering's pet lectures. If Mr. Pickering's scheme should ever be adopted, I may congratulate myself as being one born out of due time, having passed my examinations without having attended lectures either in the provinces or at Bloomsbury.

A Country Pharmaceutical Chemist.

August 12th, 1872.

Plucked for the Preliminary.

Sir,—I am sure it is enough for me to tell you that I have been unsuccessful in passing the Preliminary, to gain me your sympathy. How I failed I cannot say with certainty, but I have a suspicion which I will presently disclose to you. Meanwhile, I am determined to try again, and to this end I keep my Latin fresh in my mind by constant repetition of "hic, hujus, huic, hunc, hoc," etc., until my landlady thinks I am poking fun at her; while in English I believe I have found a clue as to how many classes adverbs of time are divided into, and I am not without hope that I shall soon obtain more correct information concerning the females upon which one of the questions at the last examination turned.

But I am bad at figures; I always was, and, after recent experience, I am afraid I always shall be. Besides a natural inability to calculate, I labour under the disadvantage of having been taught an old-fashioned multiplication table commencing "twice one are two."

Knowing my deficiency, you may guess, when I read their names in the Journal two months since, how I envied those gentlemen whose peculiar skill in figures fitted them for members of the Pharmaceutical Society's Finance Committee. When, therefore, I found in the Journal last week that two of those gentlemen had been favouring the Council with some statistics, I thought—here is a chance to find out the system upon which modern arithmetic is based! One of those gentlemen having stated that there were 5029 Pharmaceutical Chemists on the Register of whom only 2051 were members of the Society, I decided, my master having a copy of the Register, to find out how modern statistics were compiled. First I counted the number of pages,—roughly speaking about 30; next I counted the number of names in each page—average about 82. Thirty-times eighty-two, then, ought to give as a result something near to 5029. But, sir, upon the old system, it would not, and I am ashamed to tell you how far out the answer was. Then I marked the list off in tens and reckoned ten tens to a hundred. Wrong again! Next I counted the names one by one, and by the old system could only make it 2492, and I confess I was fairly puzzled. Suddenly I shouted "Eureka!" (I think that is the word), for it struck me that the other gentleman's figures would throw some light upon the mystery. So as the first gentleman had said there were 12,000 chemists and druggists on the register, whilst there were only 2466 members of the Society; and the second gentleman said that not one-twentieth of the chemists and druggists were members of the Society, I multiplied 2466 by 20, by the old system, and tried to obtain an answer under 12,000. But I couldn't. So will you please give me your advice as to where I can get an arithmetic book based on the new system; or, if you cannot, please put the question in the Notes and Queries column. I want to go on for the Major, but I must get the Preliminary out of the way first, which I cannot hope to do while I am so

Perplexed.

Manchester, August 14, 1872. (?)

M.—We have no qualification for giving an answer upon the subject.

C. J. Bell.—Hydrochloric acid is undoubtedly intended.

J. L. W.—No; the Bill was withdrawn.

R. B.—Yes.

Apprentice.—Apply to the Secretary at 17, Bloomsbury Square, for a copy of a pamphlet entitled "Hints to Students."

Medicus.—Apply at Apothecaries' Hall.

Communications, Letters, etc., have been received from Mr. W. J. Williams, Mr. N. Chifney, Mr. J. R. Jackson, Mr. A. W. Gerrard, "One who has Passed," "A Man," "Machaon," "T. Snooks," C., J. L.

In consequence of the pressure upon our space, consequent upon reporting the proceedings at Brighton this week, we are compelled to defer the publication of several communications.

OLEIC ACID AND SOME OF ITS COMBINATIONS.

BY ALFRED W. GERRARD,

Dispenser and Pharmacist, Guy's Hospital.

The introduction of the oleates of mercury and morphia as remedial agents by Mr. J. Marshall, F.R.S., suggested to me the following as capable of preparation, and as having some therapeutic value:—

Mr. Frank Clowes, to whom Mr. Marshall referred the chemical question of his paper ('Lancet,' May 25th, 1872), mentions that the scales of peroxide of mercury are with difficulty soluble in oleic acid. I find this is not so if the peroxide is previously well levigated. There is no necessity, therefore, for preparing the fresh oxide for solution in the oleic acid.

The oleic acid used in the following preparations is that made at the stearine candle factories, where it occurs as a secondary product. It is contaminated with a variety of impurities the removal of which is a tedious process. It has the colour of olive oil, but a thinner consistence, and a slight tallowy odour; is soluble in all the ordinary fats and oils, alcohol and ether, but insoluble in glycerine. It forms normal and acid salts; the normal salts of the alkalies potash and soda are the soluble soaps of the pharmacopœia.

Professor Miller, in his 'Elements of Chemistry,' part 3, page 363-4, says, "Pure oleic acid, at temperatures above 57°, forms a colourless limpid oil without taste or smell; it does not redden litmus even when dissolved in alcohol; at 40° it concretes into a hard crystalline mass composed of fine needles. When solid it undergoes no change in the air, but when liquid it absorbs oxygen, rapidly acquiring a brown colour, a rancid odour, and an acid reaction upon litmus, its point of solidification gradually becoming lowered until it falls below 0° Fahrenheit."

By reason of the impurities in commercial oleic acid, I find that it cannot be made to unite with the salts used in the following preparations in equivalent proportions; it will, however, form solutions of 20 per cent., and this I have chosen as a suitable strength:—

Oleate of Lead (20 *per cent.*).

Prepared by heating together oxide of lead one part, oleic acid four parts, until dissolved; on cooling, it forms a semi-transparent tenacious mass somewhat thinner than lead plaister. This is not well adapted for direct application, but requires diluting, and as it mixes readily with ordinary fats and oils, I have adopted the following formula for its exhibition:—

Ointment of Oleate of Lead.

Take of
- Oleate of Lead (20 per cent.) 2 parts.
- Oil of Almonds . . . . 1 part.
- Prepared Lard . . . . 1 „

Mix with a gentle heat.

On cooling, this forms an elegant ointment resembling that of spermaceti.

Oleate of Zinc (20 *per cent.*).

Prepared by heating together oxide of zinc one part, oleic acid four parts, until dissolved. During the process of solution some bubbling takes place with disengagement of watery vapour. It is transparent when melted; on cooling, it has the appearance of lead plaister, is hard and friable, and requires to be diluted in the same manner as oleate of lead.

Ointment of Oleate of Zinc.

Take of
- Oleate of Zinc (20 per cent.) 2 parts.
- Oil of Almonds . . . . 1 part.
- Prepared Lard . . . . 1 „

Mix with heat.

This forms an ointment of the ordinary consistence.

Whilst experimenting with the above, I thought that if atropine and aconitine were soluble in oleic acid, they might prove useful preparations. I find they are readily so at ordinary temperatures, whilst the sulphate of atropine is soluble on the application of heat.

I have prepared solutions of the above, which nearly correspond to the ointments of the British Pharmacopœia.

Solution of Oleate of Atropine.

Take of
- Atropine . . . . . . 2 grains.
- Oleic Acid . . . . . 98 grains.

Dissolve.

Solution of Oleate of Aconitine.

Take of
- Aconitine . . . . . . 2 grains.
- Oleic Acid . . . . . 98 „

On economical grounds there can be no objection to the introduction of the oleates, as large quantities of oleic acid can be obtained at a cheap rate, but the chief consideration is whether they present any advantages as remedial agents beyond those of the same kind already in use. This is a question for the therapeutist, and must be left to the physician and surgeon to decide.

My thanks are due to Mr. A. Higgins, of the Borough, for the oleic acid used in the above experiments.

THE BATTLE OF THE DIGITALINES.*

On the 11th of May, 1867, we thus terminated one of our studies in the exhibition;—"In the glass-case of M. Dorvault two new products sparkle in microscopic tubes: crystallized menyanthine and digitaline. Again, ought we not to ask if this last alkaloid is well authenticated; if it is not rather derived from, than an active principle of, digitalis? A number of reasons lead us to believe in the improbability of this marvellous crystallization, a veritable philosopher's stone imposed on the chemists; chemical experience is indispensable to prove the fact. At all events, these discoveries are due to the intelligence and indefatigable energy of M. Nativelle."

In 1869 M. Nativelle declared that his crystallized digitaline of 1867 contained at least two-thirds of inert matter. In 1871 a new process of extraction of the crystallized digitaline, a process verified by Professor Buignet, and rewarded by a great prize of the Academy of Medicine, gave to M. Nativelle the success and recompense due to his incomparable diligence as a manipulator. In May, 1872, as a consequence

* From La France Médicale, July 27.

of the contradictory communications of MM. Marotte and Gubler, the Academy, on the motion of M. Boudet, as organ of the Society of Pharmacy, appointed a commission to inquire into the therapeutical value of the different digitalines. Amongst clinical physicians some were for the digitaline of the Codex, others for the crystallized digitaline of Nativelle and others again for the old preparations of digitalis.

M. Roucher, the learned military pharmaceutist, cleared up the difficulty, or rather perhaps made it more complicated, by assigning a complex composition to digitalines crystallized or amorphous, and by ascertaining physiologically the identity of action of the crystallized digitaline and that of the Codex.

In the midst of these varieties of studies, opinions, actions, affirmations and negations, a young and ingenious chemist, Dr. Blaquart brought to the School of Medicine, in a thesis which was brilliantly supported in spite of a hostile and irritating opposition, a mass of new facts on this much-controverted question of digitaline. This thesis (a critical study on digitaline, from a chemical and physiological point of view) is an original work in its important details, and is enhanced by the clearness and neatness of its style.

The treatise is divided into preface, history of the extraction of digitaline, the discovery of pure crystallized digitaline in ordinary digitaline, its extraction, analysis of ordinary digitaline, results that arise from the analysis of common digitaline, examination of the process of M. Nativelle, the gain of crystallized digitaline to chemical science, physiological review, comparison of the relative activities of different digitalines, experiments with hogs, guinea-pigs, rabbits, toads and sparrows; the solubility of various digitalines in gastric juice, an examination into the physiological activity of other product besides digitaline, extracts of *brute* digitaline and conclusion. This table of contents shows that it is not an ordinary thesis, and that it should be justly celebrated amongst the scientific treatises on digitaline. We would like to make many extracts, but space forbids; we will therefore content ourselves with giving his conclusions:—

"Crystallized digitaline exists in the ordinary digitaline, and we have well ascertained its presence by isolating it in a state of purity. We estimate that it is to be found in the proportion of 10 to 12 per cent., and it has been possible for us to extract almost the half of this quantity. Consequently we deny the assertion that 'the means hitherto employed for the preparation of digitaline do not allow of finding a trace of crystallized digitaline.' The mode of operation that we have followed, and which in no way resembles that of M. Nativelle, is too long and too difficult to even dream of applying to therapeutical uses.

"Ordinary digitaline is a complex product; we propose to give it henceforth the name of *brute* digitaline. By obtaining successive eliminations by means of solvents devoid of chemical action (so that the objection cannot hold that these substances are the products of metamorphoses), we have extracted the following substances:—Crystallized digitaline, amorphous digitaline (which is in the most dominant proportion), digitinose, digitoleic acid, chloride of sodium, acetate of potash, and a red syrupy liquid, which is without doubt complex, and contains sugar.

"As chloroform dissolves neither the acetate of potash, nor common salt, it is supposed that digitaline, purified by this menstruum, is increased in activity. We have found two digitalines, distinct from one another, but the one probably derived from the other, viz. amorphous and crystallized digitaline. The digitaline prepared after the method of the Codex, namely, that which has been purified by chloroform, is not neutral, as has always been hitherto said, but very noticeably acid to litmus paper. The method of M. Nativelle for extracting the crystallized principle of digitalis (that which he described in the report of the commission for the Orfila prize) gave us so much difficulty that we were soon convinced that this mode of operation was not susceptible of practical application; other chemists of greater authority, who have themselves encountered the same difficulties, are of the same opinion. M. Nativelle changed the name of ordinary digitaline to digitaléine. In reality there is no reason for this name, the ordinary digitaline or digitaleine, they being both the same, is a complex substance. We have intimated the volatility of crystallized digitaline; M. Roucher has demonstrated it with great exactness. This property could perhaps be utilized in toxicological researches. Our only essay in this direction was fruitless, and it would be well to attempt a new experiment. Crystallized digitaline comports itself as a glucoside. Crystallized digitaline, amorphous digitaline, and the red syrupy liquid act in the same manner both on cold-blooded and warm-blooded ani-animals, and produce the same characteristic disturbances in the action of the ventricle.

"In our experiments on hogs we discovered that our crystallized digitaline showed itself a little more active than that of M. Nativelle; that amorphous digitaline, equal in action to the crystallized principle, when introduced under the skin in a dry state, produces more rapid and more energetic symptoms of poisoning than when injected in solution; and also that the digitaline of commerce differs almost insensibly from the crystallized, the difference is perhaps slightly in favour of the latter. Observations founded on experiments with guinea-pigs allow us to class our substances as follows:—The digitaline of commerce, amorphous digitaline, and crystallized digitaline. Rabbits gave us contradictory results; the advantages were divided. In our only experiment on sparrows, the digitaline of commerce was greatly excelled by the crystallized digitaline and by the amorphous digitaline, both of which manifested their action at the same time. From all these various results, we were perplexed to know how to arrive at a decided conclusion. After having seen the three substances take by turn, in our classification of their relative energies, the first and the last place, we were led to conclude that in a general way their activity differed little. Further, that the digitaline of the Codex, the crystallized principle, has no effect on toads. In experiments on frogs, digitinose and digitoleic acids have never exercised the least influence on the ventricle.

"To have been complete, our work ought to have been enriched by clinical experience, and we do not deceive ourselves that there is in this respect a great want. But the commission which the Academy of Medicine is about to appoint will not be slow to make science sure on this point. We ought also to have made a comparative examination of foreign digitalines, of the English and the German digitaline. Time was wanted for us to have undertaken this extensive task.

"If it is permitted to us to express a general opinion at the conclusion of our studies, we would say that the introduction into therapeutics of the crystallized principle of digitalis has appeared to us premature in the present state of our knowledge, and we do not hesitate to conclude with one of our learned professors, M. Bussy, that at present the best practical means of concentrating in a small space the active and efficacious properties of the plant is by the process known as that of the Codex of 1866. This process, though it does not give a definite product, and one absolutely pure from a chemical point of view, has not the less furnished to the therapeutist a preparation useful on the same grounds as numbers of officinal preparations, which seem to us to offer to the practitioner at least as great a guarantee as the employment of the tincture or the extract of digitalis. We cannot forget that in these opinions we agree with Soubeiran, Orfila, Rayer, Bouchardat, and Bouilland, opinions consecrated for more than twenty years by therapeutical science."

This thesis is a new proof of the danger of premature assertions in chemical science. Many hundreds of chemists have analysed digitaline, and have affirmed the impossibility of extracting from it a definite crystallized substance; a pharmaceutist, M. Nativelle, gives them the direct denial in attempting and realizing this impossibility; in his turn he declares—and with him and after him another learned pharmaceutist, M. Buignet—that this crystallized digitaline is extracted by treatment with alcohol to the exclusion of exhaustion by aqueous solution, and that in every digitaline hitherto prepared, including the digitaline of the Codex, not a trace of crystallized digitaline could be obtained; but all these scientific allegations vanish before the discovery of Dr. Blaquart. His crystallized digitaline is obtained from the digitaline of the Codex. In solution it is more active than that of M. Nativelle, which, according to M. Roucher, is not certainly homogeneous. Under the microscope, and in contact with reagents, the digitalines of Blaquart and Nativelle appear and act identically the same. The report of M. Buignet to the Academy is therefore weakened in one of its important assertions, viz., that alcohol at 50° is alone capable of extracting from digitalis its active crystallized principle. What becomes then of the watery infusion of leaves of digitalis, and by what magic have the doctors from all time obtained a sedative from this simple decoction? But does it signify? Contradiction has always been one of our least faults. The report of M. Buignet is again criticized by M. Blaquart on the subject of the process for extracting the crystallized digitaline of M. Nativelle. This process, followed with the most scrupulous care, and in its most minute details, did not enable Dr. Blaquart to arrive at the result so skilfully reported by the learned reporter of the Academy. Some few crystals lost in a green mass were the result of three experiments on fifteen kilograms of digitalis. This want of success on the part of Dr. Blaquart is not solitary; similar attempts have been equally unfruitful in many of the laboratories of Paris. We must, without doubt, attribute this failure to the want of a skilful *tour-de-main*. But skill aided by patience, thanks to a coming enlightenment, will, perhaps, some day bring crystals of digitaline to all chemists. Whilst waiting, the possession of some Nativelle prisms is a rare piece of fortune. We hope very soon to be able to offer them. The Academy has already obtained some, three phials of this *rara avis* were brought a short time since to the bureau, and M. Nativelle has placed them at the disposition of the medical body for experiments.

When a substance is of such easy extraction, is it not somewhat strange that a year is necessary in order that a few grammes should be prepared? However this may be, the academical report is silent on this point. Is it in the thousandth or in the ten thousandth degree that digitalis gives its crystallized alkaloid? Until more fully informed, Dr. Blaquart considers crystallized digitaline as a curiosity of the laboratory; and if it is taken into account that the digitaline of the Codex (*digitaléine* of M. Nativelle), his crystallized digitaline, that of Dr. Blaquart, the pyrodigitalic acid of Dr. Roucher are all equally coloured green by hydrochloric acid,—where shall we then find a certain characteristic to distinguish between these four poisons in granules? Is this not the weak point in the armour? Digitaline is only acceptable to the palate of the invalid hidden in sugar; it has to be previously pulverized and mixed in a syrup or a mucilage. It must therefore acquire for the legal physician, the therapeutist, and the pharmaceutist, a special character, an original reaction, so that it may be called by its right name. Otherwise there will be the confusion of the digitalines. It is true that—their physiological action, in spite of a pretended activity four times as great, being identical (to within the difference of a few contractions of the heart)—after the numerous experiments of Blaquart and Roucher, there is reason, with M. Bussy, to hold to the digitaline of the Codex until a new discovery, and to ask, with Professor Gubler, what use can a crystallization have in a medicament of which it weakens more than it increases the action. Will not all these chemical conflicts concerning digitaline result in leading many practitioners to the galenic preparations of this plant, and at first to its leaves freshly pulverized? For, besides throwing doubts into the minds of the medical body, it is rendered more and more impossible for the pharmaceutist to do the work of his ten fingers. Alkaloids cannot be produced except on a large scale; and if year after all the materia medica is to be transformed into very poisonous but beautiful little crystals, and if for every poison crystals of many kinds must be obtained, the great chemists would become artists in poison, and the pharmaceutists their humble intermediaries. All this detracts nothing from the honour due to M. Nativelle, whose great power as an analyst is the admiration of our laboratories. If among the numbers of modern chemists he holds, and has held for many years, a place above the ordinary level, if he has consecrated his long career by a discovery justly acknowledged, the merit is not less for a young doctor who, led by the good tradition of his first master in chemistry, M. Jacquelain of the Central School, has himself alone elucidated the question of the digitaline of the Codex, by retaining it, contrary to all the assertions and all the experiments of the chemists, including even M. Nativelle, as the crystallized digitaline.

This is the principal object of the thesis of Dr. Blaquart, and it must be read to know all the interesting points of the study of digitaline, now made by him as clear as day.

NOTE ON CYSTINE.

BY JAMES DEWAR.*

The following observations on Cystine are a continuation of those formerly communicated to the Society by Dr. Arthur Gamgee and myself, during the course of the session 1869–70, and reprinted with addition in the 'Journal of Anatomy and Physiology' for that year; and although really little of a novel nature to present to the society, still it is necessary to show some additional facts have been observed tending towards the synthesis of this interesting substance.

The most important fact ascertained with regard to the chemical relation of cystine in the memoir referred to was the production of pyruvic acid, when it was treated with nitrous acid. In this reaction the amido residue was not alone eliminated, the sulphur also separating as sulphuric acid, however carefully the experiment was performed. The fear of allowing the action to proceed too far, on the necessary small quantity of substance operated upon, prevented us from purifying the product thoroughly, and consequently, the analysis differed slightly from that of pure pyruvic acid. We had no hesitation in saying, however, the acid agreed better with the chemical characters of the syrupy modification of pyruvic acid than with that of Wischelhaus's carbacet oxylic acid, that we had anticipated would be produced, and that in all probability cystine would be found to be an amido-sulpho pyruvic.

If cystine is directly related to pyruvic acid, it must contain five instead of seven hydrogen atoms (and this supposition agrees well with the published analysis). The formula of the compound will then be, $C_3H_5NO_2S$. On this supposition, we may derive from pyruvic acid at least five isomers, that will all have the general characters of cystine, although there are many other possible constitutional formulæ.

Pyruvic Acid.	1.	2.
CH_3	CH_2NH_2	CH_2NH_2
CO	CO	CO
CO.OH	CO.SH	CSOH

3.	4.	5.
$CH_2(NH_2)$	$CH\begin{matrix}NH_2\\SH\end{matrix}$	CHS
CS	CO	$C\begin{matrix}NH_2\\H\end{matrix}$
CO.OH	CO.OH	CO.OH

Of the five possible cystines formulated, it is impossible to select that of the natural substance, because of our ignorance of the intermediate sulpho-acid. All attempts to replace the amido group alone by the action of nitrous acid having failed, I have tried several experiments, with the object of replacing the sulphur alone, with the small quantity of cystine at my disposal.

If cystine is one of the above five substances, the replacement of the sulphur by hydrogen will generate very different bodies. Theory enables us to predict that, in the case of bodies having the constitutional formulæ of No. (5), we ought to obtain alanine. In that of (3) (β) alanine, and in that of (4) amido-lactic acid (serine), and in that of (2) amido-glycerine; whereas it is difficult to imagine the sulphur in (1) being replaced. A successful experiment in this direction ought to restrict the selection to two possible constitutional formulæ in the worst case, and synthetical processes might then be attempted. It was formerly observed that nascent hydrogen generated in an acid solution, readily liberated sulphuretted hydrogen, and might be used as a test for this substance. The action goes on, however, very slowly, and it was found extremely difficult to get anything like the theoretical quantity of sulphur evolved. With this experience, sodium amalgam suggested itself as being more powerful, and equally likely to act. When cystine is dissolved in caustic soda, and sodium amalgam added, in a few minutes it is easy to detect the presence of a sulphide by the nitro-prusside test. The action was allowed to proceed for several days, being occasionally rendered acid by the addition of hydrochloric acid, and the amalgam renewed. Ultimately the alkaline solution, after being neutralized with hydrochloric acid, was evaporated and treated with boiling alcohol to separate the chloride of sodium, and to dissolve any hydrochlorate of alanine that might be formed. After the filtrate was evaporated the residue still contained sulphur, from the presence of hydrochlorate of cystine. This was separated by treating with water, and the filtrate was boiled with oxide of lead, treated afterwards with sulphuretted hydrogen to precipitate the dissolved lead, and evaporated. The residue was then heated to 200°C. in a tube, with the object of subliming the alanine. No crystalline sublimate was observed; it is probable, therefore, that substances of the constitutional formulæ of 5 do not express the constitution of normal cystine. This result is subject to a certain amount of reservation, from the difficulty of separating a small quantity of substance from a very large amount of secondary material accumulated in the course of the experiment. The battery is far better adapted to give a supply of nascent hydrogen in this case; and an experiment made in this way looks promising, if sufficient material was to be had.

The small quantity of substance left I have employed for the purpose of corroborating the production of pyruvic acid, when it is treated with hydrate of baryta.

Took a decigramme of cystine, treated it in a tube with a solution of hydrate of baryta, and heated it all night to a temperature of 130° C., opened it, and transferred contents to a beaker, boiled to expel the ammonia produced, then added an exactly equivalent quantity of sulphuric acid, filtered from the sulphate of baryta; after boiling to expel the sulphuretted hydrogen, the filtrate evaporated contained a yellowy syrupy acid, which contained a few crystals under the microscope, having the appearance of Finck's uvitic acid. Ammonia was added, and gave a yellow solution, which was evaporated on the water-bath; it was dissolved in water, and gave a white precipitate, with nitrate of silver, which was not distinctly crystalline; it also gave a white precipitate with subnitrate of mercury, and a red colour with a crystal of sulphate of iron, and no precipitate with sulphate of copper. The barium salt was also found to be non-crystalline, the acid lost the power of giving a red colour with ferric salts after treatment with sodium amalgam, and the composition of the silver salt agreed better with pyruvic acid than formerly.

Considerable progress has been made in an examination of the chemical characters and relations of the thio-peruvic acids. Normal thio-peruvic acid has been obtained from the di-chlorpropionic ether. When this ether is treated with excess of alcoholic sulphide of potassium, we obtain at once a precipitate of chloride of potassium and a solution of the potash salt of the new acid. When this is diluted with water, acidulated with sulphuric acid, and shaken up with ether, the acid is obtained in yellow crystalline plates, part of it seems to remain a viscid fluid. The lead and silver salts are white and insoluble, blacken when heated. It precipitates mercurous salts, black from the first. The calcium, barium, iron, cadmium, and copper salts are all soluble. The potassium and sodium salts are intensely yellow, and decompose slightly on exposure to the air. When treated with tin and sulphuric acid, they evolve sulphuretted hydrogen.

The thio-carboxyl pyruvic acid has not yet been obtained in a pure state. When pyruvic acid is treated with pentasulphide of phosphorus, a violent action takes place, associated with much frothing; and when the product is distilled, a large mass of carbon is left in the retort, and a very small quantity of distillate is obtained. It is probable that chloro-pyruvil, when treated with sulphide of potassium, will give a more satisfactory yield. It is the author's intention to make a careful comparison

* Read before the Royal Society of Edinburgh, February 5.

of these two acids, and to transform them into amido-acids, with the object of making an artificial cystine; and the results arrived at will shortly be communicated to the Society.

TINCTURE OF FERRIC CHLORIDE.

BY R. ROTHER.

The numerous vital objections to the officinal process induced the writer to supplant the nitric acid of the formula by the use of potassium chlorate. This alteration removed one of the most disagreeable and unsatisfactory agents ever associated with this preparation. The uncertain action of nitric acid, together with its various other defects in this connection, becomes more thoroughly apparent when compared with the unqualified success attending the action of potassium chlorate.

In the attempt to remedy the defective method of dissolving the iron, the writer resorted to the use of sodium chloride by double decomposition with a mixture of ferric sulphate and chloride and the interposition of alcohol; then to the employment of ferrous sulphate and calcium chloride; after this the trial by double decomposition between ferrous sulphate and sodium chloride in presence of alcohol was made.

Now when atomic proportions of ferrous sulphate, sodium chloride, chlorhydric acid and potassium chlorate are mixed, with a view to obtain ferric chloride and sodium sulphate, and the mixture is then treated with alcohol, a yellowish red solution and a yellowish granular precipitate are obtained. The solution will most usually contain only two-thirds of the intended amount of ferric chloride, whilst the remaining one-third of the iron is carried down with the sodium sulphate in a peculiar state of combination, probably as basic sulphate or oxy-chloride. By washing the precipitate with water most of the sodium sulphate, together with some iron, are dissolved, but most of the iron remains in the residue insoluble in chlorhydric acid. By the above reaction it seems very probable that only two-thirds of the ferric sulphate is decomposed by the sodium chloride.

The trial with calcium chloride is very satisfactory in regard to completeness of decomposition, the only drawback is the bulky nature of the calcium sulphate, which must be carefully washed to secure the whole of the iron. This is attained by pressing the hot mixture through muslin; the process is very expeditious, and could be recommended were it not for the difficulty of handling the precipitate.

The double decomposition between the ferrous sulphate and sodium chloride, in presence of alcohol, results in a green solution and a white precipitate; the green solution when treated with chlorhydric acid and potassium chlorate, yields a solution which corresponds only to two-thirds of the original amount of ferrous sulphate, the remainder is precipitated as ferrous sulphate along with the resulting sodium sulphate and undecomposed chloride. From this it is evident that only two-thirds of the ferrous sulphate is decomposed by an atomic equivalent of sodium chloride.

It was also noticed that in the alcoholic solution of ferrous chloride, a certain proportion of water was necessary to cause the decomposition of the potassium chlorate, whereas, in case of a deficiency, no oxidation would take place through the chlorate.

But originally the writer noticed that metallic iron dissolved more readily in moderately diluted acid; however, as the solution always proceeds immoderately slow, and it was difficult to determine when all of the acid had been saturated, it was found that the process would be much facilitated and hastened by using only the proper quantity of iron to be dissolved, and for this purpose employing the whole amount of the acid at once.

Finding that the ordinary forms of iron were invariably too coarse for rapid solution, the writer resorted to the pulverized iron of the market; this is not the iron reduced by hydrogen, but still a very fine powder, and and can be bought at one-sixth the price of the former. It naturally dissolves very rapidly, and, therefore, in case of necessity, the tincture can be prepared with it in a very short time by the following process:—

Take of Iron in fine powder . . .	1300 grains.
Chlorhydric acid sp. gr. 1.16.	$17\frac{1}{2}$ troy ounces.
Potassium chlorate in pwdr.	475 grains.
Strong alcohol	2 pints.
Water sufficient.	

Dilute the acid with the water to the measure of two pints, then gradually add the iron in small quantities at a time; when complete solution is effected, add the potassium chlorate; stir until dissolved; let stand a few minutes and then mix the alcohol with the solution while yet warm, and filter.—*The Chicago Pharmacist.*

ORGANIC CHEMISTRY AND THERAPEUTICS.*

BY A. W. HOFMANN.

It has been said that chemistry is the most useful of all the sciences, and the assertion is not an exaggerated one. Where indeed in the whole domain of the arts and industry is the field which has not been made more productive by the powerful influence of chemical research, and what resources for our daily wants do we not owe to the development of this science? But, however powerful may be the direct influence which chemistry, in giving us the dominion over matter, has exercised and still exercises every day upon our well-being, it has contributed nearly as much to the progress of civilization by the revolution which it has provoked in all branches of science, and in the region of thought; in one word, in our entire life. In the short space of time accorded to me I should be unable to indicate even in a superficial manner how much chemistry has contributed to the present state of things; considering the learned body whom I am addressing, I might enumerate the services chemistry has rendered to medical science; but the subject would be too vast. I will be content with noticing the advantages which therapeutics has derived and will derive from the development of organic chemistry.

Since only organic chemistry is to be spoken of, it will be well to commence by defining the extent of this portion of the science; the more so, as its extent is much modified with the lapse of time, and that, even now, all chemists are not in accord as to the limits they ought to assign to it. It requires but a superficial study of chemical phenomena to see how few simple bodies possess the power of combining with each other in a great number of proportions. Hydrogen does not combine with chlorine, bromine or iodine in more than one proportion. This same hydrogen forms with oxygen two combinations, and two also with sulphur. Phosphorus and arsenic are remarkable for the facility with which they combine with oxygen, but they only form with it two combinations. In an analogous manner, sulphur and phosphorus combine with chlorine in two proportions only, and it is rarely that an element forms with another three or four combinations; there are, however, three oxides of antimony and of iron, and four of lead and of manganese known. Nitrogen unites with oxygen in a still greater number of proportions,—the number of its well defined oxygen compounds being not less than five,—but these compounds are an exception to the usual law.

But there are two elements which, in this respect, are distinguished from all others, carbon and hydrogen; their combinations are innumerable. This is not saying that the known hydrocarbons are so numerous,—chemists

* Lecture delivered at the Medico-Chirurgical Institute of Berlin

have only yet studied a few hundreds; but the study of the composition and the mode of formation of these compounds induces the conclusion, that nature has scarcely assigned a limit to their production. Already the bodies belonging to this class are ranged in series regulated by a very simple law of derivation, and a knowledge of some members of one of these series enables us to predict the composition and properties of members yet unknown. Further, the comparison of two of these series so established by means of a certain law demonstrates with the greatest clearness the existence of a series of which the members are yet wanting to us, and thus we see unrolled before our astonished eyes a glimpse of the infinite variety of combinations that hydrogen may form with carbon.

These hydrocarbons appear under the most diverse forms. Some are transparent, colourless gases, resisting every attempt made to liquefy them; others, of which the boiling-point is often much below the freezing-point of water, only take the liquid form under the combined influences of strong pressure and a low temperature. A great number exist in the form of liquids, with tastes and odours the most diverse, boiling at all possible temperatures, from the heat of the hand to a red heat, or even not volatilizing at all without decomposition. Finally, others are solid bodies, colourless or coloured, crystalline or amorphous; some fusible at greatly varying temperatures, others infusible; some distilling or subliming at all possible temperatures; others breaking up variously under the influence of strong heat: all differing from each other in taste and smell no less than do the gaseous and liquid carbides. If the hydrocarbons were not distinguishable from other substances except by their number and the variety of their properties, these would entitle them to be looked upon as a group distinct from the rest of chemical compounds; but they present yet other characters which furnish a no less powerful argument for separating them from the bodies which constitute the other groups. Following the analogy of their composition, the members of this group of carbides present in the individual development of their properties an agreement which is not observed in the less extensive groups of combinations.

Under the influence of elementary bodies, the hydrocarbons undergo numerous modifications. Oxygen and nitrogen especially, either alone or combined more or less with hydrogen, possess the faculty of entering into combination with the members of this group. There is thus formed an unlimited number of derivative compounds which, besides the carbon and hydrogen, contain nitrogen or oxygen, or both those elements at the same time, or other elementary bodies, such as chlorine and sulphur. The introduction of these elements into the hydrocarbons modifies the properties of the latter, according to laws the determination of which is the problem presented to the chemist. Already, for many years, the best methods of research have been applied to this study, and if the goal, such at least as is conceived by the enthusiastic searcher, is yet afar off, much has already been done towards attaining to it. Even now, to a certain extent, the changes in the properties of a carbide which the introduction of an elementary body will cause can be determined beforehand. Numerous researches have shown that the modifications that one of a series undergoes in certain circumstances are reproduced in the same circumstances upon all the members of the same series; so that the conquest of a single fact often suffices to throw light upon a series of analogous ones. It follows naturally that each reaction modifying a hydrocarbon in any manner whatever, will produce, when applied to the other hydrocarbons, a class of derivative products between which there will be the same correspondence as between the carbides that gave them birth. There is thus formed, around each carbide, a symmetrical group of derivative compounds, and, the circle always increasing, each of these derivatives may in its turn become the centre of a new system of compounds.

This is not the place to follow further the endless ramification of the hydrocarbons; it is rather sought to recall the exceptional character of the group, and to indicate, though only in a general way, what has led chemists to consider the hydrocarbons and their derivatives, as a whole, to be isolated and distinct from the other combinations.

This group of bodies presents a new interest when it is known that it forms, in great part at least, the substance of plants and the bodies of animals. The hydrocarbons and their derivatives are combustible. In contact with oxygen, under favourable circumstances, they produce oxide of carbon, carbonic acid, and oxide of hydrogen or water; a portion only of the nitrogen oxidizes, the remainder is disengaged in the free state during combustion. Such is the manner in which the substance of plants and animals comports itself. The branch just torn from the tree soon undergoes change; the bark contracts, the leaf fades, and every trace of humidity disappears. If this dry wood be now heated, it will inflame and burn until there remains only a small grey or white mass of mineral substance, incapable of further alteration under the prolonged action of heat. We say then that the wood has burnt, leaving nothing but ash. If a similar experiment be made with a substance of animal origin, a piece of meat for instance, the same phenomena are observed, and of the piece of meat nothing is left but the ash. That part of the wood, or the meat, which can be so burnt, consists of combinations of carbon, hydrogen, oxygen and nitrogen; and these combinations in burning, volatilize under the form of carbonic acid, water, binoxide of nitrogen or free nitrogen.

This similitude of composition between organic matters and the hydrocarbons and their derivatives has led to the latter being designated the group of organic compounds. Moreover, it has been in studying the organic substances, plants and the bodies of animals, that the chemist has become acquainted with these carbides of which we speak. Not more than half a century since the name of chemistry of the organic compounds, or simply organic chemistry, taken from its origin, was given to this new branch of science. Thanks to the talent of the great chemists of this century and the zeal of their scholars, it has developed wonderfully and with marvellous rapidity. Even the first researches led to most unexpected results, and discoveries followed one upon another. The extraordinary number of compounds produced by so small a number of elements captivated the interest of all. It was believed that those compounds formed an entirely new class of bodies, differing from mineral substances by their properties and composition, but above all by their mode of formation. As attempts to reconstitute from their elements these compounds extracted from plants and animals were not at first successful their formation was attributed to the mysterious influence of the vital force, and a boundary line was traced between the products of a mineral nature and those of an organic nature which was thought to be uncrossable. But this line of demarcation was only an artificial one; it has long since disappeared, effaced by new discoveries. Plants and animals no longer monopolize the secret of the formation of organic compounds; science has revealed it. By the aid of the elements alone, the chemist has been able to produce these bodies one after another with all the properties that they present when extracted from the living organism. And if some among them have hitherto escaped this synthesis, and cannot yet be produced except under the influence of the vital forces; if in many cases that result has only been obtained by elaborate processes which nature produces in the most simple manner; nevertheless, known facts justify the hope that the difficulties met with in producing artifically certain bodies found in living organisms will be soon surmounted by the indefatigable zeal of chemists.

(To be continued.)

The Pharmaceutical Journal.

SATURDAY, AUGUST 24, 1872.

Communications for this Journal, and books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Elias Bremridge, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE QUALIFICATIONS AND REMUNERATION OF ASSISTANTS.

Whatever difference of opinion may exist as to whether at the present time pharmacy takes rank as a trade or as a profession, it will be generally conceded that much vigilant and persevering work will have to be done before it attains the position it aspires to hold in the future; and since the maximum strength of a chain only equals the strength of its weakest link, the detection and removal of weak points when a long-continued strain is expected is not only wise but necessary.

Such a weak point has been more than once indicated in our correspondence columns, as existing in the present state of the law respecting pharmaceutical assistants. Although the Pharmacy Act of 1868 doubtless permitted many unqualified persons to claim that their names should be placed upon the Register of Chemists and Druggists, it also provided that no further additions should be made except of persons who have so far proved their qualifications for carrying on business as to have passed the Minor examination. But no similar safeguard exists with regard to assistants, and it is greatly to be regretted that even the risk of a business suffering from the effects of mistakes and incompetency is not sufficient to deter some employers from engaging "assistants" who have little qualification beyond the name.

One consequence of this is made evident by the frequent inquiries received as to the legality of registered chemists and druggists keeping one or more branch establishments, and leaving them to the care of such unqualified men. Another is that the assistant who has been to the trouble and expense of passing his Minor is met in competition by the uneducated man; and though there may be little doubt as to which would be chosen by the respectable pharmacist, there is equally little doubt that this competition has an injurious effect upon the rate of remuneration an examined man can command.

Now that the necessity for passing the Preliminary examination before commencing apprenticeship is generally admitted, it would be well if the original idea that the Minor should be a test of fitness for performing an assistant's duties were to become a little more popular. Dr. Attfield justly remarks in his paper (p. 153) that the Major examination was originally designed as the minimum gauge or measure of a man's fitness to conduct business on his own account, the Minor examination being devised as that best fitted to test the capacity and capabilities of an assistant in pharmacy. It does not follow, however, that the examination is lowered, and that education formerly only good enough for assistants is to-day considered good enough for masters, because the Minor is now the *compulsory* test before entering business; for under the Act of 1852 the Minor examination was purely optional, as the Major is now, and there was nothing to hinder an unexamined man calling himself a "chemist and druggist's assistant," or a "chemist and druggist" either.

In a recent number "A Master" instanced a case of an assistant whom he found unable to wrap up an eight-ounce mixture cleanly and neatly, who appeared to have seen little or no dispensing, and whom "A Master" therefore discharged. A correspondent, signing himself "A Man," has favoured us with a letter, which from want of room we are unable to print, in which he suggests that it would be better to sacrifice a quire of white demy than to dismiss an otherwise qualified assistant. This advice, no doubt kindly meant, is scarcely sound, for an assistant should certainly have long before passed so preliminary a stage. With many of the best friends of pharmacy, we rather look forward to the time when every master shall have passed the Major examination and every assistant the Minor. To this point some of our American brethren have already attained, for in the Act recently passed,* regulating the practice of pharmacy in Philadelphia, it is enacted that no person is to dispense prescriptions, except as an aid under the immediate supervision of the proprietor or a qualified assistant, who has not been apprenticed two years and attended one full course of lectures on chemistry, materia medica and pharmacy; and no proprietor is to leave his store in charge of any but a qualified assistant. Were English pharmacy but rid of all uneducated competition, one evil at least would be in a fair way of removal; for the master pharmacist would be better able to comply with the demand, which assistants might then with more assurance make, that their labours should be more adequately remunerated than they are at present.

The following gentlemen have been elected office-bearers of the British Pharmaceutical Conference for the ensuing year:—*President*, Mr. H. B. Brady; *Vice-Presidents*, Messrs. H. Deane, R. Bentley, D. Hanbury, W. W. Stoddart, T. H. Hills, J. Williams, R. Reynolds and F. M. Rimmington; *Treasurer*, Mr. G. F. Schacht; *General Secretaries* Professor Attfield and Mr. F. Baden Benger.

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* *Ante*, Vol. II. p. 953.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(*Continued from page* 136.)

At the conclusion of the reading of the President's Address—

Mr. SAVAGE said: Gentlemen, as a local member of the Conference a very pleasing duty devolves upon me; and after the very able and exhaustive address which we have had from our President, I am sure any words from me would fall far short of the expression of feeling which has been manifested here to-day. Throughout it has been an admirable treatise. Commencing in the educational course with the Preliminary examination, it proceeded to deal with the Minor and next with the Major examinations, and these have been supplemented by the ladies,—which comes with an excellent grace from the President, seeing that he is a bachelor. I have now a very pleasing duty to perform. It is simply to move that a vote of thanks be accorded to H. B. Brady, Esq., for the very admirable address which he has now given.

The motion was seconded by Mr. BREW, and carried unanimously.

The PRESIDENT: I feel, gentlemen, that my thanks are rather due to you for the consideration which you have extended to me while reading what I have thought to be a somewhat matterless address. Had circumstances admitted it, I would rather have attempted to make my address correspond in character, if not in ability, with the addresses which have preceded it from this chair. As I stated at the beginning, circumstances have entirely precluded my giving that attention to matters of research and to pharmaceutical matters generally beyond the mere business attention that I have usually endeavoured to accord. But it seemed to me that there was perhaps something to be said on these matters that I have touched upon; and it is gratifying to me that you have received them in the very kindly way you have, although my thanks are due rather to you than yours to me.

ELECTION OF HONORARY MEMBERS.

Mr. HANBURY: I have the honour of proposing that Dr. Edward Squibb, of Brooklyn, New York, and Professor Markoe, of Boston, be elected honorary members of the Conference. One of those gentlemen is now present. The other is a very distinguished pharmaceutist in America, and one whom it would be an honour for the Conference to associate with itself.

The motion was seconded by Mr. Schacht and carried unanimously.

Professor GEORGE F. H. MARKOE: Mr. President and gentlemen of the British Pharmaceutical Conference, this reception is altogether unexpected by me. I came to England not as a representative of the American Pharmaceutical Association, although I have the honour of holding office in that Association, but simply as an American pharmacist, who came to see how his British brethren practised pharmacy. It is altogether impossible for me to say anything which could properly give expression to the feelings which now possess me. I can only bear willing and, indeed, grateful testimony, to the kind attention I have received on every hand from the British pharmacists. Everywhere I have only had to mention that I was a pharmacist from America, and it has been sufficient to secure for me a most hearty welcome and every attention. Although I have not come in an official capacity, I certainly should be false to the American Pharmaceutical Association, as one of its vice-presidents, if I did not extend to one and all the members of this Conference the most hearty welcome to visit the sessions of the American Association at any time when it may suit them. The members of the American Pharmaceutical Association would be most glad to give them a hearty welcome. The President has alluded so eloquently to the subject of American pharmacy and the systems of education practised in America that it is needless to enlarge upon them; and it would be presumptuous for me, a mere stripling in pharmacy, to do so, when there is present at the meeting an American pharmacist of far greater distinction than myself, and who was distinguished in pharmacy before I was born.

PHARMACEUTICAL EDUCATION.

The President said there were several papers on this subject to be read, and suggested that the discussion should be deferred until they could all be considered together.

PHARMACEUTICAL EDUCATION.

BY PROFESSOR ATTFIELD.

Introduction.

No apology is necessary for bringing the subject of pharmaceutical education before the members of the British Pharmaceutical Conference; for the Conference is an organization chiefly for the encouragement of pharmaceutical research, and research is impossible where education does not flourish. Before we can promote pharmaceutical research we must promote pharmaceutical education. Moreover, the Annual Meeting of the Conference affords the only opportunity for discussion of the whole subject of pharmaceutical education by the leading pharmacists of the country.

Some apology, however, is due from myself in explanation of the circumstance that a professional teacher in pharmacy should venture to address pharmacists, not on the aspects of education with which he is supposed to be familiar, but on the principles which underlie the whole question—matters on which some one whose brain is not constantly occupied with the details of teaching might be expected to think and write with greater breadth and effect. Moreover, I am aware that in advocating the cause of pharmaceutical education a professor in a school of pharmacy lays himself open to the charge that his utterances are the offspring of personal and interested motives. To these two points I do not allude for my own sake, but because I feel that if they were not mentioned and explained the force of what I have to say would be diminished, and my subject suffer in consequence. At the outset, therefore, I would state that I only write this paper at the request of many pharmaceutical friends. For the past eighteen months I have been urged privately, and, more recently by correspondents in the Pharmaceutical Journal, to review the question of pharmaceutical education, and to give my opinions thereon. Hitherto I have refused for the above reasons, but repeated solicitation has overcome any reluctance, and I now proceed to write what I had hoped to have seen written before now by some leader in pharmacy occupying a more independent position.

Definition.—By pharmaceutical education I mean such instruction in the principles and practice of chemistry, botany, and materia medica, such a knowledge of practical dispensing or the compounding of medicines, and such acquaintance with all that relates to prescriptions and the galenical preparations of a pharmacopœia, as shall fit a man to be a chemist and druggist or a pharmaceutical chemist.

The Claims to Importance of Pharmaceutical Education no longer need enforcement; they are recognized in almost every civilized country of the globe. England was not the first to acknowledge them; she was preceded or has been outstripped by France, Germany, Russia and Switzerland. In Norway "the study of pharmacy is regulated by a law which dates from 1672," (1. 1. 241).* Still, thirty years and more ago a Society was

* Such figures (1. 1. 241) throughout this paper refer to the series, volume and page of the PHARMACEUTICAL JOURNAL.

founded in Great Britain "for the purpose of advancing chemistry and pharmacy and promoting an uniform system of education of those who should practise the same," as well as for protective and eleemosynary purposes. For these special objects "The Pharmaceutical Society of Great Britian" was granted a Royal Charter of Incorporation in 1843, an Act of Parliament legalizing the title of Pharmaceutical Chemist in 1852, and another in 1868 raising the term Chemist and Druggist to a title only to be acquired thereafter by those possessing such a pharmaceutical education as would stand the test of appropriate examination. The followers of pharmacy, as a body, the Legislature and the public have admitted and recognized the importance of pharmaceutical education.

The Object of the Author of this Paper is, then, not to maintain the importance but to consider the nature and extent of pharmaceutical education in England as gauged by the legal examinations. Two additional questions relating to pharmaceutical education are occupying attention at the present time. The one is how to supply the demand for knowledge which compulsory examination has called forth; the other is the future relation of the Pharmaceutical Society to pharmaceutical education.

But before either of these questions can be usefully discussed, the character of the knowledge required by a candidate for the "Minor" must be considered. To show that this order of procedure is imperative, let me somewhat expand the former question—that which is generally described as the question of Provincial Pharmaceutical Education. Members of the Pharmaceutical Society and other pioneers of pharmaceutical progress are commendably anxious that sound *education* should be provided for the young men who are legally compelled to pass the "Minor" Examination before they can be styled "Chemist and Druggist;" the majority of the young men themselves obtain only such an amount of *information* as will enable them to pass the said examination. Let us here distinguish between things different. The principals in pharmacy residing in provincial towns are asking the Council of the Pharmaceutical Society to aid in the development of local schools of pharmacy, on the assumption that compulsory examination has created a wide-spread demand by assistants and apprentices for pharmaceutical education. Now I assert that such a demand ought to exist, and that under improved organization will exist, but that it does not yet exist. The demand for knowledge which has arisen on the part of the young men is, I regret to say, of a vastly inferior description to that which is rightly embraced under the term education—knowledge of a kind and extent such as would be beneath the dignity of any recognized school to supply. The principals are basing their agitation on a demand for genuine education which does not yet exist; the candidates for the title of chemist and druggist are being supplied with a spurious education without any agitation at all. I shall bring forward proof in support of this statement presently; meanwhile I assert that the Pharmacy Act of 1868 has not created any demand for sound pharmaceutical education that did not exist before 1868, and that consequently any attempt to supply such education before the demand arises will result in that loss of effort, time and money which has hitherto followed nearly every attempt to establish a school of pharmacy in the provinces. If what I state is true, it will be admitted by all that the first question for discussion is the nature and extent of the education which should be possessed by every candidate for examination; and second, what means can be adopted whereby to ensure that a candidate does possess this knowledge. If sufficient means can be devised and employed for rendering certain the acquirement of this knowledge by a candidate, then, and not till then, will a demand for sound education arise. Only when these two questions have been satisfactorily settled will there be any *locus standi* for the third question, namely, how best to provide candidates with means for acquiring pharmaceutical education commensurate with the demand that will then arise; and fourth, the relationship of the Pharmaceutical Society to pharmaceutical education.

Pharmaceutical Education.—Past.

I shall first treat of pharmaceutical education from its birth in this country (1841) to the time of the passing of the Act providing compulsory examination (1868); next, state its lamentable position at the present time; and, lastly, consider the means by which it may be raised to its proper position; a position, that is to say, under which true schools of pharmacy can flourish throughout the country under the fostering care, but not necessarily under the immediate control, of the Pharmaceutical Society of Great Britain.

1841. In the first volume of the first series of the PHARMACEUTICAL JOURNAL (1. 1. 41), one of the leading objects of the Pharmaceutical Society was stated to be "the establishment of a system of education which will give professional character, influence and respectability to the whole body."

1842. After a few preliminary lectures on Botany, delivered in the summer, on account of the facilities for obtaining fresh plants at that season, a School of Pharmacy was opened at 17, Bloomsbury Square, in October, 1842. In the course of an introductory address, the Vice-President, Mr. Charles James Payne, said, "It is greatly to be regretted that so many circumstances have combined to keep the great majority of chemists and druggists in past times to that continuous and unwearied application to the mere mechanical part of their business which commercial habits induce, so that we have constantly had occasion to deplore the lack of information in the principles of our art, which has been betrayed by many who have been brought up to it. Without entering into the various causes of this deficiency, the most striking has certainly been the want of a defined and regular system of education amongst the chemists and druggists as a body, and the absence of some compulsion to avail themselves of it. . . . We conceive that no youth should be allowed to enter upon the study or practice of pharmacy, who has not received such a scholastic education as shall have brought his mind into habits which will prepare him for a pursuit in which the intellect must be brought into exercise continually." After alluding to the Preliminary examination, he says, "We then consider that a young man's professional knowledge should embrace a competent acquaintance with Chemistry, Materia Medica, Botany, and Pharmacy. . . . We are not about to merge the trade in the profession, but to establish the trade upon fixed and scientific principles." In this the first session, a course of lectures on Chemistry was given by Fownes, on Botany and Materia Medica by Anthony Todd Thompson, and on Pharmacy by Redwood.

The Council seems to have recognized the fact that these early morning lectures would only be attended by students residing in the metropolis and suburbs, for in a leader in the Journal (1. 2. 121) occurs the remark that, "When the school in London is completely established and has realized our expectations, it will be time to consider the propriety of forming branch schools in other parts of the country, where the amount of population and the zeal of our brethren in the cause of improvement are such as to give scope for the undertaking. We have received communications from several places on this subject, and have no doubt that when the proper time arrives, the zeal will not be found wanting."

1843. The subject of Provincial Schools of Pharmacy still occupies attention (1. 2. 669). "The necessity of adopting some measures for promoting an improved system of education among the rising members of our body, not only in London but in all parts of the country, appears to be generally felt and acknowledged." Lectures were delivered and proposed to be delivered in

Manchester, Bristol, Bath, Liverpool, Newcastle, Norwich, and Birmingham, and the Editor of the Journal trusts that "the time is not far distant when these and other branches of our Institution will be provided with some means of instruction for students in Pharmacy. The manner in which this is to be effected," he goes on to say, "requires mature consideration. It is evident that the number of country schools must be limited, since no institution of this kind could flourish without a certain number of pupils. The amount and description of assistance afforded by the Council to such measures must also be regulated on fair and equitable principles, and must be dependent on the state of the funds of the Society. In some places, facilities may exist for adopting the lectures of a medical school, in others it may be found necessary to establish separate courses for our students. In these and other particulars, a variety of circumstances must be considered, and whatever plans are adopted, should not be decided on without the most mature deliberation. Our object is to establish an effectual and permanent system of education, in effecting which object, no contingency should be overlooked; and whatever plans are proposed, must be considered with reference not merely to any particular locality, but to the general interests and requirements of the Society at large. We are not yet prepared to go into the details of the subject, but to allude to it on the present occasion in consequence of the communications which we have received from correspondents in the country; being anxious to promote pharmaceutical education by every means in our power, and at the same time to point out the necessity of considering so comprehensive a question in all its bearings."

The foregoing quotation is lengthy, but I am sure that neither it nor the others I have given or shall give, will be considered out of place, for they not only illustrate the rise and progress of pharmaceutical education in this country, but have a direct bearing on the questions of pharmaceutical education in the provinces and in London, which are now occupying so much of the attention of the Council and members of the Pharmaceutical Society.

In the Report of the Council for the year (1842–3), the country members are assured that the establishment of provincial schools and the extension of means for facilitating education throughout the country locally, has not been lost sight of; at the same time they are reminded that a reduction of the annual subscription from two guineas to one, which had been mooted, would deprive the Council of the means of affording pecuniary aid to provincial schools. The erection of a laboratory at Bloomsbury for the practical study of Chemistry is also hinted at; and thus even at this time, while the collapse of local schools is foreshadowed, such an extension of the metropolitan is contemplated as was destined to attract thither pupils from the whole country, and make it a provincial as well as a London school.

On August 15th, 1843, the subject of education was maturely considered by the Council (1. 3. 104). "The Council were unanimous in the opinion that it was imperative upon the Pharmaceutical Society to introduce a more regular plan of education for students in Pharmacy than had hitherto existed in this country, and to extend the benefits of public instruction to all places in which it may be found practicable; at the same time it was thought expedient to proceed with some degree of caution, and to establish schools in such towns only as could be expected from their population and other advantages to support them creditably." Manchester was at once aided by a grant of thirty guineas, which, with the pupils' fees, enabled the local committee to defray all expenses incurred in the delivery of twelve lectures on chemistry, and the same number on general and medical botany. As further evidence that originally there was no intention to confine pharmaceutical education to the metropolis, attention may be drawn to the fact that grants of money purely for educational purposes were also made in 1843 to Bath, Bristol, and Norwich, the total amount thus given to provincial schools during the year being £221. 10*s.* (1. 3. 236 and 567). The reports from the four branch schools were most encouraging, and the editor of the Journal (1. 3. 197) seemed disposed to deduce therefrom an argument in favour of voluntary pharmaceutical education, but he suspends judgment, seeing some indications that ultimately compulsory education may have to be enforced. Ultimately the Council announced (1. 3. 287) their intention of awarding annual grants to branch schools to the extent of one-fourth of the amount of annual subscriptions received from the town or district, and additional small grants towards the purchase of books and collections illustrating Materia Medica. The conditions under which the grants would be made, accompanied the announcement, "In regulating the local privileges of each branch, the first consideration to be attended to is the welfare and improvement of the parties immediately concerned; and if strangers be admitted to any of these privileges, the terms and mode of admission should be such as to give members, associates and apprentices who subscribe to the Society, a decided advantage over others." With regard to the number of such schools, it was considered that five or six in such localities as possessed the greatest facilities for their growth would produce more benefit than a larger number established on a scale too limited to be kept up with spirit (1. 3. 462).

1844. This year, effort in the cause of voluntary education met with the first indications of that want of response on the part of those for whom it was exerted that seems to have attended it from that time to the present. Manchester deplored the indifference of her young men, the attendance at the London school did not equal the expectations of the Council, the reports from the other schools do not seem to have been encouraging. The annual subscription to the Society was also reduced from two guineas to one, effectually preventing any further grants that might have been required for education in the provinces. From various parts of the country, however, came inquiries from learners who seemed anxious to devote a certain portion of their time entirely to study. This stimulated the Council in carrying out their original intention of establishing in London such a laboratory for instruction in practical chemistry as should, with the courses of lectures, library, etc., afford ample scope for the exertions of pupils during a certain number of months prior to their passing the examinations. A laboratory was therefore provided, and a course of practical instruction arranged. Thenceforward the school in the metropolis ceased to be simply a metropolitan school. As a mere London school it probably would, like the other schools, have been closed for want of support, but affording educational occupation for students during the whole of the day, it attracted just a sufficient number of pupils from the whole area of England and Wales to warrant the Council in maintaining it, and from time to time increasing its efficiency. While still the school in London, it ceased to be the London school, but became what it has since continued to be, the School of Pharmacy for the whole of Great Britain. The Pharmaceutical Society was thus enabled to carry out its object of providing means of obtaining pharmaceutical education for the whole of the country, though not in the manner anticipated.

1845. In this year the Council of the Society further develope their scheme of general pharmaceutical education. The school is alluded to as "a *national* establishment for the cultivation of pharmacy and the education of chemists and druggists" (1. 5. 145). Pharmaceutical education itself is also accorded a position commensurate with its importance, and its claims for consideration by the parents of pharmaceutical apprentices urged in a dignified manner. Jacob Bell, the founder of the Pharmaceutical Society, the leader of its Council, and the editor of its Journal, thus speaks of the educational organization of the Society, in words peculiarly worthy of reproduction at the present time. Alluding to attendance on the Society's Courses of Lectures, Laboratory Instruction, etc., he says (1. 5. 105), "These have been instituted for the purpose of enabling young men to become fully acquainted with the theory and practice of pharmacy; and the progress which has been made has demonstrated the benefit to be expected from a continuance of the undertaking. We hope this will become in course of time a regular part of the education of the chemist, and that parents when placing their sons in a house of business, will insist upon the privilege of a season being allowed for this very important study. The apothecary, or general practitioner, is obliged to devote the last two or three [it is now four] years of his apprenticeship to lectures, dissections, and hospital practice, and could not be admitted to examination without producing certificates of such attendance. The education of the chemist ought to be as elaborate in degree as that of the medical practitioner, and it is quite as necessary for him to study in the Laboratory as it is for the medical student to walk in the hospital. There is as much science required in one department as in the other, although the nature of the studies varies with the occupation; and since the medical student is obliged to give up two or three [four] years to the scientific study of his profession, the student in pharmacy has no reason to complain if required to devote a year to a similar object. A parent who could afford to give an apprentice-fee with his son, could equally afford to pay the small additional expenses of instruction in a school of pharmacy. Those who could not defray the necessary charges attendant on a proper education, should bring up their sons to some other business more consistent with their means."

1846. Nothing could better show the devotion of the Pharmaceutical Society to the cause of Pharmaceutical Education, an object which until recent years continued to hold the foremost place, than the fact that in 1846 the Council positively decided to relinquish the Society's functions as an examining body rather than give up its mission as an educating institution. Fearing that Parliament would not grant the powers of compulsory examination to an educating corporation, the Council proposed to transfer its examining powers to what was to be called "The College of Pharmacy of England," to be constituted solely for the purpose, and a Bill was drafted on the principle (1. 5. 557). It was considered that such a college, by creating a demand for pharmaceutical education, would give an impetus to schools of pharmacy: competition between the schools would have a salutary effect, and the emulation thus excited would lead to improvements in the system of education.

1847. Objections to the proposed Bill having been urged, especially by the College of Physicians, (1. 6. 497), the machinery of the Pharmaceutical Society was adapted to the end in view without the co-operation of a second body. These preliminaries had, however, occupied so much time that the opportunity passed for introducing the Bill to Parliament. It served, nevertheless, to stimulate the arrested energies of provincial pioneers in education. Acting on the assumption—then, as now, a wrong assumption—that compulsory examination involved compulsory education, meetings were held in several towns, again, notably, Bristol, with the object of resuscitating local schools of pharmacy.

1848 to 1852. During this period pharmaceutical education made slow but certain progress. The numbers of students at the School of Pharmacy increased, though the average period of study decreased. It continued to be chiefly attended by pupils from the provinces. A school in Birmingham was also attempted, but "the Committee regret that the attendance was neither so numerous nor so regular as could have been wished." Liverpool also started the school which, with varying fortune, has been open ever since.

Once more a Pharmacy Act was sought, and once again the dread that Parliament would not listen to men who had sanctioned such an unholy alliance as that of education with examination induced the Council to raise two spectres,—one, the continuance of the Society as an educating body, and the establishment of a College of Pharmacy for conducting the examinations; the other the adoption of the Society as the examining body and the relinquishment of the school of pharmacy. But the ghosts vanished. A Select Committee of the House of Commons sifted the question, and finding that the school was not only not carried on as a source of revenue, but at a great annual expense; that the professors were not interested in attracting pupils from other schools; and the examiners not interested in favouring candidates who had derived their education from the Society, took no exception to the Society's duplex character.

Parliament thus tacitly sanctioned the very sensible and only possible relationship to education which the Society had hithero followed. The editor of the Journal hoped that other schools of pharmacy besides that at Bloomsbury would eventually flourish and prove remunerative, and that when that result was obtained the Society would gladly resign its educational functions.

The Council also reported (1852) that "If, contrary to past experience, it should be found that Schools of Pharmacy and Practical Chemistry can be supported without endowment or collateral aid, the maintenance of an educational establishment connected with the Society may be unnecessary. At the present time the Council think it would not be right to abandon the proceedings which have contributed to give the Society the character and influence it now enjoys."

1852 to 1868. During the interval that elapsed between the passing of the Pharmacy Acts "The Council of the Pharmaceutical Society continued steadily to persevere, according to its original programme, in the advancement of education, sometimes without much prospect, but always animated by the hope that the object of the Bill introduced in 1852," namely, compulsory education, examination, and registration "would be accomplished; and this period of probation probably furnished the means of success. . . . When the public demanded that certain restrictions should be placed on the sale of poisons, the Council of the Society succeeded in obtaining recognition of the principle they had always enunciated, that education of the vendor was the only safe foundation for a Poison Bill." Midway in this period of sixteen years, pharmaceutical education in this country lost its founder and best friend, Jacob Bell. In life this noble-minded man, never wearied in urging the claims of pharmaceutical education, and at death, besides assigning the valuable copyright of the PHARMACEUTICAL JOURNAL to the Pharmaceutical Society, he munificently bequeathed two thousand pounds "to be expended in establishing or otherwise increasing the efficiency of the School of Pharmacy, or in promoting Pharmaceutical Education in such manner as the Council of the said Society shall deem expedient." The Council having reason to believe that the donor had contemplated such an application of his bequest, erected, with this £2000, the present commodious suite of laboratories at the top of the premises in Bloomsbury Square. The School during this long term still annually cost the Society a considerable sum of money; but if the whole of the country thus contributed to the support of pharmaceutical education, the whole of the country received the benefit, three-fourths of the students every year being provincial pupils. If the members in any one district received more benefit than another, Welshmen and Yorkshiremen may be said to have had the advantage, a session seldom passing without the presence of several representatives from the great northern county and the principality. In short, by supporting the School, the Society did all it could towards the support of pharmaceutical education throughout the whole country.

Pharmaceutical Education.—Present.

What has the Pharmacy Act of 1868 done for pharmaceutical education? Exactly a quarter of a century before that Act was obtained, namely, in 1843 (1. 3. 196), we were told that the schools of pharmacy—there were five in England at that time—were established for purposes of education, the libraries and museums of the Pharmaceutical Society organized for purposes of education, the examinations of members and associates devised for purposes of education, the Pharmaceutical Journal instituted for purposes of education. In 1841, education was to be the lever by which the character, influence and respectability of the whole body of chemists and druggists was to be raised. In 1842, the provinces caught up the cry. In 1843, lectures on pharmaceutical education were delivered in eight large towns. In 1844, to the London School for Pharmaceutical Education was added a laboratory for the pursuit of practical pharmaceutical chemistry. In 1845, the metropolitan was converted into a national school for pharmaceutical education. In 1846, the Pharmaceutical Council elected to retain the power and privilege of educating rather than examining if either were relinquished. During the whole life of the Pharmaceutical Society, its watchword has been *Education.* Compulsory education, compulsory examination, compulsory registration. This is the order in which the three objects of the Society have generally been set forth (1. 5. 246), while education has always been looked to as an object superior to examination. Well, compulsory registration has been obtained, and a strong staff it has proved. Compulsory examination has been granted, and an admirable agent for good it might be made. But compulsory education, which everybody always thought was to follow in the wake of compulsory examination, as a valuable train follows a powerful engine, Where is it? Where? It does not exist. What has the Pharmacy Act of 1868 done for it? Nothing. Emphatically, nothing. Worse than nothing; it has degraded voluntary education from its previous promising position; it has reduced its value by one-half. Prior to 1868, the average period of study of each pupil in the laboratory of your national school of pharmacy was from four to five full months, each student working daily from eight or nine o'clock till five; since 1868 it has been a little over two months. Till 1868, the Professor of Practical Chemistry in the school succeeded in teaching all students chemistry; after 1868, the majority have shown disinclination to learn anything beyond certain facts regarding "the definite chemical bodies of the Pharmacopœia." Class examinations of all candidates for the "Minor" and "Major" were instituted, the Professor taking upon himself the office filled at medical schools by the tutor; but as soon as it was found that these examinations covered the whole area of pharmaceutical chemistry, then the men who most needed them, those who only wanted to learn what was required for "the Minor," contrived to keep away. But worse than all this, the place which every well-wisher of pharmacy expected to see occupied by compulsory pharmaceutical education is filled by that hideous usurper, CRAM. Let me at once say that this is no fault of our excellent examiners. I shall have to use some very strong language in denouncing the practice termed "cramming,' but not one word against the examination for which candidates are crammed. My remedy for cramming, on the contrary, is intimately connected with the elevation of education. I am of opinion that ninety-five per cent. of the cramming now practised can be prevented. With regard to this cramming or "coaching," it is a fact that, during the past ten months, more students have been crammed than have been legitimately prepared for the Minor Examination of the Pharmaceutical Society of Great Britain. There are establishments for cramming which received last session more pupils than sought the aid of the Society's School of Pharmacy. "It is not astonishing that so obvious a demand for 'coaching' should produce a commensurate supply of the abomination, and that we should be unblushingly told by advertisement that an *ignoramus* may be transformed into a *Chemist and Druggist* in a month!" ('Chemist and Druggist,' January, 1872). And what is very terrible, these crammers keep their word in most cases. I know I am helping to advertise them in stating all this, and would not do so but that I trust their days are numbered; added to which any one may know that they do what they promise or they would not flourish as they do. The manner of performing it is as follows: A promise is exacted from every candidate that after passing the examination he shall return to his crammer and reproduce the questions he has been asked. Those brought by first pupils are carefully written down; and thus, in a short time, the crammer has a list of the questions commonly asked by each examiner; the lists are revised from time to time by the aid of subsequent candidates. On the entry of a pupil, a list of questions and answers in each subject is placed before him with the general instruction that the first half of each set is to be learnt by heart, and the second to be acquired if possible. And so, one week is given to what is called "chemistry," one to "botany," one to "materia medica," and one spent over the "pharmacopœia;" and any young man who has previously been in a druggist's shop is thus successfully prepared for the Minor. Nay, even if he has never before seen a prescription, an extra fortnight or so at "practical dispensing" enables him to satisfy the examiners. The successful legitimate candidate knows his subjects; the successful illegitimate candidate knows the questions that will be put to him. Will the Council of the Pharmaceutical Society allow these dreadful odds to obtain much longer? This is not a case of competition, even unfair competition, between one kind of education and another, for education means 'to bring out,' not 'to thrust in;' it is a question of education *versus* cram. Can any language used in describing the latter system be too strong? Can it be characterized by too vile a name? Its true designation has been furnished by one of its own promoters. Eighteen months ago (3. 1. 629), "Charles Gerrard, described as a teacher, living in Lincoln's Inn Fields, together with another man, were charged with inciting a person in the employ of Messrs. Rivington, the printers, to steal an early proof of one of the examination papers of the Apothecaries' Hall. It appeared that the prisoners had for some time been striving to obtain a copy, and at length, by arrangement with the police, the proof-puller was allowed to supply them with two copies, for which he received ten pounds. A detective then immediately arrested the prisoners, while the proofs were in their hands. They were both committed for trial," and subsequently convicted. What is the difference between stealing questions which have been written by the hand of an examiner and those which come from his mouth? Students, I trust the temptation to traffic with the crammer, this destroyer of your self-respect and enemy to your real progress, will soon be removed; meanwhile, pause before you listen to his wiles or purchase his wares, for if you buy you will probably be haunted by the reflection that you have been made receivers of stolen property. There is a vast deal of difference between crammers and private tutors, though all are not private tutors who so call themselves, and all is not cramming that is so termed. Many a student swallows his intellectual food too fast; and honest teachers often have to warn honest pupils against this evil. All this is occasionally described as "cramming;" but the cramming I wish to denounce is the insidious and wicked process I have detailed; the thing which flourishes under the Pharmacy Act as it never before flourished, or can flourish in any other Court of Examiners—the thing which if not uprooted, or even if allowed to continue in its present stage of development, will render provincial schools unnecessary, and your central school the partial success that it has been made by the attendance hitherto of a few admirable pupils annually.

A few admirable pupils annually. Yes, pharmaceutical education is not yet swamped by superficiality or crushed by cram. Good men, most of them pupils of the Society's School of Pharmacy, still present themselves before the Board of Examiners as in the years before 1868. This is nearly all I can say for Pharmaceutical Education—Present. I regret to have to say so much of pharmaceutical cramming, but I could not say less.

I can assure my readers, especially those who, with the great mass of the public, erroneously consider examination to be the panacea for all ignorance, that I have understated the case as regards cramming. I presume no one will doubt the existence of the evil who observes what is going on around him, and if he doubts the extent let him ascertain how many teachers pointedly question their pupils as to what each has been asked by the Board of Examiners, and how many pupils altogether such teachers have had during, for instance, the past session.

Pharmaceutical Education.—Future.

Discussion on the future of pharmaceutical education will be facilitated by a consideration of the causes which have reduced it to its present low position. The statement has been made that the standard of the Minor examination has not been altered; that the Major, if changed at all, has been improved; that the examiners are mostly those who sat before 1868. Why should cram be more rife now than ever? Why does cram flourish at all?

As to the standard of examinations, I maintain that it has been lowered enormously. The examination which the collective wisdom of the leading pharmacists of the country had devised as that best fitted to test the capacity and capabilities of an assistant in pharmacy, and which always with the same object in view, had been altered and improved and made more practical from time to time during nearly thirty years, is suddenly so lowered *en masse* as to be the examination for testing the capacity and capabilities of a principal in pharmacy, while the assistant is no longer asked to pass an examination specially devised for men of his own class. The examination originally designed as the minimum gauge or measure of a man's fitness to conduct business on his own account (the Major) must now logically be considered as indicating that he is somewhat above his business or better than he need be, a distinction so lightly valued that very few more aspire to it now than under the old voluntary system of examination. Of course no one pays the founders of the Pharmaceutical Society such an equivocal compliment as is implied in this state of things; on the contrary, I presume that every one considers that the old standards were wisely chosen and strengthened, and that when the present period of expediency and transition has passed, the old positions will be regained. If this be the policy of the Society it has my concurrence; I quite approve of the tactics by which the Pharmacy Act of 1868 was obtained. I point to the fact that the education formerly only good enough for assistants is now considered good enough for masters, as one that refutes the statement concerning the non-alteration in the standards of examination, and as one that could not do otherwise than damage the cause of pharmaceutical education.

Again, in the days of voluntary examination education was the chief object; examination was considered only as a test of the possession of education, and the passing of the "Minor" was only an incident in the student's career. Now, except by the few, examination is regarded as the end and education the means. Not only have education and examination changed places in general estimation, but while examination has kept its place, education has been forced from above to below—it has lost two places. Looking to the depression of the examination standard that I have already spoken, education has been thrust to a very low position indeed.

Cram now flourishes in pharmacy to a greater extent than it did prior to 1868, simply because the demand for it under a compulsory system of examination is so great that its development on a grand scale is highly remunerative. Why cram flourishes at all at any examination is because examiners are but human and examination at its best a most imperfect machine for ascertaining the nature and amount of a man's knowledge. Why it flourishes to a tenfold extent at our examinations as compared with any other in England or the Continent—and it does so—is because our Examining Board does not possess either of the guarantees against it possessed by other Examining Boards. In all Europe there is no system of examination so liable to abuse as our own. It is not exactly like any other, but approaches in character most nearly to those of the London University and the Medical Corporations. It resembles the general system of the London University (that is, excluding the examinations for degrees in medicine) to the extent of being conducted on principles similar to those by which free-trade is governed. A candidate at either board is not asked where he obtained his knowledge. The assumption acted on is that brain-power can be accurately measured by examination, and that if possessed to the requisite extent its source is immaterial. But at the London University a candidate is liable to be taken over a large area by a special examiner in each subject, the most eminent man as regards his subject that the kingdom can furnish. Even under these circumstances the time allowed to this examiner for *vivâ voce* examination of his candidate, though as long as practicable, is quite insufficient to allow of the whole area being traversed, hence a just decision cannot be given with certainty. Thus an entrance for cram is provided, for it is not brain-power that is measured so much as memory, or the faculty of storing facts. But at the pharmaceutical examinations the area embraced by any one subject is not large, the examiner in any one subject is not, and it is unnecessary that he should be, the most eminent as regards that subject that the country can produce, and the time given to examination in any one subject is quite insufficient for thoroughly traversing even the limited area, nor would it be sufficient if double the present length. Thus even the imperfect guarantee against excessive cramming which obtains at the London University is not possessed by our own Board. Next, our examinations resemble those of the College of Physicians, College of Surgeons and Apothecaries' Hall, in so far as they are conducted by followers of the same profession or calling as that which the candidate aspires to enter. But these boards possess a guarantee against cramming, which, though not perfect, is of great power and value and is wholly wanting at Bloomsbury Square. Every candidate must produce evidence that he has had the opportunity of being properly educated at a recognized school for four years, as well as in preliminary matters, and inasmuch as more than ninety per cent. of the candidates have, for obvious reasons, taken all the advantage they could of these opportunities, cramming is reduced to insignificant proportions compared to the position occupied by education. This supplement to examination is also required by nearly all the pharmaceutical examining boards on the Continent. I repeat that our examinations, as at present organized, especially the Minor, encourage the rank growth of the noisome thing termed cram, and hence discourage the development of pharmaceutical education.

The remedy for this abuse is compulsory education. In this opinion I shall probably be supported by every one interested in the welfare of pharmacy; but as to the form compulsory education shall take there will, I know, be a less unanimous declaration. Respecting compulsory education in the abstract, it would seem from a leading article in the number of the PHARMACEUTICAL JOURNAL published on the day I commenced to write this paper (July 20th, 1872), that everybody considers that this long fought-for and grand object has already been obtained. I read, "In fact it may fairly be stated that the Society as a voluntary association has already completed its labour in the cause of education, and that, having succeeded in making education compulsory, it has done the work it originally projected. It is now the time for those who have been at best mere lookers-on to come forward and give their aid in making the advantages of that work accessible to all." Wrong, a a thousand times wrong. The Society has *not* succeeded in making education compulsory. That the Society will ultimately succeed in so doing I have no doubt, for I have faith in its traditional policy as regards education and in its educational leaders on and off its Council; but that compulsory education is already attained is a statement contrary to all the facts of the case, and one that I shall be astounded to hear maintained by any one who may do me the favour to discuss this paper.

Compulsory education must be obtained in one of two ways. Either the class of experts whence the examiners are drawn must be entirely changed, the time allotted for examination greatly prolonged, and the area of examination considerably enlarged; or, on the other hand, the system may remain as at present, and simply be supplemented by a scheduled statement that the candidate has attended the classes of a recognized school for a stated length of time. Objections may be urged to both plans, but so far as I see, one or other must be adopted. Neither is perfect, but that any friend to pharmacy will reject both I cannot believe.

The "free-studentship" method is open to serious, and to my mind insuperable objections. I like the idea of a man getting his knowledge where and as he likes so that he gets it; but I do not see how the idea is to be embodied in pharmacy without opening a wide door to cram. "A really good examiner," Tait says, in an entertaining and most instructive article on Examination, or "Artificial Selection," as he terms it, in 'Macmillan's Magazine' for March, 1872, "A really good examiner is perhaps the rarest product of civilization. In an unusually large experience extending to each of the three kingdoms, I have met but two, and I see clearly how each of even these might be greatly improved. . . . An examiner ought to possess not merely great knowledge, but enormously extensive knowledge, of his subject and of the various modes of teaching it. . . . The examiner must possess simultaneously, infinite tact and thorough common sense. . . . Even if he be possessed of all these requisites, the examiner must be allowed sufficient *time* to test a man's knowledge. . . . Granting that all these desiderata can be supplied, there still remains the excessive difficulty of examining into the really useful part of one's knowledge. For, in the great majority of cases, the useful part is precisely that which it is least possible to break up into detached fragments, such as those required in the modern process of examination." The writer of this article, perusal of which I strongly recommend to all interested in the subject, further states his fondness for two methods of ascertaining fitness for work, but candidly says that he does not see how either could be applied at present: the first is the system of trial and approval which we apply to servants of every grade from the most menial to the most confidential; the other is to take the certificate of such qualified teachers as have had the opportunity of observing the progress and behaviour of a student. The latter method he considers to be something quite priceless compared with the quickly-formed, and, therefore, at best, dubious judgment of an examiner. For my own part, although I believe in freedom in trade, freedom in thought, and freedom in most things, I do not believe in freedom in education. A few years ago when the agitation in favour of free trade was at its height we could not get a Pharmacy Act because no one would allow free trade in poisons to be an exception to the rule. Even the schedule-of-attendance supplement to the medical systems of examination was said to be on its last legs. It was strongly attacked, but with the best results, for its abuses were remedied. Freedom cannot bind everything however. It has let the valuable agents vulgarly termed poisons loose from its chain and allow them a certain amount of protection. Pharmacists are the last who should agitate for free trade in education.

The method of supplementing our ordinary plan of examination at the "Minor," by requiring the production of a Schedule of Certificates of (*a*) having passed the Preliminary examination, (*b*) worked for a stated period in a shop under a registered chemist and druggist, and (*c*) attended certain courses of instruction at a recognized school of pharmacy, is a long-tried method—a method the details of which are ready to our hands by application to the medical examining bodies in this country, or the pharmaceutical examining bodies on the Continent, and one under which, in our case, less cramming would be practised than by medical students. For the medical students who support the medical crammers are chiefly those whose friends having driven them into medicine against their will, have bribed them by a too-full purse. These men take care to be present in the body at lectures, and hence get their schedules signed, but at other times follow their own foolish ways, and at last have to seek the aid of the crammers. In the nature of things this class would scarcely be represented in pharmacy; and I question if, under the schedule-of-attendance method, there would be a sufficient demand for cram to keep the loathsome thing alive. I have no objection, indeed, I have the strongest desire, to see any possible improvement carried out in the selection of examiners. I do not know that there is at present any weak brother on our Board; if so, let him be displaced by a stronger forthwith. But, on the whole, I do not believe that a more able and patient set of examiners could be found in pharmacy than now sit at Bloomsbury. To go outside pharmacy for examiners, I do not think to be a practicable proceeding. I have no objection, indeed, I have every desire to see, both the Minor and Major Examinations, especially the former, made more practical (3. 3. 115.). To give the public the guarantee of the Pharmaceutical Society of Great Britain that a man is a "Chemist and Druggist," when, perhaps, he has never seen a test tube, and does not know how to detect an impurity, an adulteration, or a falsely-labelled chemical, is an anomaly that cannot much longer be excused: indeed, I know that the leaders in pharmaceutical progress are most anxious that this scandal should be removed with all speed. Let not the most sanguine suppose, however, that a more practical examination would be less liable to the invasion of cram; a crammer has greater command over some practical than over theoretical matters. But neither the selection of examiners, nor any alteration in the examinations, is involved in the adoption of the schedule-of-attendance scheme. It is no part of my intention, nor is it my province, to advocate or decry the slightest interference with the present mode of examination. I simply wish those examinations, as they stand, to be made THOROUGH. I wish them to be so supplemented as to involve the death of cram and the life of education. I select and support that one of the two methods of securing compulsory education which I believe to be effective and practicable. I see no difficulties in the way of the adoption of the principle, but even if fuller administrative powers were required from Parliament, I should with certainty of success proceed at once to obtain them.

In the firm belief that this question of compulsory education, and the form it shall take, will receive priority of discussion at the hands of the members of the Pharmaceutical Conference at the present meeting, and by the leaders of pharmacy hereafter, and priority of organization by the Council of the Pharmaceutical Society, I will now briefly introduce the subjects of *provincial* pharmaceutical education, and the ultimate relationship of the Society to either or all the Schools of Pharmacy.

From data possessed by the Secretary of the Pharmaceutical Society, it is his opinion that in the course of a few years 1000 youths will pass the Preliminary examination annually; that 750 apprentices will annually present themselves as candidates for the title of chemist and druggist, and 600 gentlemen will annually start in business. This calculation is of course based on the present condition of things. There can be little doubt that if the efforts of the Pharmaceutical Society to improve the trade generally by means of education and examination be successful, many young men will be deterred from entering pharmacy, the present excessive number of small shops being greatly reduced. The existing central school of pharmacy can accommodate 150 or 200 students in a session if each studies for a few months; there will therefore be room for three or four, or possible five such schools. France possesses three. That a school of pharmacy can be established in every twentieth town is simply impossible. Moral reasons are said to prevent some people sending their sons to the school in London or other large town. If this is true, such parents should select a calling which can be followed nearer home, though I fail to see how that would meet the difficulty; it is chiefly that which cometh from within which defileth. At the same time I have long urged for other reasons the establishment of residential halls, clubs, in connection with schools of pharmacy. I far more strongly sympathize with the patient and perserving youth who steadily prepares for the Minor by sheer hard work in a country village. It seems unfair to compel such a man to attach himself to a recognized school. The same objection to the compulsory-attendance plan obtains in the medical profession, but it is not found to be an important objection. In truth, I believe, that the number of such men will be very small when the Minor examination comes to be conducted with the thoroughness foreshadowed in the last report on our examinations by the officer of the Privy Council (3. 3. 115). Moreover, I have found that these men of all others are most glad to take advantage of professorial assistance. "There can be no doubt (3. 3. 50), that even where the pupil has the advantage of a master capable and willing to instruct him, he will be benefited in supplementing such practical instruction by hearing scientific principles systematically enunciated by other persons."

The steps by which to establish such schools in the provinces should be undertaken by the Council of the Pharmaceutical Society through the agency of committes and deputations, assisted by, and assisting local committees, all the care and deliberation exercised when founding the central school being observed in establishing the new schools. I am of opinion that such schools would be self-supporting, for I am assuming that pharmaceutical education is made compulsory in the manner suggested. That point reached, their financial connection with the Society would cease, whether the school were located in the metropolis or the provinces; but until that position were obtained liberal support should be accorded. The manner of distributing aid scarcely needs remark; there being only four or five schools, each would be treated on its merits without any elaborate machinery. To spread aid to pharmaceutical education broadcast over the whole country would, in my opinion, prove to be sheer waste of energy and money.

Mr. Benger's proposal (1. 1. 253) to establish special technical schools for boys intending to become pharmacists is important, but is scarcely practicable at present. Moreover, the rapid spread of scientific education in general schools will probably in time render any such proceeding unnecessary. That no chemist and druggist should take an apprentice who has not passed the Preliminary examination of the Pharmaceutical Society is a proposition which has been accepted by all who have spoken or written on the subject. I think it might be urged officially on every chemist and druggist in England as soon as the new and vastly improved Register is published. Mr. Edward Smith's suggestion (3. 2. 301) that only apprentices who have passed the Preliminary examination should be admitted as students at schools of pharmacy has my earnest support; I often temporarily fail in teaching a student some chemical fact or principle through his want of knowledge of arithmetic. Mr. Smith's method of ascertaining which are the deserving recipients of aid from the parent Society by an elaborate system of special examinations, and Mr. Schacht's original plan of carrying out the same object (3. 2. 401) would be attended by a vast deal of trouble, and would not, I think, with any amount of labour be successful. But if successful, such examinations would be open to the abuse of cram. Mr. Schacht's more recent scheme now before the Society extends aid only to provincial associations, having recognized schools similar in kind, and not very different in degree to those, the establishment of which I have advocated in this paper; such a plan was also urged by Mr. Hustwick (3. 2. 499). I have shown that all such schools must fail unless cram be crushed, but assuming this to have been done, then I do not see the need for any separate special examinations, the Minor itself would afford means of ascertaining the relative efficiency of these schools, and thus provide for the distribution of aid so long as aid might be necessary. As to the manner in which aid might be given, it would necessarily differ according to the requirements and amount of local support of the school, but Mr. Reynolds' plan (3. 2. 751) would probably be taken as a basis, "1. To increase the fees of teachers of chemistry, practical chemistry, materia medica, pharmacy and botany. 2. To pay one-half the salary of curator and lecture-assistant. 3. To distribute such duplicate specimens from the Society's Museum as might be available. 4. To make grants to libraries. 5. To grant loans of materials for class teaching, with the power of making them absolute grants. It is clear that provincial schools must mainly be under local management. As a school, metropolitan or provincial, becomes self-supporting much of its connection with the parent Society would naturally cease; but the question whether all connection should lapse may well be postponed. I see no difficulty in providing suitable teachers for future schools of pharmacy. The sources are obvious, but I may mention one not quite so apparent. At present it is cause for constant regret that our Bell Scholarships do good to all other professions except our own; a Bell Scholarship is too often the lever by which a worthy, clever and ambitious young pharmacist so elevates himself that his talents are lost to pharmacy altogether. As a teacher or professor in a school of pharmacy he would find full scope for his skill and energy, and pharmacy not lose the fruit she had taken such pains to mature.

In conclusion, let me beg for the fullest consideration of pharmaceutical education by every pharmacist having the interest of pharmacy at heart. I invite objections to my own views; I ask for criticism; and if neither can be given, three words of approval will strengthen my position. The pharmaceutical press is open to all. I have Mr. Schacht's authority for stating that "The Council of the Pharmaceutical Society are most anxious to devise a scheme that shall prove generally satisfactory to the trade at large; and as in this matter they are treading upon almost strange ground, they feel that this way would be largely prepared for them, and their labours would be much assisted by the fullest expression of opinion on every point bearing upon the question." I have taken some pains to ascertain and, in the former part of this paper, partially to reproduce the opinions expressed several years ago by Council after Council of the Pharmaceutical Society, and other leaders in pharmacy on this same subject of pharmaceutical education. Their statements bear the stamp of much thought and mature deliberations extending over a long period, and are worthy of more careful perusal than has apparently been bestowed on them by most recent writers. My other contributions to the discussion are the views I have expressed in the second and third parts of the paper, and for which I alone am responsible.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

THE PRESIDENT'S ADDRESS.

(*Concluded from page* 139.)

We have an illustration of this progress in the fact of continual occurrence, that conceptions which prove inadmissible to the minds of one generation, in consequence either of their want of intellectual power to apprehend them, or of their preoccupation by older habits of thought, subsequently find a universal acceptance, and even come to be approved as "self-evident." Thus the first law of motion, divined by the genius Newton, though opposed by many philosophers of his time as contrary to all experience, is now accepted by common consent, not merely as a legitimate inference from experiment, but as the expression of a necessary and universal truth; and the same axiomatic value is extended to the still more general doctrine, that energy of *any* kind, whether manifested in the "molar" motion of masses, or consisting in the "molecular" motion of atoms, *must* continue under some form or other without abatement or decay; what all admit in regard to the indestructibility of matter, being accepted as no less true of force, namely, that as *ex nihilo nil fit*, so *nil fit ad nihilum*.*

But, it may be urged, the very conception of these and similar great truths is in itself a typical example of intuition. The men who divined and enunciated them stand out above their fellows, as possessed of a genius which could not only combine but create, of an insight which could clearly discern what reason could but dimly shadow forth. Granting this freely, I think it may be shown that the intuitions of individual genius are but specially exalted forms of endowments which are the general property of the race at the time, and which have come to be so in virtue of its whole previous culture.—Who, for example, could refuse to the marvellous aptitude for perceiving the relations of numbers, which displayed itself in the untutored boyhood of George Bidder and Zerah Colburn, the title of an intuitive gift? But who, on the other hand, can believe that a Bidder or a Colburn could suddenly arise in a race of savages who cannot count beyond five? Or, again, in the history of the very earliest years of Mozart, who can fail to recognize the dawn of that glorious genius, whose brilliant but brief career left its imperishable impress on the art it enriched? But who would be bold enough to affirm that an infant Mozart could be born amongst a tribe, whose only musical instrument is a tom-tom, whose only song is a monotonous chant?

Again, by tracing the gradual *genesis* of some of those ideas which we now accept as "self-evident," such, for example, as that of the "uniformity of nature"—we are able to recognize them as the expressions of certain intellectual tendencies, which have progressively augmented in force in successive generations, and now manifest themselves as mental instincts that penetrate and direct our ordinary course of thought. Such instincts constitute a precious heritage, which has been transmitted to us with ever-increasing value through the long succession of preceding generations; and which it is for us to transmit to those who shall come after us, with all that further increase which our higher culture and wider range of knowledge can impart.

And now, having studied the working action of the human intellect in the scientific interpretation of nature, we shall examine the general character of its products; and the first of these with which we shall deal is our conception of *matter* and of its relation to *force*.

The psychologist of the present day views matter entirely through the light of his own consciousness: his idea of matter in the abstract being that it is a "something" which has a permanent power of exciting sensations; his idea of any "property" of matter being the mental representation of some kind of sensory impression he has received from it; and his idea of any particular kind of matter being the representation of the whole aggregate of the sense-perceptions which its presence has called up in his mind. Thus when I press my hand against this table, I recognize its unyieldingness through the conjoint medium of my sense of touch, my muscular sense, and my mental sense of effort, to which it will be convenient to give the general designation of the tactile sense; and I attribute to that table a *hardness* which resists the effort I make to press my hand into its substance, whilst I also recognize the fact that the force I have employed is not sufficient to move its mass. But I press my hand against a lump of dough; and finding that its substance yields under my pressure, I call it *soft*. Or again, I press my hand against this desk; and I find that although I do not thereby change its *form*, I change its *place;* and so I get the tactile idea of *motion*. Again, by the impressions received through the same sensorial apparatus, when I lift this book in my hand, I am led to attach to it the notion of *weight* or ponderosity; and by lifting different solids of about the same size, I am enabled, by the different degrees of exertion I find myself obliged to make in order to sustain them, to distinguish some of them as *light*, and others as *heavy*. Through the medium of another set of sense-perceptions which some regard as belonging to a different category, we distinguish between bodies that *feel* "hot" and those that *feel* "cold;" and in this manner we arrive at the notion of differences of temperature. And it is through the medium of our tactile sense, without any aid from vision, that we first gain the idea of *solid form*, or the three dimensions of space.

Again, by the extension of our tactile experiences, we acquire the notion of *liquids*, as forms of matter yielding readily to pressure, but possessing a sensible weight which may equal that of solids: and of *air*, whose resisting power is much slighter, and whose weight is so small that it can only be made sensible by artificial means. Thus, then, we arrive at the notions of *resistance* and of *weight* as properties common to all forms of matter; and now that we have got rid of that idea of light and heat, electricity and magnetism, as "imponderable fluids," which used to vex our souls in our scientific childhood, and of which the popular term "electric fluid" is a "survival," we accept these properties as affording the practical distinction between the "material" and the "immaterial."

Turning, now, to that other great portal of sensation, the sight, through which we receive most of the messages

* This is the form in which the doctrine now known as that of the "conservation of energy" was enunciated by Dr. Mayer, in the very remarkable essay published by him in 1845, entitled 'Die organische Bewegung in ihrem Zusammenhange mit dem Stoffwechsel.'

sent to us from the universe around, we recognize the same truth. Thus it is agreed alike by physicists and physiologists, that *colour* does not exist *as such* in the object itself; which has merely the power of reflecting or transmitting a certain number of millions of undulations in a second; and these only produce that affection of our consciousnses which we call colour, when they fall upon the retina of the living percipient. And if there be that defect either in the retina or in the apparatus behind it, which we call "colour-blindness" or Daltonism, some particular hues cannot be distinguished, or there may even be no power of distinguishing any colour whatever. If we were all like Dalton, we should see no difference, except in form, between ripe cherries hanging on a tree, and the green leaves around them: if we were all affected with the severest form of colour-blindness, the fair face of nature would be seen by us as in the *chiaroscuro* of an engraving of one of Turner's landscapes, not as in the glowing hues of the wondrous picture itself. And in regard to our visual conceptions, it may be stated with perfect certainty, as the result of very numerous observations made upon persons who have acquired sight for the first time, that these do *not* serve for the recognition even of those objects with which the individual had become most familiar through the touch, until the two sets of sense-perceptions have been co-ordinated by experience.*

When once this co-ordination has been effected, however, the composite perception of form which we derive from the visual sense alone is so complete, that we seldom require to fall back upon the touch for any further information respecting that quality of the object. So, again, while it is from the co-ordination of the two dissimilar pictures formed by any solid or projecting object upon our two retinæ, that (as Sir Charles Wheatstone's admirable investigations have shown) we ordinarily derive through the sight alone a correct notion of its *solid* form, there is adequate evidence that this notion, also, is a mental *judgment* based on the experience we have acquired in early infancy by the consentaneous exercise of the visual and tactile senses.

Take, again, the case of those wonderful instruments by which our visual range is extended almost into the infinity of space, or into the infinity of minuteness. It is the mental not the bodily eye, that takes cognizance of what the telescope and the microscope reveal to us. For we should have no well-grounded confidence in their revelations as to the *unknown*, if we had not first acquired experience in distinguishing the true from the false by applying them to *known* objects; and every interpretation of what we see through their instrumentality is a *mental judgment* as to the probable form, size, and movement of bodies removed by either their distance or their minuteness from being cognosced by our sense of touch.

The case is still stronger in regard to that last addition to our scientific *armamentum*, which promises to be not inferior in value either to the telescope or the microscope; for it may be truly said of the spectroscope, that it has not merely extended the range of our vision, but has almost given us a new sense, by enabling us to recognize distinctive properties in the chemical elements which were previously quite unknown. And who shall now say that we know all that is to be known as to any form of matter; or that the science of the *fourth* quarter of this century may not furnish us with as great an enlargement of our knowledge of its properties, and of our power of recognizing them, as that of its *third* has done?

But, it may be said, is not this view of the material universe open to the imputation that it is "evolved out of the depths of our own consciousness"—a projection of our own intellect into what surrounds us—an *ideal* rather than a *real* world? If all we know of matter be an "intellectual conception," how are we to distinguish this from such as we form in our dreams?—for these, as our laureate no less happily than philosophically expresses it, are "true while they last." Here our "common sense" comes to the rescue. We "awake, and behold it was a dream." Every healthy mind is conscious of the difference between his waking and his dreaming experiences; or, if he is now and then puzzled to answer the question, "Did this really happen, or did I dream it?" the perplexity arises from the consciousness that it *might* have happened. And every healthy mind, finding its own experiences of its waking state not only self-consistent, but consistent with the experiences of others, accepts them as the basis of his beliefs, in preference to even the most vivid recollections of his dreams.

The lunatic pauper who regards himself as a king, the asylum in which he is confined as a palace of regal splendour, and his keepers as obsequious attendants, is so "possessed" by the conception framed by his disordered intellect, that he *does* project it out of himself into his surroundings; his refusal to admit the corrective teaching of common sense being the very essence of his malady. And there are not a few persons abroad in the world, who equally resist the teachings of educated common sense, whenever they run counter to their own preconceptions; and who may be regarded as—in so far—affected with what I once heard Mr. Carlyle pithily characterize as a "diluted insanity."

It has been asserted over and over again, of late years, by a class of men who claim to be the only true interpreters of nature, that we know nothing but matter and the laws of matter, and that force is a mere fiction of the imagination. May it not be affirmed, on the other hand, that while our notion of *matter* is a conception of the intellect, *force* is that of which we have the *most* direct—perhaps even the *only* direct—cognizance? As I have already shown you, the knowledge of resistance and of weight which we gain through our tactile sense is derived from our own perception of *exertion*; and in vision, as in hearing, it is the force with which the undulations strike the sensitive surface that affects our consciousness with sights or sounds. True it is that in our visual and auditory sensations we do not, as in our tactile, *directly* cognosce the force which produces them; but the physicist has no difficulty in making sensible to us indirectly the undulations by which sound is propagated, and in proving to our intellect that the force concerned in the transmission of light is really enormous.*

It seems strange that those who make the loudest appeal to experience as the basis of all knowledge, should thus disregard the most constant, the most fundamental, the most direct of all experiences; as to which the common sense of mankind affords a guiding light much clearer than any that can be seen through the dust of philosophical discussion. For, as Sir John Herschel most truly remarked, the universal consciousness of mankind is as much in accord in regard to the existence of a real and intimate connection between cause and effect, as it is in regard to the existence of an external world; and that consciousness arises to every one out of his own sense of *personal* exertion in the origination of changes by his individual agency.

Now while fully accepting the logical definition of cause as the "antecedent or concurrence of antecedents on which the effect is invariably and unconditionally consequent," we can always single out one *dynamical* an-

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* Thus, in a recently recorded case in which sight was imparted by operation to a young woman who had been blind from her birth, but who had nevertheless learned to work well with her needle, when the pair of scissors she had been accustomed to use was placed before her, though she described their shape, colour, and glistening metallic character, she was utterly unable to recognize them *as scissors* until she put her finger on them, when she at once named them, laughing at her own stupidity (as she called it) in not having made them out before.

* See Sir John Herschel's 'Familiar Lectures on Scientific Subjects.'

tecedent—the power which does the work—from the aggregate of *material conditions* under which that power may be distributed and applied. No doubt the term cause is very loosely employed in popular phraseology; often (as Mr. Mill has shown) to designate the occurrence that immediately preceded the effect; as when it is said that the spark which falls into a barrel of gunpowder is the cause of its explosion, or that the slipping of a man's foot off the rung of a ladder is the cause of his fall. But even a very slightly trained intelligence can distinguish the power which acts in each case, from the conditions under which it acts. The force which produces the explosion is locked up, as it were, in the powder; and ignition merely liberates it, by bringing about new chemical combinations. The fall of the man from the ladder is due to the gravity which was equally pulling him down while he rested on it; and the loss of support, either by the slipping of his foot, or by the breaking of the rung, is merely that change in the material conditions which gives the power a new action.

Many of you have doubtless viewed with admiring interest that truly wonderful work of human design, the Walter Printing Machine. You first examine it at rest; presently comes a man who simply pulls a handle towards him; and the whole inert mechanism becomes instinct with life,—the blank paper continuously rolling off the cylinder at one end, being delivered at the other, without any intermediate human agency, as large sheets of print, at the rate of 15,000 in an hour. Now what is the *cause* of this most marvellous effect? Surely it lies essentially in the power or force which the pulling of the handle brought to bear on the machine from some extraneous source of power,—which we in this instance know to be a steam-engine on the other side of the wall. This force it is, which, distributed through the various parts of the mechanism, really performs the action of which each is the instrument; *they* only supply the vehicle for its transmission and application. The man comes again, pushes the handle in the opposite direction, detaches the machine from the steam-engine, and the whole comes to a stand; and so it remains, like an inanimate corpse, until recalled to activity by the renewal of its moving power.

But, say the reasoners who deny that force is anything else than a fiction of the imagination, the revolving shaft of the steam-engine is "matter in motion;" and when the connection is established between that shaft and the one that drives the machine, the *motion* is communicated from the former to the latter, and thence distributed to the several parts of the mechanism. This account of the operation is just what an observer might give, who had looked on with entire ignorance of everything but what his *eyes* could *see*; the moment he puts his *hand* upon any part of the machinery, and tries to stop its motion, he takes as direct cognizance, through his sense of the effort required to resist it, of the *force* which produces that motion, as he does through his *eye* of the motion itself.

Now, since it is universally admitted that our notion of the external world would be not only incomplete, but erroneous, if our visual perceptions were not supplemented by our tactile, so, as it seems to me, our interpretation of the phenomena of the Universe must be very inadequate, if we do not mentally co-ordinate the idea of force with that of motion, and recognize it as the "efficient cause" of those phenomena,—the "material conditions" constituting (to use the old scholastic term) only "their formal cause." And I lay the greater stress on this point, because the mechanical philosophy of the present day tends more and more to express itself in terms of *motion* rather than in terms of *force*,—to become *kinetics* instead of *dynamics*.

Thus from whatever side we look at this question,—whether the common sense of mankind, the logical analysis of the relation between cause and effect, or the study of the working of our own intellects in the interpretation of nature,—we seem led to the same conclusion; that the notion of *force* is one of those elementary forms of thought with which we can no more dispense, than we can with the notion of space or of succession. And I shall now, in the last place, endeavour to show you that it is the substitution of the dynamical for the mere phenomenal idea, which gives their highest value to our conceptions of that order of nature, which is worshipped as itself a God by the class of interpreters whose doctrine I call in question.

The most illustrative as well as the most illustrious example of the difference between the mere generalization of phenomena and the dynamical conception that applies to them, is furnished by the contrast between the so-called laws of planetary motion discovered by the persevering ingenuity of Kepler, and the interpretation of that motion given us by the profound insight of Newton. Kepler's three laws were nothing more than comprehensive statements of certain groups of phenomena determined by observation. The *first*, that of the revolution of the planets in elliptical orbits, was based on the study of the observed places of Mars alone; it might or might not be true of the other planets; for so far as Kepler knew, there was no reason why the orbits of some of them might not be the excentric circles which he had first supposed that of Mars to be. So Kepler's *second* law of the passage of the Radius Vector over equal areas in equal times, so long as it was simply a generalization of facts in the case of that one planet, carried with it no *reason* for its applicability to other cases, except that which it might derive from his erroneous conception of a whirling force. And his *third* law was in like manner simply an expression of a certain harmonic relation which he had discovered between the times and the distances of the planets, having no more rational value than any other of his numerous hypotheses.

Now the Newtonian "laws" are often spoken of as if they were merely *higher generalizations* in which Kepler's are included; to me they seem to possess an altogether different character. For starting with the conception of two *forces*, one of them tending to produce continuous uniform motion in a straight line, the other tending to produce a uniformly accelerated motion towards a fixed point, Newton's wonderful mastery of geometrical reasoning enabled him to show that, if these *dynamical* assumptions be granted, Kepler's *phenomenal* "laws," being necessary consequences of them, must be *universally* true. And while that demonstration would have been alone sufficient to give him an imperishable renown, it was his still greater glory to divine that the fall of the moon towards the earth—that is, the deflection of her path from a tangetial line to an ellipse—*is a phenomenon of the same order* as the fall of a stone to the ground; and thus to show the applicability to the entire universe, of those simple dynamical conceptions which constitute the basis of the geometry of the Principia.

Thus, then, whilst no "law" which is simply *a generalization of phenomena* can be considered as having any *coercive* action, we may assign that value to laws which express *the universal conditions of the action of a force*, the existence of which we learn from the testimony of our own consciousness. The assurance we feel that the attraction of gravitation *must* act under all circumstances according to its one simple law, is of a very different order from that which we have in regard (for example) to the laws of chemical attraction, which are as yet only generalizations of phenomena. And yet even in that strong assurance, we are required by our examination of the basis on which it rests, to admit a *reserve* of the *possibility* of something different; a reserve which we may well believe that Newton himself must have entertained.

A most valuable lesson as to the allowance we ought always to make for the unknown "possibilities of nature" is taught us by an exceptional phenomenon so familiar that it does not attract the notice it has a right to claim. Next to the law of the universal attraction of masses of matter, there is none that has a wider range than that of the *expansion of bodies by heat*. Excluding water and one or two other substances, the fact of such expansion might be said to be *invariable*; and, as regards bodies whose gaseous condition is known, the law of expansion can be stated in a form no less simple and definite than the law of gravitation. Supposing those exceptions, then, to be unknown, the law would be *universal* in its range. But it comes to be discovered that water, whilst conforming to it in its expansion from 39½° *upwards* to its boiling-point, as also, when it passes into steam, to the special law of expansion of vapours, is exceptional in its *expansion* also from 39½° *downwards* to its freezing-point; and of this failure in the universality of the law, no rationale can be given. Still more strange is it, that by dissolving a little *salt* in water, we should remove this exceptional peculiarity; for *sea*-water continues to contract from 39½° downwards to its freezing-point 12° or 14° lower, just as it does with reduction of temperature at higher ranges.

Thus from our study of the mode in which we arrive at those conceptions of the orderly sequence observable in the phenomena of nature which we call "laws," we are led to the conclusion that they are human conceptions, subject to human fallibility; and that they *may* or *may not* express the ideas of the Great Author of Nature. To set up these laws as self-acting, and as either excluding or rendering unnecessary the power which alone can give them effect, appears to me as arrogant as it is unphilosophical. To speak of *any* law as "regulating" or "governing" phenomena, is only permissible on the assumption that the law is the expression of the *modus operandi* of a governing power. I was once in a great city which for two days was in the hands of a lawless mob. Magisterial authority was suspended by timidity and doubt; the force at its command was paralysed by want of resolute direction. The "laws" were on the statute book, but there was no power to enforce them. And so the powers of evil did their terrible work; and fire and rapine continued to destroy life and property without check, until new power came in, when the reign of law was restored.

And thus we are led to the culminating point of man's intellectual interpretation of nature,—his recognition of the unity of the power, of which her phenomena are the diversified manifestations. Towards this point all scientific inquiry now tends. The convertibility of the physical forces, the correlation of these with the vital, and the intimacy of that *nexus* between mental and bodily activity, which, explain it as we may, cannot be denied, all lead upward towards one and the same conclusion; and the pyramid of which that philosophical conclusion is the apex, has its foundation in the primitive instincts of humanity.

By our own remote progenitors, as by the untutored savage of the present day, every change in which human agency was not apparent was referred to a particular animating intelligence. And thus they attributed not only the movements of the heavenly bodies, but all the phenomena of nature, each to its own deity. These deities were invested with more than human power; but they were also supposed capable of human passions, and subject to human capriciousness. As the uniformities of nature came to be more distinctly recognized, some of these deities were invested with a dominant control, while others were supposed to be their subordinate ministers. A serene majesty was attributed to the greater gods who sit above the clouds; whilst their inferiors might "come down to earth in the likeness of men." With the growth of the scientific study of nature, the conception of its harmony and unity gained ever-increasing strength. And so among the most enlightened of the Greek and Roman philosophers, we find a distinct recognition of the idea of the unity of the directing mind from which the order of nature proceeds; for they obviously believed that, as our modern poet has expressed it,—

"All are but parts of one stupendous whole,
Whose body nature is, and God the soul."

The science of modern times, however, has taken a more special direction. Fixing its attention exclusively on the *order* of nature, it has separated itself wholly from theology, whose function it is to seek after its *cause*. In this, science is fully justified, alike by the entire independence of its objects, and by the historical fact that it has been continually hampered and impeded in its search for the truth as it is in nature, by the restraints which theologians have attempted to impose upon its inquiries. But when science, passing beyond its own limits, assumes to take the place of theology, and sets up its own conception of the *order* of nature as a sufficient account of its *cause*, it is invading a province of thought to which it has no claim, and not unreasonably provokes the hostility of those who ought to be its best friends.

For whilst the deep-seated instincts of humanity, and the profoundest researches of philosophy, alike point to mind as the one and only source of power, it is the high prerogative of science to demonstrate the *unity* of the power which is operating through the limitless extent and variety of the universe, and to trace its *continuity* through the vast series of ages that have been occupied in its evolution.

Parliamentary and Law Proceedings.

Duties of Employers towards their Apprentices.

At the Maldon County Court, on Thursday, August 15th, an action was brought by the Rev. E. R. Horwood and the Rev. G. Tamplin, two of the trustees of Dr. Plume's charity, and Mr. Charles Smith, tailor, Maldon, against Mr. James Henry Trist, of 106, East India-road, Poplar, chemist, for breach of a covenant contained in apprenticeship indenture between the plaintiffs and defendant, and by which Thomas Arthur Smith (son of the plaintiff Charles Smith) was apprenticed to the defendant for five years, from May, 1871, to learn the businesses of a chemist, druggist and dentist.

Mr. A. Evans appeared for the plaintiffs, but the defendant did not attend.

It appeared from the opening statement of Mr. Evans to the jury and the evidence of the apprentice that in May, 1871, the lad went on trial at defendant's shop with a view of entering into apprenticeship. He was there six weeks, and during that time the master expressed himself quite satisfied with all he did, and gave expression to no complaint as to the lad's education, memory, or aptitude for the business, In consequence of this an indenture of apprenticeship was prepared at a premium of £65, £32. 10s. of which was paid down—£15 by Dr. Plume's trustees, and £17. 10s. by plaintiff, Charles Smith. In the indenture the defendant obliged himself "to use his best endeavours to teach and instruct, or cause to be taught and instructed, the apprentice in the several businesses." Almost immediately afterwards defendant commenced complaining of everything which he did, and those things which before the apprenticeship had been done to defendant's satisfaction were afterwards always objected to by him. The employment had consisted chiefly in mixing up and retailing out seidlitz powders, salts and senna, and other small articles, and in mixing pills, the defendant taking care not to allow his apprentice to know the nature of the drugs and ingredients of the latter, or the purpose for which they were made. No books were provided for the lad's reading; and even if they had been he was allowed no time for the purpose, being engaged in the shop from seven a.m. till ten and eleven p.m. In addition to the above duties he had had to clean the shop, the stoves, shake mats, and perform other menial offices usually executed by a shop-boy. Except on two or three occasions no lessons were given by the master to the apprentice, and when any information was sought by the latter of the former it was refused. Matters so continued up till December, when in answer to an application from the father for a report of his son's progress, defendant wrote a letter stating that, in consequence of defective education and memory, the apprentice was not suited for the business, and that a mechanical employment would be more suitable for him; to which the father replied that this did not absolve defendant from performing his covenant. In February of this year, defendant offered to return the premium, but then altered his mind, saying that if any one could make the lad a chemist he could, and should not part with him, but promised the father to put him through a severe course of study, giving not less than three lessons a week. This was not carried out; but from this time till May or June defendant entirely neglected him, and refused to give the slightest instruction; but on the contrary left the shop daily to the care of the apprentice, and at night returned and abused him for not having done more business. In May defendant gave the lad a black eye, and apologized for having done so to the father, and on June 1st the apprentice was sent home by the defendant, and it appeared with as little knowledge of chemistry and dentistry as he had carried with him. No effort had been made to prepare the lad for his Minor examination. Under these circumstances, Mr. Evans submitted that the plaintiffs were entitled to be put into the same position as they were on before the indenture was executed, and that the defendant could not and ought not to be allowed to retain the plaintiffs' money when he had entirely failed to perform the consideration for which it was paid.

As the defendant did not appear, the Judge at once summed up, instructing the jury that if they believed the defendant had not used his best means to instruct they should find a verdict for the plaintiffs.

The jury at once found a verdict for £32. 10*s.*, and his Honour ordered defendant to pay plaintiffs' taxed costs and expense of witnesses, with immediate execution.—*Chelmsford Chronicle.*

Correspondence.

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

Provincial Education.

Sir,—In justice to myself I must notice a letter from 'Country Major Associate,' in your issue of August 3rd. Your correspondent writes as follows: "With regard to the subject of payment for results, 'G. T.' says that I had better leave the matter in abler hands." Now it is a pity that when he referred to my letter to find out the date, he did not look to see what it was I really did say. If he will take the trouble to look again, he will find the expression used by me runs as follows: "With regard to the subject of payment for results, 'Country Major Associate,' had better leave it in the hands of Mr. Schacht, as I do not think he will find abler ones to grapple with it?" Now this is very different from what 'Country Major Associate' makes me say.

Your correspondent thinks, or rather fancies, that Mr. Schacht's scheme cannot be adopted by the Society, on account of "the objection of examined men to allow some of the interest of their money deposited in the Society, to be distributed to the students of the country." Would it surprise him to learn that Mr. Schacht's scheme has already been adopted by the Council? And though I dare say many ('Country Major Associate' amongst them) would much prefer to see the annual surplus invested in Consols, than spread abroad, doing good to their own class, yet it is a great comfort to think that as they unfortunately happen to be in a minority, they cannot have it their own way.

There seem to be a little "Bunkum" in 'Country Major Associate's' account of his own case. In the present state of the trade, "examined pharmaceutists" are in but a small minority, and of this learned few, how many "delight to teach"? Your correspondent must excuse me if I doubt the statement that his pharmacy contains more specimens than the local museums, or his library more and better books than the local library, at least I should not think that is the case, with respect to the Norwich Association.

In the Journal of the 10th we have served up, cut and dried, an ideal representation of "the Society, local committee, teacher and student," under the scheme of Mr. Schacht. Somewhere or other, I remember to have met with an old proverb, so old indeed, that even if 'Country Major Associate' had met with it, I doubt if he would have paid any attention to it, and it ran something to the effect that, "An ounce of practice was worth a pound of theory," and I think it very applicable to 'Country Major Associate's' ideal representation. For my own part, I cannot see what there is in this representation so formidable that the Society could not overcome it. With regard to his sneer at the lower middle classes, let him remember that from this class have risen, greater, nobler, and better men than from all the wealthy aristocrats put together. Did he never hear of Faraday, of Brindley, or of Stephenson? To my way of thinking it is more creditable for the son of a "policeman, coastguardsman, artisan, or small shopkeeper," to work his way up to a responsible and respectable position in life, than it is for the son of a wealthy man who has no end of advantages in money, tutors, etc. 'Country Major Associate' seems as if he would make worldly prosperity the standard, whereby to judge a man, instead of mental ability. Who are those men whose names stand foremost in Science, Art, and Commerce? They are the men who work, who have stern necessity to spur them forward, and with whom work has become a duty, a pleasure, and a habit. I admire and support Mr. Schacht's scheme because it does what is so distasteful to 'Country Major Associate,' that is, it helps those who need help, those whom 'Country Major Associate' styles the lowest class of chemists, those who with the glorious example of Faraday before them, will in future time form the backbone of our trade, raising it to a high scientific position with a fair commercial prosperity, Ask those who have had experience in teaching of any sort, not particularly pharmacy, who are the hardest workers, and who need the most help, and they will tell you that they are those who have only their hands and head to depend on, and that the son of a coastguardsman or shopkeeper has before now come to stand before "Kings and princes." And this is where Mr. Schacht's scheme so admirably fits in, it does not aid indiscriminately, but the more a student works the more is he helped and rewarded. If there is any fault in the scheme, it is that it makes the interest of the student to a certain degree secondary to that of the local association. I think that every student who can pass the required examination should be rewarded and stimulated to further exertion whether he belongs to a local association or whether he does not.

G. T.

Norwich, August 12th.

C. Hutchinson.—We believe the person mentioned is still living; probably his address is given in the 'Medical Directory.'

J. Barker, F. Clayton, and *J. D. Jenkinson* are thanked for their communication.

In consequence of a press of matter we are again compelled to defer the publication of several communications.

Communications, Letters, etc., have been received from Mr. E. B. Vizer, Mr. D. Hanbury, Mr. W. Geddes, Mr. Severs, Mr. J. F. Brown, Mr. F. Andrews, Mr. W. Smeeton, Mr. E. C. Ellis, Messrs. Gard and Co., Mr. Yewdall, "Chemist," "Quinia," "Secretary of Newcastle Chemists' Assistants' Association," "Ex-Student at Bloomsbury Square," "Not Happy," Z.

The following journals have been received:—The 'British Medical Journal,' August 17; the 'Medical Times and Gazette,' August 17; the 'Lancet,' August 17; the 'Medical Press and Circular,' August 17; the 'Chemical News,' August 17; 'English Mechanic,' August 17; 'Gardeners' Chronicle,' August 17; the 'Grocer,' August 17; the Journal of the Society of Arts,' August 17; Grocery News,' August 17.

THE MICROSCOPE IN PHARMACY.

BY HENRY POCKLINGTON.

(*Continued from page* 104.)

PODOPHYLLI RADIX.—The structure of the root of *Podophyllum peltatum* is strikingly dissimilar to any I have hitherto described, and presents several interesting features.

The first thing which will strike the observer on examining a thin cross section is the singular roundness of the large cells of which the major portion of the root is composed. The centre of the root is composed of sub-cylindrical cells, sometimes overlapping each other at their junction by a finger-like extension, which in cross section might be mistaken for a large aggregation of the intercellular substances of Mulder. The adhesion of these cells in linear series is remarkable, and it is easy to separate them into long columns by a short maceration in warm water. They contain great quantities of starch imbedded in a semi-albuminous substance, the deportment of which differs slightly from that of the usual protoplasmic cell contents, with which it is probably intimately allied, but is slightly admixed with dextrinous (?) matter.

A very incomplete vascular ring separates this structure from the cortical series. The vascular wedges are usually completely isolated, and are small in proportion to the diameter of the root. The vessels are pitted with long narrow pits, and might almost be considered to be scalariform vessels, were it not that they are oval, or circular, in cross section. Their walls are very thin. With the vessels are associated delicate liber cells and canaliculi, which contain the dark yellowish-brown resinous matter which is sometimes transfused into the vessels and stains them deeply.

The cells of the cortical layers vary in size and shape from precisely similar cells to those of the central portion to the compressed cells of the outermost portion. In no case do they present special features other than already noticed. It follows, as a matter of course, from the circular, or oval, cross outline of the parenchymatous cells that their adhesion to each other is very incomplete. What would otherwise be intercellular spaces are filled, sometimes with intercellular substance of a complex and very variable character, and sometimes with a finger-like protrusion of one of the contiguous cells. This latter is the most rare occurrence by far. The behaviour of the intercellular substance with the usual reagents is perplexing and somewhat contradictory. In many cases nitrate of silver stains it intensely; in other cases, in the same section, this reagent appears inert. Magenta usually, but not invariably, stains it intensely. Iodine always stains it yellow. A solution of iodine and iodide of potassium in water dissolves it and isolates the cells. Sulphuric and nitric acids, in a dilute form, attack it very slowly. Benzole and alcohol have no sensible action upon it.

The starch granules present are usually separate granules, modified in shape by pressure within the cell with a distinct punctate, often radiate, hilum; and are intensely bi-refractive, giving the usual black cross with polarized light.

The sphæraphides abundantly present are remarkable for their great size and beauty, and are arranged linearly by the side of the vascular bundles and distributed, also in linear series, through the central, and innermost cortical portion of the root. Each sphæraphide is contained in a delicate cell, a little larger than itself, and containing a hyaline semi-fluid matter, apparently protoplasmic. The projections of the compound crystal are coated with some substance which can be intensely stained with nitrate of silver if very carefully applied in a weak solution. The isolation of these special cells and their contents is perfectly easy; maceration in water containing a little potash is sufficient, or, and this is not difficult, the cells being large, they may be isolated by simple dissection. Solution of gum arabic in water, to which has been added either camphor or arsenious acid, is the best medium in which to mount either the isolated sphæraphidian cells or sections of the root. The latter do not mount satisfactorily.

(*To be continued.*)

NOTES ON PEPSIN AND BISMUTH, AND ELIXIR OF PEPSIN AND BISMUTH.

BY E. SCHEFFER.

Several facts which I published in a previous essay,* impressed on me the impossibility of a preparation such as elixir pepsin, bismuth (and strychnine.) I do not want to speak again about the presence of alcohol in a solution containing pepsin, as I have repeatedly given the results of my experiments, which prove, beyond doubt, that pepsin and alcohol, particularly when the latter amounts to a certain percentage, are incompatible.

The main objection I intended to bring against such an elixir, prepared with ammonio-citrate of bismuth in a neutral or alkaline solution, is the neutral or slightly alkaline state. My experiments prove clearly that pepsin, in neutral solution, does not keep, and that in alkaline solution it loses its digestive properties. In how minute quantities the presence of an alkali destroys the digestive properties of pepsin, will be shown by the following experiments, quite recently made.

Having once taken our well water—which contains carbonate of lime and magnesia—instead of distilled water, to swell the pepsin, before the acid was added, I was astonished to find that the pepsin did not act on albumen. This caused me to repeat the experiment simultaneously with others for control.

A. Pepsin swelled in distilled water; the acid (6 drops of muriatic acid to the fluid ounce) added afterwards.

B. Pepsin swelled in well-water, and 6 drops of acid added to 1 oz. after 2 hours.

C. Pepsin swelled in distilled water, which had been shaken with carbonate of magnesia, for two days, and then filtered; 6 drops of acid added after two hours.

D. Pepsin dissolved in acidulated well water.

Of these four experiments each contained the same amount of acid, the same amount of pepsin, and to each vial the same amount of coagulated albumen was added. After having been exposed to a temperature of 105° Fahr. for six hours, in A and D all the albumen was dissolved, while in B and C the albumen did not appear to have been acted upon.

Therefore, in C, the small quantity of magnesia

* Am. Jour. Phar., Feb., 1872, and Pharm. Journ. [3] ii. 761.

which the distilled water had dissolved, and with which quantity the pepsin had been in contact before the acid was added, was sufficient to modify the pepsin and destroy its digestive action on fresh coagulated albumen. In B, the carbonates of the well water had caused the same result. In D, the carbonates were destroyed by the addition of acid before the pepsin was added, and therefore the albumen was easily dissolved. Such proofs, I think, must necessarily convince the most sceptical.

The physician might wish for a combination of pepsin and bismuth in the liquid state, but another question is, can such a combination be made, or can it exist? Those that manufactured the elixir of pepsin and bismuth (and strychnine), were satisfied to know that they used pepsin in its preparation, but whether it was in it or in an active form, never troubled them, as they never tested for it. They could conscientiously put their label on the bottle, and maintain that they used pepsin in its preparation. The physician prescribed it in good faith, because he had confidence in the firm who made it, and in the name by which the preparation was designated.

Having tested several elixirs of pepsin and bismuth that I was able to obtain I found that even after the addition of hydrochloric acid not the least quantity of albumen was dissolved.

Thinking that an acidulated bismuth solution might, in combination with pepsin, prove more efficacious, containing the pepsin in its active form, my first aim was to find a bismuth salt for that purpose.

Crystallized ternitrate of bismuth dissolves in glycerine, which solution can be diluted with a considerable quantity of water before the subnitrate is precipitated. This salt I dropped from the list, as the solution is too acid, and the taste too styptic.

Freshly precipitated subnitrate of bismuth, prepared with one part of crystallized ternitrate with 40 parts of water was put on a filter, and when entirely drained added to glycerine, in which it dissolves, forming a clear solution, but on the addition of water the clear solution becomes milky after some time.

I now tried the action of acids on ammonio-citrate of bismuth. For that purpose I made two solutions of ammonio-citrate of bismuth of the same strength, with the difference that the one solution was made with water alone, and the other with a mixture of glycerine and water. To these solutions were now added different acids, and the following results obtained: Mineral acids gave in both solutions immediately a precipitate. By the addition of organic acids, such as acetic, lactic and citric, both solutions kept clear, but after a lapse of several hours the pure water solutions became milky, and by longer standing deposited a white precipitate, while in the solutions containing glycerine an opalescence did not show itself before twenty-four hours.

Judging that a small quantity of organic acid, sufficient to dissolve the pepsin, would not give even an opalescence in a solution of ammonio-citrate of bismuth containing glycerine, I thought that a glycerole could be made containing pepsin as well as bismuth, etc.; but by mixing the pepsin solution with the solution of the bismuth salt, the pepsin was precipitated in the same characteristic form as it is precipitated from its solutions by chloride of sodium.

Having at first intended to make the glycerole contain in the pint 128 grains ammonio-citrate of bismuth, 256 grains of saccharated pepsin (respectively 1 and 2 grains to the fluid drachm), 1 fluid drachm of lactic acid, 8 fluid ounces glycerine, and 8 ounces of water, I thought that by making it only half as strong in bismuth and pepsin it might answer, but the pepsin was in this instance also precipitated. The ingredients were put together in four different ways, but in all with the same result.

This negative result proves clearly that the pepsin is precipitated from its solution by the bismuth salt, and as I have proven in my essay (Feb. 1872), that a watery solution of pepsin is precipitated by chloride of sodium in the same way as an acidulated one, we must infer that the bismuth salt acts in the same manner, and that therefore the elixir of pepsin and bismuth, as it was made, *cannot contain any pepsin.*

Abstracting, therefore, from the alcohol, and not speaking of the neutral or alkaline solution, the elixir of pepsin and bismuth is an incongruity, and when patients have derived any benefit from it, it has been from the bismuth it contained, and the stimulating effect of the spirits, but surely not from the pepsin, *as it does not contain any pepsin.—Amer. Journ. Pharmacy.*

ORGANIC CHEMISTRY AND THERAPEUTICS.*

BY A. W. HOFMANN.

(Continued from p. 146.)

There is no need to establish an artificial line of demarcation. The group of hydrocarbons and their derivatives are clearly distinguished from the rest of the chemical edifice. Born from the union of two powerful radicals, carbon and hydrogen, these bodies can, under the influence of a small number of elements, give birth to innumerable compounds, which, spite of the infinite variety of their properties, bear all of them the mark of one indubitable parent; they are the primary matter from which plants and animals are formed. The group unites an assemblage of properties such as are not present in any other class of combinations, and which, if they do not permit the drawing of a well-defined line of demarcation, are sufficient to justify the consideration of these bodies as a distinct group.

But what is the influence which the researches in the field so defined have exercised upon the development of therapeutics? The chief features only of the principal services rendered by chemistry to therapeutics can here be indicated. In his early studies upon the substance of plants and animals the chemist is led to use analytical methods, and at starting it is only by analytical facts that therapeutics profits by the progress of chemistry. The physician is enabled for the first time to recognize the active principles of a series of medicaments long employed with success, and in many cases these active principles when indicated by science have been substituted for the mixture, often so disagreeable, the properties of which have only been discovered by chance or by empiricism.

An interesting example is found in the time when the study of organic chemistry first began to occupy the attention of chemists. The poisonous properties of bitter almonds (*Amygdalus communis*) had been indicated from antiquity. It was known also at the commencement of the eighteenth century that the leaves of the cherry-laurel (*Prunus lauro-cerasus*) furnished an oil possessing poisonous properties, and in the closing years of the same century, cherry-laurel water was already employed as a medicament. But at that time the nature of the active principle contained in bitter almonds and in cherry-laurel water was not yet suspected; and it was only at the commencement of the present century

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* Lecture delivered at the Medical Chirurgical Institute of Berlin.

that Dohm recognized in water of bitter almonds the presence of prussic acid, discovered in 1782 by Scheele. Soon afterwards Gehlen and Schrader demonstrated that the above waters owed their remarkable physiological properties entirely to the presence of prussic acid, and in 1837 Liebig and Wohler proposed to substitute for these medicaments, always variable and uncertain in composition, solutions of prussic acid of known strength.

In the second decade of our century the labours of Sertürner resulted in a great progress in the same road. The study of the juice of various *Papaveraceæ*, known under the name of opium, led him to the discovery of morphine; to this latter was afterwards added a group of opium bases, among which should be mentioned codeine, discovered by Robiquet. The study of the *Rubiaceæ* and *Strychnaceæ* gave results not less important. Pelletier and Caventou discovered quinine and cinchonine in the cinchona bark and strychnine in the fruit of *Strychnos Nux-vomica* not to speak of other less important bases. In the place of opium, a complex substance, containing not less than six different alkaloids possessed of opposite properties; in the place of the powder or tincture of cinchona; in the place of the tincture or extract of nux-vomica; in the place, in one word, of mechanical mixtures, as variable in their medical properties as in their composition, the physician has now at his disposition morphine and codeine with their well crystallized salts, quinine and cinchonine, and finally strychnine and its salts,—chemical compounds of which the uniform action cannot be denied. Besides these the chemist has extracted from the *Digitalis purpurea* and *Artemisia*, their active principles, and the physician is thus enabled to substitute for the infusions and extracts of those plants digitaline and santonine, which are now obtained pure and well crystallized.

Another investigation, no less important therapeutically, has been that of the valerian root (*Valeriana officinalis*). It was found that its action was due to two different principles, oil of valerian and valerianic acid, both of which merit the attention of the chemist, and either of which is available for use by the physician. For the infusion of coffee or of tea, caffeine (theine) may now be substituted, and in the place of tincture of galls the physician may employ chemically pure tannic acid.

But the researches of organic chemistry have not been confined to substances already recognized as medicines; there is scarcely a plant, flower or fruit which it has not searched for active principles. Chemists discovered veratrine in the white hellebore (*Veratrum album*), atropine in the belladonna (*Atropa belladonna*); and quickly physicians utilized in the happiest manner the neurotic and febrifuge properties of the one, and the faculty of dilating the pupil possessed by the other.

Soon the researches made in the domain of organic chemistry took a fresh direction; they were no longer limited to submitting animal and vegetable matter to the action of solvents like water, alcohol and ether, or exhausting them by bases or dilute acids, or, in one word, decomposing them into their immediate principles. The most energetic reagents; substances greedy for water, such as sulphuric and phosphoric acids; oxidizing agents of all degrees of intensity, from fuming nitric acid, chromic acid, oxide of manganese and peroxide of lead or to oxygen obtained by electrolysis, rendered active by means of platinum black; chlorine, bromine, iodine; ammonia, in the gaseous state or in solution; the hydrated alkalies, in concentrated solution or even in a state of fusion,—all these bodies became the chemist's new instruments of research. And it was no longer only upon the principles already formed in the animal or vegetable organism that his researches were made.

In the presence of such powerful agents of decomposition, the primitive substances underwent more or less profound modifications, and these were the products of the decomposition of the elements of plants which the chemist had then in his hands. Here was an unexpected source of riches for the seekers. The same body, under the influence of different reagents, was found to undergo the most varied metamorphoses; and under different conditions of time, concentration and temperature, the same reagent produced upon the one body the most diverse modifications. Moreover, these products of decomposition of animal and vegetable substances were modified in their turn under the influence of chemical agents, until at last the successive substances led to the simplest combinations or even to the elements themselves. Aided by this new method of investigation, organic chemistry suddenly took a development which for a time completely relegated inorganic chemistry to the second place. But at the same time that the field of research was so enlarged, the number of labourers increased, and from their active hands soon issued the incontestable treasury of facts upon which to-day organic chemistry rests. At first these treasures were in chaos and confusion; men whom chance favoured with a valuable discovery and those who saw long efforts crowned at last by success frequently knew not what to do with their riches. But soon the spirit of order took up the task of classifying the mass of materials; it sought to test them and distinguish that which was important from that which was not, and to unite those which appeared analogous. When once order had taken the place of confusion, the eye was immediately arrested with admiration at the constitution of each substance, and at the marvellous bonds which connected all these bodies with each other.

(*To be continued.*)

THE AIMS AND INSTRUMENTS OF SCIENTIFIC THOUGHT.*

BY PROFESSOR CLIFFORD.

It is my duty to speak to you for a short time about the aims and instruments of scientific thought. It may have occurred (and very naturally too) to such as have had the curiosity to read the title of this lecture, that it must necessarily be a very dry and difficult subject, interesting to very few, intelligible to still fewer, and above all, utterly incapable of adequate treatment within the limits of a discourse like this. It is quite true that a complete setting forth of my subject would require a comprehensive treatise on logic, with incidental discussion of the main question of metaphysics; that it would deal with ideas demanding close study for their apprehension, and investigations requiring a peculiar taste to relish them. It is not my intention to present you with such a treatise this evening. The British Association, like the world in general, contains three classes of persons. In the first place it contains scientific thinkers, that is to say, persons whose thoughts have very frequently the characters which I shall presently describe. Secondly, it contains persons who are engaged in work upon what are called scientific subjects, but who, in general, do not, and are not expected to think about the subjects in a scientific manner. Lastly, it contains persons who suppose that their work and their thoughts are unscientific, but who would like to know something about the business of the other two classes aforesaid. Now, to any one who, belonging to one of these classes, considers either of the other two, it will be apparent that there is a certain gulf between him and them; that he does not quite understand them, nor they him; and that an opportunity for sympathy and comradeship is lost through this want of understanding. It is this gulf that I desire to bridge over, to the best of my power. That the scientific thinker may consider

* Lecture delivered before the British Association at Brighton, Monday, August 19th, 1872.

his business in relation to the great life of mankind; that the noble army of practical workers may recognize their fellowship with the outer world, and the spirit which must guide both; that this so-called outer world may see in the work of science only the putting in evidence of all that is excellent in its own work—may feel that the kingdom of science is within it. These are the objects of the present discourse, and you will see that they compel me to choose such portions of my vast subject as shall be intelligible to all, while they ought at least to command an interest universal, personal and profound. In the first place, then, I want to explain what is meant by scientific thought. You may have heard some of it expressed in the various sections this morning. You have probably also heard expressed in some places a great deal of unscientific thought, notwithstanding that it was about mechanical energy, or about hydrocarbons, or about eocene deposits, or about malacopterygii; for scientific thought does not mean thought about scientific subjects with long names. There are no scientific subjects. The subject of science is the human universe; that is to say, everything that is, or has been, or may be related to man. Let us, then, taking several topics in succession, endeavour to make out in what cases thought about them is scientific, and in what cases not. Ancient astronomers observed that the relative motions of the sun and moon recurred all over again in the same order about every nineteen years. They were thus enabled to predict the time at which eclipses would take place. A calculator at one of our observatories can do a great deal more than this. Like them, he makes use of past experience to predict the future; but he knows of a great number of other cycles besides that one of nineteen years, and takes account of all of them; and can tell about the solar eclipse of six years hence exactly where it will be visible, and how much of the sun's surface will be covered at each place, and, to a second, at what time of day it will begin and finish there. This prediction involves technical skill of the highest order; but it does not involve scientific thought, as any astronomer will tell you. By such calculations the places of the planet Uranus at different times of the year had been predicted and set down. The predictions were not fulfilled. Then arose Adams, and from these errors in the prediction he calculated the place of an entirely new planet, that had never yet been suspected; and you all know how the new planet was actually found in that place. Now this prediction does involve scientific thought, as any one who has studied it will tell you. Here there are two cases of thought about the same subject, both predicting events by the application of previous experience; yet we say that one is *technical* and the other *scientific*.

Now, let us take an example from the building of bridges and roofs. When an opening is spanned over by a material construction, which must bear a certain weight without bending enough to injure itself, there are two forms in which this construction can be made; the arch and the chain. Every part of an arch is compressed or pushed by the other parts; every part of a chain is in a state of tension, or is pulled by the other parts. In many cases these forms are united. A girder consists of two main pieces or booms, of which the upper one acts as an arch and is compressed, while the lower one acts as a chain and is pulled; and this is true even when both the pieces are quite straight. They are enabled to act in this way by being tied together, or braced, as it is called, by cross-pieces, which you must often have seen. Now, suppose that any good practical engineer makes a bridge or roof upon some approved pattern which has been made before, he designs the size and shape of it to suit the opening which has to be spanned, selects his material according to the locality, assigns the strength which must be given to the several parts of the structure according to the load which it will have to bear. There is a great deal of thought in the making of this design, whose success is predicted by the application of previous experience; it requires technical skill of a very high order, but it is not scientific thought. On the other hand, Mr. Fleming Jenkin designs a roof, consisting of two arches braced together, instead of an arch and a chain braced together, and although this form is quite different from any known structure, yet before it is built he assigns with accuracy the amount of material that must be put into every part of the structure in order to make it bear the required load, and this prediction may be trusted with perfect security. What is the natural comment upon this? Why, that Mr. Fleming Jenkin is a scientific engineer. Now it seems to me that the difference between scientific and merely technical thought, not only in these but in all other instances which I have considered, is just this. Both of them make use of experience to direct human action; but while technical thought or skill enables a man to deal with the same circumstances that he has met with before, scientific thought enables him to deal with different circumstances that he has never met with before. But how, you will say, can experience of one thing enable us to deal with another quite different thing? To answer this question we shall have to consider more closely the nature of scientific thought.

Let us take another example. You know that if you make a dot on a piece of paper, and then hold a piece of Iceland spar over it, you will see not one dot, but two. A mineralogist, by measuring the angle of a crystal, can tell you whether or not it possesses this property without looking through it. He requires no scientific thought to do that. But Sir William Rowan Hamilton, the late Astronomer Royal of Ireland, knowing these facts, and also an explanation of them which Fresnel had given, thought about the subject, and he predicted that, by looking through certain crystals in a particular direction, we should see not two dots but a continuous circle. Mr. Lloyd made the experiment and saw the circle, a result which had never been even suspected. This has always been considered one of the most signal instances of scientific thought in the domain of physics. It is not distinctly an application of experience gained under certain circumstances to entirely different circumstances. Now, suppose that the night before coming down to Brighton you had dreamed of a railway accident caused by the engine getting frightened at a flock of sheep, and jumping suddenly back over all the carriages, the result of which was that your head was unfortunately cut off, so that you had to put it in your hat-box and take it back home to be mended. There are, I fear, many persons even at this day who would tell you that after such a dream it was unwise to travel by railway to Brighton. This is a proposal that you should take experience gained while you are asleep, when as the President says, you have no common sense, experience about a phantom railway, and apply it to guide you when you are awake, and have common sense, in your dealing with a real railway. And yet this proposal is not dictated by scientific thought.

Now let us take the great example of Biology. I pass over the process of classification, which itself requires a great deal of scientific talk; in particular when a naturalist, who has studied and monographed a fauna or a flora, rather than a family, is able at once to pick out the distinguishing character required for the subdivision of an order quite new to him. Suppose that we possess all this minute and comprehensive knowledge of plants and animals and intermediate organisms, their affinities and differences, their structure and functions; a vast body of experience, collected by incalculable labour and devotion. Then comes Mr. Herbert Spencer; he takes that experience of life which is not human, which is apparently stationary, going on in exactly the same way from year to year, and he applies that to tell us how to deal with the changing characters of human nature and human society. How is it that experience of this sort, vast as it is, can guide us in a matter so different from itself? How does scientific thought, applied to the development of a kangaroo fœtus or the movement of the sapinexogen, make prediction possible for the first time in that most important of all sciences, the relations of man with man? In the dark or unscientific ages men had another way of applying experience to altered circumstances. They believed for example that the plant called Jew's-ear, which does bear a certain resemblance to the human ear, was a useful cure for diseases of that organ. This doctrine of signatures, as it was called, exercised an enormous influence on the medicine of the time. I need hardly tell you that it is hopelessly unscientific; yet it agrees with those other examples that we have been considering in this particular; that it applies experience about the shape of a plant, which is one circumstance connected with it, to dealings with its medicinal properties, which are other and different circumstances. Again, suppose that you had been frightened by a thunderstorm on land, or your heart had failed you in a storm at sea; if any one then told you that in consequence of this you should always cultivate an unpleasant sensation in the pit of your stomach, till you took a delight in it, that you should regulate your sane and sober life by the sensations of a moment of unreasoning terror; this advice would not be an example of scientific thought. Yet it would be an application of past experience to new and different circumstances. But you will already have observed what is the additional clause that we must add to our definition in order to describe scientific thought and that only. The step between experience about animals and dealings with changing humanity is the law of evolution. The step from calculated places of Uranus to the existence of Neptune is the law of gravitation. The step from observed behaviour of crystals to conical refraction is made up of laws of light and geometry. The step from old bridges to new ones is the laws of elasticity and the strength of materials. The step then from past experience to new circumstances must be made in accordance with an observed uniformity in the order of events. This uniformity has held good in the past in certain places; if it should also hold good in the future and in other places, then, being combined with our experience of the past, it enables us to predict the future, and to know what is going on elsewhere; so that we are able to regulate our conduct in accordance with this knowledge. I want to make a little clearer the fact that what you call the evidence for a thing depends upon the assumption that this uniformity is valid at places and times at which it has not been observed. The aim of scientific thought, then, is to apply past experience to new circumstances; the instrument is an observed uniformity in the course of events. By the use of this instrument it gives us information transcending our experience, it enables us to infer things that we have not seen from things that we have seen; and the evidence for the truth of that information depends, as we have seen, on our supposing that the uniformity holds good beyond our experience.

I now want to consider this uniformity a little more closely; to show how the character of scientific thought and the force of its inferences depend upon the character of the uniformity of nature. I cannot of course tell you all that is known of this character without writing an encyclopædia; but I shall confine myself to two points of it about which it seems to me that just now there is something to be said. I want to find out what we mean when we say that the uniformity of nature is *exact;* and what we mean when we say that it is *reasonable.* When a student is first introduced to those sciences which have come under the dominion of mathematics, a new and wonderful aspect of nature bursts upon his view. He has been accustomed to regard things as essentially more or less vague. All the facts that he has hitherto known have been expressed qualitatively, with a little allowance for error on either side. Things which are let go fall to the ground. A very observant man may know also that they fall faster as they go along. But our student is shown that, after falling for one second in a vacuum, a body is going at the rate of 32 feet per second; that after falling for two seconds, it is going twice as fast; after going two and a half seconds, two and a half times as fast. If he makes the experiment, and finds a single inch per second too much or too little in the rate, one of two things must have happened: either the law of falling bodies has been wrongly stated, or the experiment is not accurate; there is some mistake. He finds reason to think that the latter is always the case; the more carefully he goes to work, the more the error turns out to belong to the experiment. Again, he may know that water consists of two gases, oxygen and hydrogen combined together; but he now learns that two pints of steam at a temperature 150 deg. centigrade will always make two pints of hydrogen and one pint of oxygen at the same temperature; all of them being pressed as much as the atmosphere is pressed. If he makes the experiment and gets rather more or less than a pint of oxygen, is the law disproved? No; the steam was impure, or there was some mistake. Myriads of analyses attest the law of combining volumes; the more carefully they are made, the more nearly they coincide with it. The aspects of the faces of a crystal are connected together by a geometrical law, by which, four of them being given, the rest can be found. The place of a planet at a given time is calculated by the law of gravitation; if it is half a second wrong, the fault is in the instrument, the observer, the clock or the law; now, the more observations are made the more of this fault is brought home to the instrument, the observer and the clock. It is no wonder then that our student, contemplating these and many like instances, should be led to say, "I have been shortsighted; but I have now put on the spectacles of science, which nature has prepared for my eyes; I now see that things have definite outlines, that the world is ruled by exact and rigid mathematical laws; "Kai su, theos, geometreis." It is our business to consider whether he is right in so concluding. Is the uniformity of nature absolutely exact, or only more exact than our experiments? At this point we have to make a very important distinction. There are two ways in which a law may be inaccurate. The first way is exemplified by that law of Galileo which I mentioned just now; that a body falling in vacuo acquires equal increase of velocity in equal times. No matter how many feet per second it is going, after an interval of a second it will be going thirty-two *more* feet per second. We now know that this rate of increase is not exactly the same at different heights, that it depends upon the distance of the body from the centre of the earth; so that the law is only approximate; instead of the increase of velocity being exactly *equal* in equal times, it itself increases very slowly as the body falls. We know also that this variation of the law from the truth is *too small to be perceived* by direct observation on the change of velocity. But suppose we have invented means for observing this, and have verified that the increase of velocity is inversely as the squared distance from the earth's centre. Still the law is not accurate; for the earth does not attract accurately towards her centre, and the direction of attraction is continually varying with the motion of the sea; the body will not even fall in a straight line. The sun and the planets, too, especially the moon, will produce deviations; yet the sum of all these errors will escape our new process of observation, by being a great deal smaller than the necessary errors of that observation. But when these again have been allowed for, there is still the influence of the stars. In this case, however, we only give up one exact law for another. It may still be held that if the effect of every particle of matter in the universe on the falling body were calculated according to the law of gravitation, the body would move exactly as this calculation required. And if it were objected that the body must be slightly magnetic or diamagnetic, while there are magnets not an infinite way off; that a very minute repulsion, even at sensible distances, accompanies the attraction; it might be replied that these phenomena are themselves subject to exact laws, and that when all the laws have been taken into account, the actual motion will exactly correspond with the calculated motion.

I suppose there is hardly a physical student (unless he has specially considered the matter) who would not at once assent to the statement I have just made; that if we knew all about it, Nature would be found universally subject to exact numerical laws. But let us just consider for another moment what this means.

The word *exact* has a practical and a theoretical meaning. When a grocer weighs you out a certain quantity of sugar very carefully, and says it is exactly a pound, he means that the difference between the mass of the sugar and that of the pound weight he employs is too small to be detected by his scales. If a chemist had made a special investigation, wishing to be as accurate as he could, and told you this was exactly a pound of sugar, he would mean that the mass of the sugar differed from that of a certain standard piece of platinum by a quantity too small to be detected by *his* means of weighing, which are a thousand-fold more accurate than the grocer's. But what would a mathematician mean, if he made the same statement? He would mean this. Suppose the mass of the standard pound to be represented by a length, say a foot, measured on a certain line; so that half a pound would be represented by six inches, and so on, and let the difference between the mass of the sugar and that of the standard pound be drawn upon the same line to the same scale. Then if that difference were magnified an infinite number of times it would still be invisible. This is the theoretical meaning of exactness; the practical meaning is only very close approximation; *how* close, depends upon the circumstances. The knowledge then of an exact law in the theoretical sense would be equivalent to an infinite observation. I do not say that such knowledge is impossible to man; but I do say that it would be absolutely different in kind from any knowledge that we possess at present.

I shall be told, no doubt, that we do possess a great deal of knowledge of this kind, in the form of geometry and mechanics; and that it is just the example of these sciences that has led men to look for exactness in other quarters. If this had been said to me in the last century, I should not have known what to reply. But it happens that about the beginning of the present century the foundations of geometry were criticized independently by two mathematicians. Lobatscheffsky and the immortal Gauss; whose results have been extended and generalized more recently by Riemann and Helmholtz. And the conclusion to which these investigations lead is that, although the assumptions which were very properly made by the ancient geometers are practically exact—that is to say, more exact than experiment can be—for such finite things as we have to deal with and such portions of space as we can reach; yet the truth of them for very much larger things, or very much smaller things, or parts of space which are at present beyond our reach, is a matter to be decided by experiment, when its powers are considerably increased. I want to make as clear as possible the real state of this question at present, because it is often supposed to be a question of words or metaphysics, whereas it is a very distinct and simple question of fact. I am supposed to know then that the three angles of a rectilinear triangle are exactly equal to two right angles. Now suppose that three points are taken in space, distant from one another as far as the sun is from Sirius, and that the shortest distances between these points are drawn so as to form a triangle. And suppose the angles of these points to be very accurately measured and added together; this can at present be done so accurately that the error shall certainly be less than one minute, less therefore than the five-thousandth part of a right angle. Then I do not know that this sum would differ at all from two right angles; but also I do not know that the difference would be less than ten degrees, or the ninth part of a right angle. And I have reasons for not knowing.

This example is exceedingly important as showing the connection between exactness and universality. It is found that the deviation, if it exists, must be nearly proportional to the area of the triangle. So that the error in the case of a triangle whose sides are a mile long would be obtained by dividing that in the case I have just been considering by four hundred quadrillions; the result must be a quantity inconceivably small, which no experiment could detect. But between this inconceivably small error and no error at all, there is fixed an enormous gulf; the gulf between practical and theoretical exactness, and what is even more important, the gulf between what is practically universal and what is theoretically universal. I say that a law is practically universal which is more exact than experiment for all cases that might be got at by such experiment as we have. We assume this kind of universality, and we find that it pays us to assume it. But a law would be theoretically universal if it were true of all cases whatever, and this is what we do not know of any law at all.

(To be continued.)

FORMATION OF OZONE BY PLANTS.*

BY C. BELLUCCI.

Scoutetten, Bineau, Kosmann, and De Luca, instituted experiments from the results of which they inferred that plants are sources of ozone, whilst Cloez (Ann. Chem. Phys. 1856) on the contrary shows conclusively that the apparent ozone was due to other causes. He passed the aeriform products from the plants through two tubes placed side by side, and containing iodized test-paper; one of these was exposed to the action of light, and the test-paper became coloured, whilst in the other which was protected from the light, it remained unaltered, showing that the action was due, not to ozone evolved from the plants, but to the effects of moisture, oxygen, and light on the test-paper. The author has carefully repeated the experiments of Cloez, and devised new ones, in which he introduced into a large Woulfe's bottle containing water saturated with carbonic anhydride, and to which a small quantity of potassium iodide and starch was added, sprigs and leaves of the following plants: *Taxus baccata*, *Juniperus virginiana*, *Abies vulgaris*, *Thuja orientalis*, *Prunus Laurocerasus*, *Buxus sempervirens*, and *Chara fœtida*. The apparatus was then placed in bright sunshine, but no change was observable in the liquid, proving that the green parts of plants do not evolve ozone under the influence of the solar rays.

NICOTINE AN ANTIDOTE TO STRYCHNIA.

A case of poisoning by strychnia which was successfully treated with nicotine, has been published in the 'British Medical Journal' by the Rev. Dr. Houghton, F.R.S., of Trinity College, Dublin. When the treatment commenced, the patient, a lad nineteen years of age, was violently convulsed, his pupils were dilated and his arms and legs were rigid. The nicotine was administered in drop doses in whisky-punch every half-hour. After the second dose the paroxysms were less violent; and when he had taken four doses he was much better, and eventually he recovered. The poisoning was caused by the lad picking up and eating an egg which had had strychnia introduced into it, and been placed in a garden for the purpose of poisoning magpies.

* 'Gazzetta Chimica Italiana,' i. 687-690., and 'Journ. Chem. Soc.'

The Pharmaceutical Journal.

SATURDAY, AUGUST 31, 1872.

Communications for this Journal, and books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Elias Bremridge, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

BRIGHTON AND ITS RECENT VISITORS.

Now that the British Association, and the British Pharmaceutical Conference have adjourned their pleasant labours until they meet next September, at Bradford, under the presidency of Dr. J. P. Joule, and H. B. Brady, Esq., respectively, it is gratifying to find that the efforts of the people of Brighton worthily to entertain their visitors have been so well appreciated. On every hand, the liberality of the townspeople, and the thoughtfulness and kindness of their representatives, have been the theme of praise. We have already spoken of the hospitality shown to the Conference by the local members of the drug trade, and the heartiness with which the Association has been entertained, is indicated by the fact, that while the promised subscriptions to the local fund amounted to nearly £2000, this money has been forthcoming without any unseemly coercion. This circumstance is justly the ground of some congratulation on the part of the Brighton press, and we are especially glad to notice among the subscribers to the fund the names of several well-known pharmacists. Financially, the Brighton meeting of the British Association has been a great success, the number of tickets issued having been 2533, representing the sum of £2,649; 2,463 tickets issued for last year's meeting in Edinburgh, representing £2,575. The Association has thus been enabled this year to make grants of money for scientific purposes amounting to £2,025. The signatures in the visitors' book of the British Pharmaceutical Conference, were in number more than one hundred. Brighton was for many years unsuccessful in inducing the British Association to visit her, but now that the ice is broken, we venture to predict that she will have a comparatively early opportunity of proving the truth of the Mayors axiom, that "to do a thing well, it requires to be done a second time."

DEODORIZERS, DISINFECTANTS, AND ANTISEPTICS.

The Public Health Bill, having received the Royal Assent, may by this time be looked upon as an established fact, and, as we are informed, it will come into operation almost immediately. This Act is very important to all who are qualified to conduct the operations of analytical chemistry, because it indicates indirectly a vast systematic application of science to sanitary matters with which they must, as a necessary consequence, be intimately concerned. If the medical inspectors who are to be appointed under the terms of this Act do their duty, it should soon, among other things, be practically discovered which are the most efficient deodorizers, disinfectants and antiseptics for common use; which of the materials used for such purposes are the most generally useful, most harmless, and cheapest. We may take it that the deodorizing and antiseptic properties of any agent can be proved without much difficulty, but it is still open to doubt whether, in the present state of physiological science, conclusive proofs of the disinfecting properties of any article can be produced. It is pretty well known to our readers that chlorine and ozone are classed as the best deodorizers; that common salt, chloride of zinc, corrosive sublimate, cold, carbolic acid, and heat (above 140° Fahr. with exclusion of air), are the best antiseptics; and that the permanganates, chlorine, ozone, sulphurous acid, animal charcoal, and lime rank highest among so-called disinfectants. We are neither prepared nor inclined to discuss the respective merits of the last-named series. But it is a remarkable fact, and one worthy of attention, that a special preparation called chloralum does not receive the general attention that it would seem to deserve, if the advertising columns of the daily newspapers, weekly journals, and monthly magazines are to be taken as the gauge of its merits. No chemical or pharmaceutical article has ever been so copiously urged upon the attention of the public, not excepting even the chlorodyne of Dr. Collis Browne or the corn flour of Mr. Polson. We know that chloralum has been authorized by the President of the Board of Trade, and has now therefore to be carried in the medicine chests of all merchant ships (to the exclusion of Sir Wm. Burnett's solution of chloride of zinc), although no directions of any sort or kind are given as to its use in the 'Ship Captain's Medical Guide,' authorized by the Board. We have indeed heard it stated by public officers and others interested in sanitary matters that they have vainly endeavoured to find out the merits of this so-called deodorizer, disinfectant, and antiseptic. Medical men and professional chiefs of public departments tell us that they know little or nothing about it. But it is most humiliating to those engaged in the promotion of sanitary science, to medical men, and to all occupied in work connected with the prevention of disease, that no one even now can say or has said *ex cathedra* whether this preparation is good, bad, or indifferent. There are things that are true, and things that are new. We want to know if the new thing in this case is a true thing, and most naturally appeal to the Medical Department of the Local Government Board, or—if such an officer exist—to the medical adviser of the Board of Trade.

This subject came up for discussion recently at Brighton in the Chemical Section of the British Association. The occasion was the reading of a paper by Mr. W. J. Cooper, who stated that whilst treating the roads of London and other towns with deliquescent chlorides he found that the waste solution running into the drains, had the effect of preventing or retarding the fermentation of sewage, which gives rise to the formation of sewage gases, and he suggests that by the use of chloride of calcium the offensive discharge of gas from sewers may be prevented at a very moderate cost.

It was already well known that the use of deliquescent chlorides in street watering was attended with the result of removing the ammoniacal odour from urea products already formed. The chloride of calcium and carbonate of ammonia, reacting upon each other, a double decomposition occurs, resulting in the formation of chloride of ammonium and carbonate of lime. It was objected by Professor Williamson that there seemed to be something contradictory in the statement that chloride of calcium would prevent a thing being formed and then catch it after it was formed. But the actions claimed for this material are twofold and distinct; first, that when added to fresh sewage it prevents or retards the fermentation which results in the decomposition of urea and the production of carbonate of ammonia; secondly, that when added to sewage which has already undergone fermentation, it combines with the ammonia to form two inoffensive salts.

It is worthy of remark, that similar results have been independently and simultaneously arrived at by Mr. E. C. C. Stanford, and were communicated in a paper read before the British Pharmaceutical Conference. These experiments seem to leave very little doubt that in chloride of calcium we have an extremely cheap and effective deodorizer, and, perhaps, disinfectant.

We take the liberty of calling the attention of our readers to a paragraph on p. 180, respecting an effort which is being made to assist the widow of a chemist and druggist, whose death was recorded in a recent number of the Journal.* The case is a painful one, and its consideration led to a grant from the Benevolent Fund by the Council at their last meeting.

* See *ante*, p. 36.

Provincial Transactions.

TYNESIDE CHEMISTS' ASSISTANTS' ASSOCIATION.

A Special Meeting of the above Society was held on Monday, August 12th, for the purpose of considering the advisability of confirming two motions passed by the Committee, at their last meeting.

1st. Proposed by Mr. Shaw, seconded by Mr. G. Heslop, and resolved,—

"That this Meeting is of opinion, after due consideration, that it is impracticable to establish a laboratory, owing to the expense necessary for the purpose, and that for the present the scheme should be abandoned."

2nd. Proposed by Mr. A. Brady, seconded by Mr. Shaw, and resolved,—

"That this Meeting is of opinion that, as the funds of the Association are at present too limited to allow of a laboratory to be made to any good purpose, it would be advisable to commence the Educational Scheme of this year with a Latin class, to be held two hours a week, on separate evenings; the fee to be regulated by the number of pupils."

The President (Mr. A. Brady) in his opening speech said that it was with no little anxiety that the Committee had come to the conclusion they had; he did not consider the expense a great drawback, as he had no doubt but that in a large society such as their own, they could soon overcome that difficulty by a special subscription, but there were other things to be considered; in the first place they would require a demonstrator to instruct the pupils, say once or twice a week, then they would require a person to be in constant attendance upon them to explain all the different reactions, etc. etc. As Latin is the stepping-stone to chemistry, he thought that they should commence with it, so as to lay a good foundation, more especially as a number of the members had not passed their classical examination.

Messrs. Welch, Shaw and Owen all agreed that the time had come when they should do all in their power to establish a class such as that proposed.

Mr. R. D. Spence agreed that a Latin class was an excellent thing to have in connection with the Society, and he for one would have very great pleasure in joining it; at the same time he did not see why they should not have a laboratory in working order as well as the class. He said there were several members working up for their "Minor;" some of them being at lodgings, they found it very inconvenient to work their practical chemistry.

After a considerable amount of discussion, it was unanimously agreed that a Latin master be obtained to conduct the class as proposed in the motion. It was also agreed that a subcommittee be appointed to draw up a scheme for a laboratory, to be laid before the committee at their next meeting.

The President then announced that he had received a reply from the Secretary of the Museum authorities granting the use of the museum for a conversazione to be held in the beginning of October. He said he would be happy to receive anything for exhibition that would be suitable and likely to prove of interest to the assembly. Specimens of drugs, chemicals, etc., for exhibition may also be sent to the Secretary, addressed Mr. G. H. Proctor, 56, Dean Street, Newcastle-on-Tyne.

LEEDS CHEMISTS' ASSOCIATION.

The result of the examinations in chemistry in connection with the Science and Art Department is very favourable, and places the Associates of this Society in the following rank:—

Organic Chemistry.	*Teacher.*	
Severs, S. T.	G. Ward, F.C.S.	1st Advanced.
Smith, C. A.	S. Jefferson, F.C.S.	2nd Advanced.
Inorganic Chemistry.		
*Highmoor, G. S.	G. Ward, F.C.S.	1st Element.
Parkinson, Thos.	,, ,,	2nd Element.
Richardson, J. R.	,, ,,	2nd ,,
*Saville, Wm.	,, ,,	,, ,,
Stevens Richard	,, ,,	,, ,,
Exley, John	,, ,,	,, ,,
Smith, H. H.	,, ,,	,, ,,
Walker, Geo.	,, ,,	,, ,,
Burton, A.	,, ,,	,, ,,
Thomas, W.	S. Jefferson, F.C.S.	2nd ,,

* Passed also in Laboratory practice.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

Tuesday, August 13th, 1872.

(*Continued from page* 156.)

Pharmaceutical Education.

BY J. SCHWEITZER.

Amongst the chemists of the present day, we find some who have passed the Major or the Minor examination, and a great many who have passed no examination at all, a very mixed body of men, many of them far from what we aim at, and what a pharmaceutical chemist should be. I say this without any disrespect to those gentlemen who were in business before the passing of the Act which made a strict and regular examination a *sine quâ non*. They have a perfect right to their present position, but as long as we count a large number of men amongst us of doubtful qualification, so long our position must be of necessity unsatisfactory and anomalous. While we admit these gentlemen on a footing of equality in business matters, and allow them to shape their course as best they can, we have certainly to guard ourselves against judging the past from the present, nor need we, in making provisions and laws for the future, fetter ourselves with unnecessary considerations on their behalf. Indiscriminate admittance into our ranks has ceased now, and a better and more uniform standard of men only will be added to the register, whereby many of the present difficulties will disappear.

The idea that the present system of pharmaceutical education is not what it should be is not at all so well founded as we are made to believe; anyhow, I must differ *in toto* from the plans hitherto proposed as a remedy. I protest against placing on the shoulders of the Pharmaceutical Society the shortcomings of those who for years were strangers, if not enemies, to the Society, and who recently were compelled to join. No new system of education will alter these, and it is wrong to speak and to act as if these men had sprung from or grown up in the Lecture Rooms and Laboratory of Bloomsbury Square, and were a living proof of the insufficiency of this institution. The fact that the Society possesses at present a surplus income of £2000 or £1800 per annum is a proof that it is founded and carried on on sound principles. It is perhaps a little too parsimonious, but the fault, if any, is on the right side. To use this surplus for the introduction of a new and expensive plan of provincial education is a hazardous, wasteful, and wrong step, almost certain, in my judgment, to lead to failure and ruin. It is generally acknowledged that small donations in money or books to provincial associations is so much money thrown away, while the establishment or maintenance of a number of regular schools would be equally ineffective, and only cause greater jealousy, and tend to cripple the parent society.

I do not lose sight of the training of apprentices and assistants, nor of the fact that their want is greater than London alone can supply, and that a successful termination of apprenticeship requires more opportunities than many provincial businesses can afford. But no chemist is compelled to take an apprentice; and I maintain that we have amongst us plenty of intelligent Pharmacists who, in every respect, are competent and willing to take and instruct apprentices. When we demand that the pupil should possess sufficient schooling to pass the Preliminary examination, we may, with greater right, expect that the master should possess also sufficient theoretical knowledge to fulfil his part of the contract, and be able to prepare and instruct his apprentice properly, or so that, when out of his time, he should, without much difficulty, be able to pass the Minor examination. The agreement between master and apprentice is a legal document, wherein one promises to do certain things in return for certain considerations, and it is, of course, the business of the contracting parties to see that they are able to fulfil their promises. I will not trouble you about apprentices who will not learn, nor have I much to say about masters who are unable to teach; the sooner both disappear the better. I feel, also, little compassion for unexamined men who maintain that their business does not afford means to keep an assistant, and, who for such reason, think themselves justified in continuously looking out for apprentices, and are ready to take any comer, uneducated, untrained to study, and unable to pass the Preliminary examination. They accept the premium, employ their apprentices for all sorts of work, save the services of a paid assistant, and clear, in this way, a good round sum every year. Such apprentices, when out of their time, never attempt to pass, or, if they do, fail, as a matter of necessity. If you can put a stop to proceedings like this, do so, but, if you cannot, certainly do not burden yourself with unnecessary responsibility, leave time and circumspection to discover and apply a remedy for individual cases. It is usually masters of this kind that clamour most for help from the Pharmaceutical Society. Not being able to educate their apprentices, they seem to think they have a right to call for help, but their right has no existence, and their difficulty is of their own seeking. If you listen to them you sanction their proceedings, and encourage them to continue in their reprehensible course.

Neither do I think claims of this kind more reasonable or legitimate if, instead of individuals, a town or province should furnish such instances by the score. The establishment and maintenance of a local school requires at least a yearly outlay of from £300 to £600, and even then you do not get a perfect school, while the fair distribution of such establishments over the country must of necessity cripple the Society in London. Establish as many such schools as you like, you would get calls for more, while every new establishment would be a new source of jealousy to the neighbouring towns, and it is not difficult to predict what the end would be. Instead of possessing what we should now have in London, at least, one good effective centre of instruction, provided with the best masters, the largest laboratory, the completest library, and the richest museum, an institution of which all of us can be proud, you would have jealousy everywhere, and a number of elementary schools all good for very little, and all alike contemptible in the amount of knowledge they would diffuse. Gentlemen, I say there is no necessity for such steps; the days of the uneducated amongst us are numbered; in a few years every chemist in business must be educated, and must have proved his knowledge by an examination, and I have no hesitation in saying that every one of such will be able to educate his own apprentices without troubling any Society for assistance. A few years' patient waiting will bring you what you seek, without risk, without much expense. One thing you certainly must always bear in mind; the raising of the standard of the future chemists by subjecting every fresh comer to a strict and proper examination.

I have said before that every intelligent chemist who has passed his examinations will be able to instruct his apprentices, so that when out of his time he could with perhaps very little additional study, pass the Minor examination. But to teach with success you must know more than your bare lesson, and I consider the Minor examination not a fit standard for a chemist in business. The Preliminary or classical examination is the proof of a youth's fitness to become an apprentice; and I think the Minor examination nothing more than a test for the competency of an assistant, but for the master I demand more. The mere word Minor indicates that you do not mean to end your days with such qualification, but that you intend to go a step further and pass the Major. Gentlemen, nobody should be allowed to carry on business on his own account, or be allowed to conduct the business of another, without having passed the Major examination. So long as we cannot enforce this, so long will our position be unsatisfactory, and all our lectures and our schools will be useless, and only waste of time and money. I am prepared to be told that examinations are no real proof of a man's knowledge. To a certain extent I admit this, but only to an exceptional extent. Examination is like a sieve, a few coarse particles may find their way into the sifted powder, and now and then a trace of the fine may be rejected with the coarse residue, but these are exceptional cases, while the result in both directions is most satisfactory and just. Gentlemen, to sum up my ideas in a few words—I consider three examinations necessary. The Preliminary or classical for the apprentice, the Minor for the assistant, and the Major for the chemist in business, or for those appointed to manage businesses. All these examinations, the Major included, should be compulsory, Nobody should be admitted to occupy any place without having qualified himself for it. The master should prepare, or be answerable that his apprentice when out of his time can pass the Minor examination.

With the departure of the apprentice all our responsibility for imparting theoretical knowledge must cease. No chemist in business can be troubled with the instruction of his assistants; they are engaged to help a master in his daily work. The knowledge for the Major examination they may acquire whenever and wherever they like, but without interference or strain on the business; it is their interest to acquire knowledge, as much as that of their masters. Of course, every right-minded master will be pleased to see that his assistant studies in his leisure hours, and will be ready and able to assist and help him over any difficulties that he may encounter. But to establish schools all over the country, and to preach that our assistants must attend there, and, if necessary, be induced by their employers to do so, is against human nature, and neither desirable nor necessary. If an assistant has the wish to learn he can do so at home, with better results, without losing so much time, and without such interruption as attendance at local schools, while engaged in business, would of necessity occasion. But should he desire to spend some time entirely for study, I would wish one thing, namely, that there should be no better, no cheaper place than Bloomsbury Square. If you have a surplus in your income, you could not spend your money more justly or to better purpose than by improving your present establishment at Bloomsbury Square. Pay your officers and professors so that in case of a vacancy you may have the best in the land to apply for it, and when you have them, treat them handsomely that they may willingly stay with you. *Open the laboratory and the whole establishment gratuitously for a limited time to every apprentice and assistant.* Nobody should come to Bloomsbury Square unprepared; and when well prepared by private study, the gaps in his knowledge may well be filled up in a comparatively short time. If you have still funds to spare, find a different place for your examining body, and separate that department altogether from your place of instruction.

Should it ever happen that Bloomsbury Square cannot offer the necessary accommodation to all its applicants, then it will be time to establish a second Pharmaceutical School, as far from London as possible. Perhaps no better place could be found than Edinburgh, but heretofore I have always heard that Bloomsbury Square suffered more from want of pupils than from want of room to accommodate them. Times, however, may alter, the present complaint of non-attendance at places of instruction may cease, and it may be necessary at a future time to find more room for accommodating our students. May we all live to see this, to see a second northern Pharmaceutical School, emulating with Bloomsbury Square, and striving with it to turn out men to become the ornaments and pride of our profession. Unfortunately, at present there exists no such necessity; what we want is more pupils, not more schools.

Note on Pharmaceutical Education.

BY B. S. PROCTOR.

In my letter to the Pharmaceutical Journal of July 20th, 1872, I spoke favourably of the education scheme presented by the committee in 1870. It has since been objected that the project then advocated did not give sufficient detail to enable its merits to be fairly judged. In the letter above alluded to I named two points of detail, viz., that satisfactory lectures delivered under suitable conditions should be paid for to the extent of 21*s.* per lecture. That the students should pay at least 1*s.* per lecture each, the Society, where necessary, making up the deficiency. I now propose to add a few further suggestions, and if they appear arbitrary and open to criticism, they may at least prove starting-points for discussion.

One source of failure in the promotion of a satisfactory condition of pharmaceutical education is the disposition so common in students to shirk persistent study in favour of a violent effort of short duration. The experienced examiner fully appreciates the difference in value between these two processes, and usually can distinguish by which the student under examination has sought to obtain his position, and not unfrequently rejection is the reward of the latter process. But the candidate thinks it an injustice to draw so fine a distinction between those who are well grounded, and others who are well grinded. We must aim at making the distinction more clear and forcible, especially to the student class. This, I believe, will be ultimately accomplished by prescribing a particular course of education as a necessary preliminary to candidature. It appears to me that the required course of education should be something like the following:—After the Preliminary examination, there should be a term of apprenticeship, or pupilage, of not less than four years, followed by attendance on lectures on chemistry, botany, materia medica, and pharmacy, in all not less than x y z lectures, spread over two years. The Minor examination should then be passed, and after a lapse of x months, including y months spent on laboratory work, the student should be qualified to enter for the Major.

A course like this would afford some sort of guarantee that the student had received a fair amount of solid instruction, and not the mere smattering which may be gained to-day and lost to-morrow. But such a course would not be practicable at the present day, because of the want of schools in which the student could go through the required curriculum, and our present step should be to lay the foundation of such schools.

It would be necessary that lectures at *registered schools only* should be acknowledged, but any local school might claim registration on submitting to periodical inspection by the central body, and showing that it provided the requisite quantity and quality of instruction. The lecturers would have to be appointed under the approval of the London Board or Council, and the lecturer's certificate of a student having attended his lectures, would have to include a statement of the number of times he had been present, and how many absent.

Then in respect to the quality of lecturing, nothing could be regarded as satisfactory which consisted of simply reading a lecture. The reading by a lecturer has but little advantage over the reading by the student himself, unless it be illustrated by specimens, diagrams, experiments, or some other species of practical demonstration. The more practical demonstration accompanies a lecture, the greater will be its advantages over those obtainable by simple reading, but we must also admit the greater will be the labour in preparing it; and it cannot be supposed that a guinea will pay for time, anparatus, and material involved in the delivery of a lecture, illustrated with experiments; therefore the project of 1870 proposed to include the payment of part of the salary of a lecturer's assistant, or curator of specimens and apparatus. If some six or eight schools, such as I have roughly indicated, could be established in convenient parts of the kingdom, at a cost to the Society of as many hundreds of pounds per annum, I should regard the money as thoroughly well spent, and the ground prepared for the subsequent enforcement of such a curriculum as sketched above. This, it appears to me, is the right course to pursue, and the only course to promote good, sound, pharmaceutical education in the provinces.

Newcastle, August, 1872.

Pharmaceutical Ethics.

BY S. R. ATKINS.

The advantages derivable from these Annual Conferences cannot be too highly rated, supplying, as they do, an opportunity for the interchange of kindly feeling, and the discussion of questions vitally affecting our interests.

That these meetings are destined to grow in importance, there can be to the thoughtful observer little doubt. It is an age of synods, congresses, and the like. The old conditions of severance and disintegration are giving place to those of combination and confederate action. No class of the community stood more in need of this than the important one represented here on the present occasion. Until recently, the life of a chemist in one of our provincial towns was largely an isolated one, and with that isolation were associated necessarily narrowness and ignorance—ignorance of each other. The character of his business fostered the same result; unlike other tradesmen, the exigencies of *his* business did not require a periodical visit to London, hence he settled down to his life-work in a contracted groove, yet doing that work in an honest, painstaking, persevering spirit, which demands from this generation, with its greater light and superior culture, the most distinct and ungrudging meed of praise.

Tout cela est changé. And whatever may be the extent of conservatism of feeling we cherish as we look back on that past, and whatever may be our regret in witnessing the spirit of unhealthy competition that has invaded our ranks, yet we cannot but recognize in the changes of the last quarter of a century the attainment of a large amount of substantial good, and the promise of better things to come.

In again attempting to work the lode, which on prior occasions has engaged my attention, I offer no apology, deeming it better that in the vast field of observation and research lying before us all, we shall best subserve the general good by each one specially cultivating some particular allotment in that field. There can, moreover, be little doubt that at the present moment, and for some time yet to come, during what is clearly a period of transition, the ethics of pharmacy will claim no small share of our attention, and this Conference will deepen its hold on the constituency it represents by giving them a prominent place in its debates.

The field of pharmaceutical ethics, we have said, is a large one; some portions have been already well ploughed up, and good seed sown therein, destined to ripen into valuable results. Other portions await their turn, which assuredly will arrive when those immediately engaging our attention are disposed of. There are, however, three questions of primary importance at the present juncture, which I desire once more should engage the attention of Conference.

It will be only in harmony with natural selection in the order of time, if we start with the matter of—

The Preliminary Examination.—A real, though gradual improvement, has been already effected. Candidates are presenting themselves in better condition for the test: still the proportion of failures is both humiliating and disappointing. Since the Edinburgh meeting I have taken the trouble again to write to valued correspondents in different parts of the kingdom, tabulating a series of questions on this subject, and their kindness in procuring and furnishing me with valuable information I take this opportunity of publicly acknowledging. The results roughly put, though carefully examined, may be thus epitomized:—Students are better prepared; greater anxiety and sense of responsibility in reference to the examination is producing a healthful stimulus. As might be expected, a larger proportion of "plucked" are amongst the senior candidates; a considerable number of this class not presenting themselves a second time for examination, an important inquiry suggests itself, are they quitting the business for some other avocation, or are they merely deferring their difficulties to the indefinite future? The premium having been paid, the probabilities are that parental pressure renders the latter alternative the real answer to the inquiry.

Again, and yet again, we must enforce the proposition, until it be recognized as a first principle, that the Preliminary examination, or its equivalent, should be passed prior to the commencement of apprenticeship; and I hold that any chemist neglecting to stipulate for this condition, in the face of the overwhelming amount of evidence adduced in its favour, does both himself and his pupil an act of injustice. A compulsory clause to this effect would be a positive boon.

But what can be done for these youths, who, placing their finger on the wax seal, have uttered the binding words, "I deliver this as my act and deed?" It is now generally admitted that to lower the standard of examination would be most impolitic, unjust to those who have gone before, and not an act of real kindness to their successors. Let it be known, for the encouragement of apprentices who have not yet passed, that, assuming they have received a respectable education, the *available leisure* to be secured in three months, if diligently used, is sufficient to enable any lad of fair ability to surmount the difficulty.

With all due deference I submit to the Conference for discussion, and to the Council of the Pharmaceutical Society for their deliberation, whether it would not be desirable entirely to change the practice in regard to this examination; in fact, abolish it so far at least as the provinces and local secretaries are concerned, and accept as the *uniform rule* what is now the *exception* only—the local examinations of the university and the College of Preceptors.

As Local Secretary, I have now for some years been called on to superintend the Preliminary Examination, and whilst I believe the system has worked fairly, I am still disposed to think the university test would be preferable.

Two objections probably will be raised on the student's side—the additional cost in money and study. As to the extra guinea, the Council in consideration of the Society's incidental expenses being lessened, might be disposed to reduce the registration fee to one guinea, and so equalize the cost. The second objection—for undoubtedly the university test is a more stringent one than our own—might be met by prospective legislation: thus, only those youths who were apprenticed after a certain date, to come under the operation of the law.

Apprenticeship.—The important matters of the Preliminary Examination and apprenticeship are, as we have seen, intimately allied, but not always in the order here stated.

Let us now assume that a well-educated youth having passed the initial test, his friends are desirous of placing him in the establishment of some respectable chemist, that he may study pharmacy and become a man of business. The difficulties in finding and selecting a suitable position are at once experienced. The men who in every respect are competent to instruct and guide, decline the responsibility. To this particular fact I desire to call especial attention, for unless the *will* and the *power* are more linked together, the difficulties of the future will be aggravated.

In the instructive though brief debate on this matter at our meeting last year, Mr. Mackay gave us a most lucid and interesting sketch of the Scottish system; Dr. Edwards furnished some valuable details in respect to the Canadian plan. Reference also was made to the views on apprenticeship held by my friend Mr. Giles. That those opinions respectively were argued with ability, it is sufficient to mention the names of the authors; yet I venture to think that neither of the systems will acclimatize on English soil.

I am disposed further to believe that our English method of placing a youth for a term of three or four years under the direct supervision of a practical pharmaceutist and within his family circle, is an immense advantage.

The system of boarding out is open to the grave objection of failing to secure anything like moral control. Parental influence at the age of 16 or 17 should be sustained and continued by the wise and thoughtful discipline of a well-ordered household; every wise man desires as much for his son. I must, therefore, regard as chimerical a scheme which altogether dispenses with these safe-guards, and plunges a lad at the most critical period of life in the midst of temptations, deprived of those aids which in reviewing our own past we must admit to have been valuable.

The additional cost of a pharmaceutical education so acquired, must also be regarded as no trifling difficulty; a cost vastly disproportioned to the net result which can be possibly secured either of social status or moneyed competency—a cost as great as that of a profession without its status, but with a pecuniary reward below that of the average of drapers and grocers.

That the position of a pharmaceutical chemist in this country is an advancing one and destined still further to improve by that process of natural selection established by educational tests, I most gladly recognize. But no estimate, however sanguine, of the lot of the ordinary provincial chemist can warrant an outlay of £250 to £300 on his apprenticeship.

The obstacles in the way of adopting the Scottish system of attending classes are so blended with another subject that it may be better stated under the consideration of the last ethic of pharmacy to which I desire to advert on the present occasion.

Provincial Education.—It is only necessary to point to the voluminous correspondence and frequent debate on this question to demonstrate the interest and importance attaching to it. That something ought to be done, and that something must be done, is a widely-spread conviction. But what, and how? There's the rub. *Quot homines tot opiniones.*

The nebulous condition of the thing at length bids fair to assume definite and substantial proportions under the masterly and comprehensive treatment of Mr. Schacht, who has thus laid us under fresh obligation for the services he has rendered to pharmacy, and so justifying the high position his name commanded at the recent election of Council.

To the analysis of his scheme Mr. Schacht invites the fullest inquiry, and in this respect it would seem he is not likely to be disappointed. A special feature in it is the multiplication of local centres of instruction—the creation of schools of pharmacy subsidized by the Pharmaceutical Society on the important basis of payment on results. This plan is decentralizing as it affects Bloomsbury Square, and centralizing within a given, but limited, radius of the local centre.

It is possible that the enlarged demand in future for technical education may render the formation of these provincial schools a matter of necessity; but I confess I should view with regret any action which would lessen the influence of our admirable school in London. Let us take care that the heart beats vigorously, the extremities must then of necessity be ministered unto.

Our central institution has done, and is doing, good work. Not simply have we a long list of honoured names—household words amongst us—who were indebted to its curriculum for the foundation of their scientific attainments, but we have scattered over every portion of the kingdom, and well-nigh of the world, men who are conducting their business with scientific intelligence and accuracy, who likewise will tell you that they look back with with grateful feelings to the time spent at the Square.

If needs be, and the possibilities of the case admit, let us try and increase the number of such agencies; but let us at the same time take care it is not to the detriment of the parent institution. I do not object to the establishing such schools of pharmacy, but my deliberate and long-cherished conviction is, that such schools must inevitably, and that from no fault of their own, fail to supply the wants of the country. Let us assume as a mere hypothesis, that five schools have been established in the same number of large towns representing a centrally and conveniently as possible the five great divisions of England, north, midland, south, east and west; and, further, that associations are formed in other important places, but of lesser populations than the aforesaid centres, yet containing a sufficient number of chemists to combine. There still remains the difficulty of dealing with smaller towns; and be it remembered it is in these places, in the aggregate so important, is to be found the great bulk of our pupils.

To attend classes at the nearest centre would be impracticable, at least with the regularity requisite for an educational course.

In the shape, therefore, of combined effort, it but remains to form a local association such as I attempted to describe at our last Conference. The history of such association when written will not be so creditable or encouraging as could be desired; a more earnest and resolute spirit for work on the part of our apprentices may alter their complexion,—let us hope it will be so.

Finally, I desire once more to place on record my settled opinion that the only real practicable solution of the many problems, in this transition period, connected with the all important matters of apprenticeship and provincial education, must, in the main, be found in the slow but certain advance in technical knowledge on our own part as teachers.

That there will always be room for combined action there can be no doubt, and I hope to see the day when every considerable town will possess its flourishing association of pharmaceutists. but let us not forget our individual responsibility. When—and not until then—the entire body of chemists are technically trained will these questions be set at rest. Patience is needed; the good work is progressing more surely than some of us imagine. May we return to our homes and separate spheres of action from these annual gatherings with the resolve to contribute our personal share to the advancement of the general good.

Salisbury.

The Conference then adjourned for a short time.

On its reassembling shortly after two o'clock,

Professor ATTFIELD read as a "postscript" to his paper, the following letters which he had received on the subject of Pharmaceutical Education.

LETTER FROM MR. EDWARD SMITH, OF TORQUAY.

"My dear Doctor,—At the outset let me say that I consider every pharmacist in the country is deeply indebted to you for your exceedingly interesting and suggestive paper on Pharmaceutical Education. The firm and determined manner in which you have handled the subject is, to me, an especial source of satisfaction, whilst the value of your paper is greatly enhanced by the fact of your being practically engaged in the work of education; it seems to me that this distinct enunciation of an opinion by so eminent a professor of the Pharmaceutical Society is precisely the one thing hitherto wanting to enable those who, like myself, have had little or no practical experience in teaching, so to focus, as it were, their ideas as to approach the subject with much less diffidence, and with much more clearness, than has before been possible. Your paper will doubtless tend to draw present divergencies of thought into a common groove, and thus be the means of more speedily enabling us to devise some wise and permanent settlement of this all-important question.

"I must confess that I have been startled beyond measure at the picture so vividly drawn, so eloquently put before us, in your description of that wretched and pernicious system of 'cramming.' Although it was well known to me that 'cramming' establishments existed, I had not conceived the possibility of the 'fact that within the past ten months more students have been crammed than have been legitimately prepared for the Minor examination.' This is not only a terribly humiliating fact, but it is highly discouraging to those who are, and have been, conscientiously striving and working hard to disseminate sound instruction amongst the rising generation of pharmacists, and is, moreover, unquestionably a state of things that cannot possibly be suffered to exist if our examinations are to be other than a huge sham.

"Whether this 'cramming' is encouraged most by an unfortunate selection of examiners, or by the present system of examination, may possibly be a point open to argument. For my own part I see no possibility of materially improving the *personnel* of the examiners, for, supposing there is at any time a 'weak brother' on the Board, this could not really affect the general result of an examination. On the other hand, I think you have made out a strong case against our present imperfect system of examination, and heartily concur in your observations both as to the imperative necessity of compulsory education, as well as to the method propounded of supplementing the Minor examination, by requiring candidates to produce certificates of attendance at some recognized school of pharmacy.

"But whilst thus acquiescing generally in your propositions, I am not unmindful of the difficulties that surround them. I think the Society has not at the present moment the necessary powers to insist upon such attendance. There may be comparatively little difficulty in obtaining such powers if we can make our aim clear and induce Government to help us. This accomplished, the very difficult question as to the number of schools confronts us.

"I certainly do *not* agree with your opinion that 'there will be room for three or four or five schools,' and that it is 'impossible to establish a school of pharmacy in every twentieth town.' The number of schools must depend upon the number of pupils, and this must depend upon the length of time each shall be required to attend a school. I gather from your paper generally that it is supposed that a pupil will attend for one session only. But why for one only? If we are to do the work thoroughly, three sessions (certainly not less than two) would be insisted upon. Now if three sessions were adopted, you would have three times the number of pupils; there would be the 1st, 2nd, and 3rd years' men. The advantages of this would be manifold. A greater number of more conveniently situated schools would be established, and a much larger proportion would be self-supporting; and thus, whilst all the larger towns would require little or no subsidy, the parent Society would be enabled to give greater help to smaller schools, *i. e.*, precisely the schools requiring most help. So far from twenty schools being impossible, I should hope to see fully that number in a flourishing condition.

"Of course, the compulsory attendance of an apprentice for three sessions would involve a complete revolution in the relation between master and apprentice, a revolution I, for one, would rejoice heartily to see brought about. The duty of the master should be limited to practical training; the duty of schools of pharmacy to supplementing this by theoretical and systematic teaching, with practical laboratory work of a higher character than can be taught in an ordinary business establishment.

"But in my opinion, all our labours in this direction will be of very little avail, unless the Preliminary examination is maintained at a good standard. Euclid and algebra ought eventually to be included, and Greek as well as Latin authors.

"I regard this examination as the grand corner-stone on which all our hopes rest. It is the entrance gate that should be most jealously guarded. We must rely absolutely upon this examination to provide suitable material for our educational efforts to thrive upon. If a youth is fundamentally weak in elementary education, if he is deficient in rudimentary knowledge, then he has not the mental power to assimilate the intellectual food of the character that ought to be provided by schools of pharmacy.

"The Preliminary examination not only tests the previous training and actual knowledge of a youth; but if the character of the examination is kept up to a suitable standard, it gives us reasonable grounds for assuming that the boy who can pass has been trained to habits of study, and has acquired a desire—a sort of appetite—for further information. A boy who cannot pass is, in no sense, worthy of our consideration. One may as well sow corn on a turnpike road as to anticipate any good fruit from such a source.

"With many apologies for so discursively criticizing your paper—you will no doubt easily separate the rubbish.—Believe me, faithfully yours,

"EDWARD SMITH."

LETTER FROM MR. JOHN MACKAY, OF EDINBURGH.

"*Dublin, 7th August*, 1872.

"My dear Attfield,—Just as I was leaving Edinburgh on Monday morning a proof copy of your paper on Pharmaceutical Education was put into my hands, and, in case my silence in the face of your invitation to criticize might be construed into concurrence with your views, I venture to send you one or two lines, to say I cannot agree with you on this important question.

"I have not time to discuss point after point wherein I disagree, and my few remarks must, therefore, be very general.

"Let me say with such a communication as yours before the meeting on the 13th, how much I regret my unavoidable absence from Brighton on this occasion, as I feel certain the discussion will be a very interesting and important one!

"From the very nature of existing things Pharmaceutical Education must, I submit, be looked on as compulsory up to a certain point, because we know that without a certain amount of education no one can for the future become a dispensing chemist. With your horror at cramming (in the true sense of the word), I quite agree, but such a system has existed, does exist, and will continue to exist. You have the highest authority for its existence; and go where you will, even in your Oxford and Cambridge, as well as in our own universities in Scotland, you will find such a course pursued, if not in all, certainly in connection with several subjects. I hold there is no Royal road to becoming a pharmacist, and the allusion you make to the public announcement that an ignoramus may be transformed into a chemist and druggist in a month is simply absurd.

"But your ideas are, I conceive, for the future education of our young men, far a-head of the present condition of things. Excuse me saying, you point rather to the *Pharmaceutical millennium*, than to the plodding weary days of the ordinary dispensing chemist. In other words, you take the aristocratic view of the matter, apparently forgetting the hundreds, nay the thousands, of those having the will, but lacking the power to take advantage of the teaching you would have all our young men have. That there should be, and probably always will be, centres in large towns, where the few, I would say the *very few*, may go and study with a satisfaction to themselves and a credit to us as a body, I at once admit; but I also think such schools should not be supported as centres of education by the funds of our Society.

"Again, regarding present examinations for the Minor and Major, I believe that these fairly represent what young men ought to undergo. No candidate for the former gets through under a minimum of three hours close examination, while the latter extends to more than double that time, having the written as well as oral to go through. Remember that with all our desire to become *Professionals*, we still belong to *trade;* and, if you doubt my statement, go into the country and even some large towns and see the curious admixture of articles the chemist and druggist keeps, and is obliged to sell, otherwise he and his family would very possibly starve. Take a glance also at the manner in which assistants as a body are paid. I will venture to assert that, in many instances, good workmen, ordinary clerks, and even letter-carriers are as well if not better paid than some who are educated and highly responsible assistants, with the actions of whom life and death frequently hang in the balance; for we know the deadly poisons which have to pass through their hands.

"Want of opportunity during an apprenticeship, and deficiency of funds after that has expired, will militate against many attending courses of lectures; and though it is an easy thing to say, well, such lads should not join us, I would ask where are you to get recruits, and from what sources are you to fill your ranks? Glance at the inducements you offer in after-life. Can you not easily count those who have been what the world calls *successful?* and, if so, can you not count the thousands who make a living and nothing more?

"I will, however, close, not without adding how much I shall feel interested to read the discussion.—I remain yours truly, "John Mackay."

Letter from Mr. William Gilmour, of Edinburgh.

"11, *Elm Row, Edinburgh,*
"9*th August*, 1872.

"Dear Sir,—Before making a few remarks on 'Pharmaceutical Education,' a proof sheet of which you so kindly forwarded, allow me to express the regret I feel in being unable to attend the meetings of the Conference this year, the more especially as I think it promises to be one of the most important as well as interesting yet held.

"I am glad the all-important question of Pharmaceutical Education is to be brought forward, and brought forward in so able and practical a manner. Doubtless it is in every way the question of questions to young and old alike at the present time, for assuredly, as contained in your paper, a thousand times wrong are they who think that compulsory examination means also compulsory education.

"I intend not to enter into that elaborate criticism of your paper which you so courteously ask, for it were folly to attempt doing so without having more leisure both to collect and write down my thoughts than I can well spare at present. The general question of education is too important and fraught with too many difficulties to be lightly written or spoken about; and it is the general question on which I would only feel inclined to write about, or, indeed, as I take it, you would only have me reply upon, rather than cavilling at every sentence or statement which did not entirely dovetail with mine. I promise, however, if some one abler does not do so, to bring the subject up at one of the earliest of our scientific meetings here in the coming winter, when, if you will allow me, I will return the compliment by you of sending me a proof of your paper by forwarding you one containing a few thoughts on the same subject from a Scotch point of view.

"Now I hope you don't think this last expression an unhappy one? I only mean that some of your principal arguments for a compulsory education cannot and do not apply to Scotland since the passing of the Pharmacy Act, 1868. Notably is this so in your argument proving the deterioration not only in the character, but also in the extent of the knowledge taught in the chemistry class of the Society's school. Here the arrangement is such that those who accept the Society's conditions, not only for the chemistry class, but for every other—botany, materia medica, etc.—get the same instruction as those who graduate in our university, and this from the very nature of the arrangement; and as one of the examiners I can speak confidently not only in the great superiority in the character of the knowledge, but also in the very tone of those candidates who now present themselves both for the Minor and Major examinations.

"Did time, however, permit, I would not simply rest content with this assertion. I would put it yet more forcibly and show that it applied equally to those who had attended no classes at all, but simply depended on their own unaided exertions. Neither would I be averse to take you on your own ground, and debate your own statements regarding the point.

"But not less does your argument fail in its application to Scotland, regarding 'cramming.' I take it upon me to say that cramming—I mean the systematic procedure by public crammers to which you refer—is totally unknown in any part of Scotland. As for private cramming, that is, mere mental effort on the part of the candidate, I cannot see that you will ever get beyond it. I know of no system of examination into which it does not enter, or no theoretical system into which it is not possible to enter. I am *not* going to put in a word of apology for such, but after all, is there not the possibility of a word of sympathy for the 'poor fellow' with mental beyond intellectual attainments? The former may be his one talent, and he has laid it out and cultivated it to the best of his ability, and who knows but it may prove more valuable and be laid out to more advantage both for the world and himself than the five talents of intellect?

"Now, coming more immediately to the question of compulsory education, holding, as I do, that the Compulsory Examination Act has raised the moral as well as intellectual tone of the young men coming forward for their examination, can I refuse to support the further movement for compulsory education also? I answer this question by asking another, viz., is it expedient? Is it expedient to drive all our young men of promise and otherways from, or out of the profession? For this I hold is the point mainly or greatly to be considered. Would a compulsory education such as you foreshadow not simply drive all the young men from the field of pharmacy? I hold it would, and for the very simple reason that it would not pay. Nay! do not start at what may at first appear such a low, grovelling, unworthy consideration. I may have put the point bluntly, but I am convinced that I have put it correctly; for the idea, I suspect, is thoroughly exploded now-a-days of following a profession from the mere love of it without respect also to the pecuniary consideration. Now, to impose further restrictions on the young men would simply drive them into other pursuits requiring either less time or money to prepare them for it, or which would prove more remunerative for the outlay. I am not going to enter into any arguments in support of this idea, but I am thoroughly convinced it is correct, unless you provide a free or a cheap education at the expense of the Society's funds; and this I would oppose more than anything else, as I have ever found that a pauper education is the worst possible.

"I hope you will excuse these few hasty thoughts and criticisms, strung together quickly and unsystematically, but I could scarcely refuse your kind invitation on so important a subject and on so important an occasion.

"I am, dear sir, yours truly,

"Wm. Gilmour."

Letter from Mr. David Kemp, of Portobello.

"*Portobello,*

"*9th August*, 1872.

"Dear Sir,—Your paper on 'Pharmaceutical Education' has given me great satisfaction, on account of the thorough and exhaustive manner in which the subject is treated, and the conviction that it furnishes the true solution of a most important and difficult question.

"Having believed all along that the Pharmaceutical Society was really desirous and honest in its endeavours to promote pharmaceutical education, not only in London but also in the provinces, I am greatly pleased with the explanation you have given of its position, and your very complete vindication of its conduct in regard to it from its commencement to the present time. With reference to the Minor examination, I am inclined to think that after the present exceptional and transitional period has passed, it might be abolished with advantage, if the rights of those who were apprentices prior to 1868, and those who have entered the business since to be examined under the present regulations, be reserved. If this were done, there would be only the Preliminary and Major examinations left, the latter of which, with education made compulsory by proof of attendance at lectures on the various subjects being required from each candidate for examination, would go far to destroy the system of cramming of which you so justly complain.

"I fully agree with you in thinking that until education is made compulsory, the demand for a thorough pharmaceutical education will not be sufficiently urgent or extensive to warrant the Society in incurring much expense in providing it out of London. In the meantime, however, the desire, such as it is, for it, should be fostered and encouraged in every legitimate way, by all who are interested in the advancement of Pharmacy and as far as practicable and just, by substantial aid from the Society, but I do not think it would be wise to provide it or right to ask it much below its fair value.

"I feel satisfied that a school such as you propose in each of three or four of the great centres of population would be sufficient to meet the demand for it when it arises, and that it ought not to be provided on any extensive or expensive scale till then.

"My answers then to the questions you proposed, namely:—

'1. Is it desirable to make pharmaceutical education compulsory? If so,

'2. By what method should it be made compulsory? and

'3. What means should be adopted for providing students with the means of obtaining pharmaceutical education?'

"Are:—

"To the first, Yes.

"To the second, By requiring proof of systematic study.

"To the third, by the present school in London, and by organizing schools elsewhere when really required and likely to be entirely or nearly self-sustaining.

"I am, dear Sir, yours truly,

"David Kemp."

Letter from Mr. Peter Squire, of London.

"277, *Oxford Street, London, W.*

"*10th August*, 1872.

"Dear Dr. Attfield,—Your very elaborate paper seems to have exhausted the subject, and left little room for criticism; but if cram does exist to the extent you say it does, and if, as I suppose, it may be possible that Examiners are insensibly led to adopt set questions, then it does appear that some means should be devised to ensure a good curriculum of education.

"Thirty years or more ago, when my opinion had weight in the Society, I ruled at the Board of Examiners that if the candidate possessed the amount of knowledge necessary to carry on his business with safety to the public, we ought not to demand from him even his indentures of apprenticeship. But vast changes have taken place since then; my ideas are too antiquated for the present generation, nevertheless, my opinion still is, and always will be, what I stated in the House of Lords, that educated intelligence is by far a better safeguard than the best devised Act of Parliament against poisoning.

"Yours truly,

"P. Squire."

Mr. G. W. Sandford, of London, fearing that he might not be able to attend the Conference had forwarded the following remarks to Professor Attfield, but being present was requested to read them:—

Professor Attfield has indeed rightly stated in introducing the important subject of Pharmaceutical Education to this meeting that no apology was necessary. I am sure every member of the Conference will thank him for so ably describing the condition of pharmaceutical education *past* and *present*, and receive with all respect and attention the opinion of one so well qualified to form an opinion on the best means of promoting it in the *future*. The advancement of pharmacy seems to me to be the special province of this Association, and though professedly we meet to exchange notes of the doings of the past year for our mutual edification and improvement, I think the education of the future pharmacists of Great Britain must be a matter of the deepest interest to us all. In the few words defining pharmaceutical education, the chief requirements of a pharmacist are forcibly expressed; and if we succeed in instilling into the minds of the rising generation these ideas, England, although last in starting, may not be the least among nations in pharmaceutical honour.

Professor Attfield proposes two questions, and they are perhaps the two leading questions on the subject now occupying the minds of most men present.

1st. How to supply the demand for knowledge which compulsory examination has called forth.

2nd. The future relation of the Pharmaceutical Society to pharmaceutical education.

For certain reasons it seems to me that these two questions should change places, and I would therefore at once offer a few remarks on the relationship of the Society to education. It is rightly asserted that the Society was originally founded for the purpose of advancing chemistry and pharmacy, and promoting an uniform system of education of those who should practise the same, but I must dissent from the opinion I have so frequently heard and seen expressed of late that the founders intended it to be *ultimately* an *educating* establishment.

We know that their object was to *enforce* education by rendering examination compulsory; but at the time the current of 'Free-trade' was running so strongly in this country that questions not purely of trade were drawn into the stream, and the efforts even of Jacob Bell and his fellow-labourers were unequal to the task of extricating this particular one. But Jacob Bell was a man not easily daunted, and, although defeated for the time, not to be turned from his purpose. His determination then was to convince the public of the advantage which would arise from the better education of chemists and druggists. But there were no means in existence—I mean no public means—to advance that education, and he rightly decided that the funds which had been gathered together by the infant Society, could not be better employed than in forming such a school as was needed—a school, which in the first place would send abroad throughout the land a better class of chemists—a school, the success of which financially should encourage the establishment of other schools in various parts of the kingdom, to be assisted also in the beginning by grants in aid; he felt that if these establishments could be made self-supporting, his work would be done. I cannot for one moment suppose that he ever intended to found a vast charity for the education—not of the children of chemists—but of those lads whose parents might in future desire to make them chemists!

Coming to Dr. Attfield's report under '1846,' he describes the difficulty of the Council when seeking to render examination compulsory by Act of Parliament; rather than relinquish its mission of education, he says it would have given up its examining powers. I do not put exactly the same interpretation on the records of the period. It seems to me that the Council were then, as now, bent on making examination compulsory, but that having established themselves as teachers, and there being in fact no other public teachers, they felt a very reasonable fear that when no man should be allowed to perform certain duties and possess certain rights until he had passed the examinations, and no other school than their own was in existence, the Legislature would naturally say, it is contrary to sound wisdom to make you, the proprietors of the school, the examiners of the pupils; such a course would be open to abuse, and consequently a public danger.

I am strengthened in this view by the opening of the leading article in the very same journal to which Dr. Attfield refers, and that article was in all probability written by Jacob Bell himself; it runs thus:—

"The main feature of the proposed Pharmaceutical Bill is the establishment of a compulsory examination for future chemists and druggists. The machinery of the Bill consists merely of an arrangement for constituting a competent Board of Examiners, and the penalty clauses are introduced for the purpose of making the examination compulsory.

"All the other parts of the Bill are matters of detail subservient to the one grand object, namely, the establishment of an efficient and compulsory examination."

A little further on, when Parliament saw no objection to the Society exercising the two functions, it seems to me the reason was that the Act in which the power of examination was given to the Society gave no exclusive rights, save those of certain titles, to the examined men; and so no hardship would virtually be suffered by rejected candidates.

And this naturally brings us immediately to the relationship of the Society to education now that the Act of '68 forbids a man even calling himself a "chemist and druggist," and virtually precludes him from practising as one by rendering it penal for him to deal in certain "poisons" which, as a dispenser, he must require daily. Even now the main appointment of examiners is left with the Pharmaceutical Society, subject to the approval of the Privy Council, and the addition of a Government assessor, and I therefore think—indeed, have publicly stated from time to time for the last three or four years—that the relationship stands in danger of being what Dr. Attfield calls an "unholy alliance." I am glad to be supported in this opinion by so able a man as Mr. Mackay.

Turning now to the first question,—"How to supply the demand for knowledge which compulsory examination has called forth?" I by no means think that although in my opinion the Pharmaceutical Society should cease to *keep a school*, it should cease also to be the *schoolmaster abroad*, aiding, and to some extent guiding, other schools.

In its early days it took the only possible means of supplying the requirement of the time—the establishment of one great model centre of pharmaceutical education—necessarily *in* the metropolis, but not, as some most unreasonably tell us, *for* the metropolis. Everybody knows that the chemists' assistants in London are mostly countrymen; that the common course of events is for country apprentices to become London assistants, and such are the men who, according to the Professor, have availed themselves of the advantages offered at Bloomsbury Square. That establishment has various facilities for education; some of them must remain and be augmented from year to year. I mean the library, museum, and perhaps the lectures. I say '*perhaps the lectures*,' because I feel that professors are an appropriate appendage to any learned society. But two great objects have now been attained. Examination is compulsory, and therefore education necessary, and the schools in London have established the fact that they may be self-supporting. Can we not then leave the School of Pharmacy mainly to its own resources? Housing, and so far helping it perhaps, but depending on proper fees from its pupils for its support. Would not such a school be in reality in more healthy and wholesome condition if so left? I have said that because the Society examines, it should not also teach; and although that may be an argument for leaving the established central school to itself, it is no argument against helping to sustain other schools in large provincial centres until they too are able to stand alone. But herein we must not be led away. There are very few provincial centres where this would be done successfully, and, as I said before, it would be monstrous to set up huge charity schools for boys who, in selecting pharmacy as their future, have done so without possessing sufficient means to carry them through their education. To aid these efforts in the country would be legitimately carrying out the intentions, and following in the steps of the founders of the Society. Much has been said about the way in which aid should be given. One man is shocked at the idea of paying lecturers; another would contribute nothing for rent. To me it has always seemed that where an association has been proved to be working in the right direction, and needs assistance, there pecuniary aid should be given to the general fund of that association, and the directors on the spot should apply it as best they could. The Pharmaceutical Society could never be hampered by the machinery required to make all such associations 'branches' or 'in connection,' and would have no further authority over them than to discontinue its assistance instantly on being satisfied either that it was misapplied or no longer needed. Fettered with details many difficulties might arise. Even paying for results might lead to that which Professor Attfield so earnestly and justly denounces—'cram.'

We know that wherever an examination has to be passed, a door is opened for 'cram.' From the 'Senior Wrangler' to the lowest clerk in a Government office 'cram' is resorted to. It is not as the Professor has stated that the Pharmacy Act has not created a demand for education. The very fact of this superficial teaching being advertised is an evidence of the demand for education; and it seems to me somewhat unjust to say the principals in pharmacy residing in provincial towns are basing their appeal to the Council to aid them, on a demand which does not yet exist. When the School of Pharmacy in Bloomsbury Square was started, no demand for it existed; but its founders desired to create a demand, and we may give our provincial friends, who know that *sound education* is required, credit for a like desire, and a desire to render the superficial system both unnecessary and distasteful to students. To correct this deplorable state of things, another power than the Act of Parliament must be employed. The Board of Examiners could do much if they had time to make the examinations more practical. They would, I know, be glad to enforce on the candidates the requirement of a period of actual service in a chemists' shop. Dr. Attfield would have a period of study in some particular school, but he must not blame the Pharmacy Act for not requiring this, because when that Act was passed there was no such school in existence except that of the Society itself.

As bearing on this question, I may just allude to the report of Dr. Greenhow, which appears in the last PHARMACEUTICAL JOURNAL. Among other good things, he says there, "It would, in my opinion, greatly conduce to the advantage equally of masters and apprentices if a general understanding could be arrived at, that no young men should enter on employment either as apprentices or assistants, who had not previously passed the Preliminary examination."

You cannot make men perfect by Act of Parliament; you may restrain them from evil, you may even keep them in a straight line of conduct by the letter of the law; but if you imbue all concerned, masters as well as apprentices, with the spirit of the Pharmacy Act—and I know no organization more powerful to do so than this Conference—you will have done much to promote the objects for which the Pharmaceutical Society has so long laboured.

NOTES READ BY MR. ROBERT HAMPSON, OF LONDON.

Owing to the zeal—I will not say over zeal—of the friends of pharmaceutical education, there has arisen something of the nature of a crisis on this question, which it is desirable to tide over, without taking false, or injudicious steps.

The very suggestive paper contributed by Professor Attfield is deserving of thorough discussion, and as he asks for free criticism upon it, and the general question, I will very briefly comment upon the "situation."

I regretfully agree with the statement that there is *not* "a wide-spread demand by assistants and apprentices for pharmaceutical education," although I believe the demand has slightly increased since the passing of the Pharmacy Act of 1868.

Whilst dwelling upon this fact, I have a lively recollection of the recent zealous efforts of the Manchester Chemists' Association in the very laudable endeavour to found a school of pharmacy in connection with Owens College. These efforts were considered to be well-timed, and necessary, and were very cordially supplemented, by the managers of the important institution to which the school was attached. Notwithstanding that Manchester is the centre of a notably wealthy district, including many thriving towns, the aggregate population equalling London in number, these very hopeful efforts ended in comparative failure. *Funds were abundant in this instance, but the students were not forthcoming.* In the face of this discouraging experience, and experience of a like character in other important places, to attempt to establish a comprehensive scheme of pharmaceutical education, however ably the scheme may be planned, is simply to court defeat, to jeopardize the interests of the school at Bloomsbury Square, which does not flourish to our satisfaction, and to spend money fruitlessly.

In trying to discover the cause, or causes, accounting for this evident want of demand for pharmaceutical education, no great distance, in the way of research, need, I think, be traversed.

The chief cause is a very palpable one, if we open our eyes to look for it, and not live in a maze of 'great expectations.'

It is simply this. The very limited, and slowly-growing demand on the part of medical men, and consequently on the part of the public also, for improved, or even passable pharmacy.

If the medical profession, or the public, were loud, or only gently pressing in their demands for improved pharmacy, or for *pharmacy at all* in the majority of places, there would be no lack of zealous students, willing, yea eager, to pay the *full value* for instruction received, —no subsidies being required—whether in metropolitan, or provincial schools of pharmacy.

When this demand shall have grown, and this demand is the only safe basis on which to build, and the labourer in pharmacy is considered to be more worthy of his hire, then, and not till then, will pharmaceutical education flourish.

We must not therefore be so irrational as to expect a rapid growth in the demand for pharmaceutical education. The improvement we so much desire, will be gradual, and in exact proportion to the demand for genuine pharmacy.

I think there is no doubt, that the unsatisfactory relationship, or rather *want* of relationship, which exists between the medical profession and those who practise pharmacy, is the most constant, and influential cause of the deficient demand, for pharmaceutical education.

An abiding interest in pharmaceutical education and progress is not to be expected, when, in many towns and whole districts, a physician's prescription is almost a novelty, and the Pharmacopœia processes are unpractised, as their is absolutely no use for any but the most simple pharmacopœia preparations.

Is the much-to-be-deprecated process of cramming a very venial offence, when the student is aware that ordinary practical knowledge, with the possession of the legal entrance into the trade, is all, in the majority of cases, that is likely to be required from him by his client when in business?

The examination-room is the place to check cramming.

Compulsory attendance at lectures will not remedy the want of demand for pharmacy. The time is not ripe for the proposed change of compulsion—a change that would press so severely upon the hard-working self-reliant student, who, in spite of all difficulties, passes the examinations with credit and honour.

The ordinary but imperious laws of demand and supply rule this question, and we must not wilfully ignore them.

Can nothing therefore be done, to bring the physician, and the pharmaceutist, into more intimate mutual relationship? Cannot this Conference, as it assembles year, by year, do something in this direction?

Much more depends upon the removal of this defective relationship, than the *premature* establishment of schools of pharmacy; for when the demand comes, the supply will follow, 'in good time.'

I would say in reference to provincial pharmaceutical education, that I think the Pharmaceutical Society would willingly aid, in the establishment of central schools of pharmacy, according as a *genuine demand* for these schools arises. This aid being given, only tentatively, as these institutions should be self-supporting.

The scheme adopted by the Pharmaceutical Council in November of 1870, had it been carried out, would have been an excellent one for the purpose.

I object to grants being given to pay lecturers and class-teachers. The students' fees ought to cover these expenses. We have no right to unjustly cheapen pharmaceutical education.

There is no prospect of establishing a large number of efficient schools of pharmacy. It is better to have *one or two* situated in important centres, well supported and conducted, than a great number of small evanescent schools, which may be here to-day, and gone to-morrow.

We must bear in mind, that if aid be given to establish schools and classes in a *diffusive manner*, central schools of pharmacy will never be formed, as a diffusive pseudo-philanthropic scheme, will prevent the requisite aggregation of students into educational centres.

I have confidence in the ultimate future of pharmaceutical education, and this confidence is mainly based upon an improving national and scientific education; the controlling influence of the legal tests required under the Pharmacy Act; and a more just recognition of pharmacy on the part of the medical profession and the public.

Parliamentary and Law Proceedings.

Important Decision against a Medical Man.

At the Sheffield County Court the Judge (T. Ellison, Esq.,) has delivered a decision of considerable importnace to medical men. A surgeon in the town had entered about forty cases, and when the first, which was to recover the sum of 12*s*., was called on, his Honour asked him whether he was a surgeon or an apothecary, or both. The plaintiff replied that he was a surgeon only. His Honour then asked him whether he claimed the 12*s*. for surgical operations or for medicine. The plaintiff replied that the claim was for medicine, and not for surgical assistance. His Honour told him that he had no qualification as an apothecary to supply medicines, and the Act of Parliament said he could only sue according to his qualification. He held the qualification of a surgeon, and he could sue for nothing but what came within his surgical practice. The plaintiff said if that were so he would withdraw the case. In going through his list of plaints he withdrew all those for medicine supplied; and where the plaint was for surgical assistance and for medicines, he had to abandon the latter. Another medical practitioner was in court who only held a diploma as an apothecary, but in his case no questions were asked, and he was allowed to prove his claims.

Accidental Poisoning by Laudanum.

On Wednesday, August 21st, an inquest was held by Mr. J. Makinson, the deputy coroner for Manchester, touching the death of Oscar Henry Cutler, the infant son of an ironmonger living in Oldham Road. A servant of the deceased's parents, named Barratt, said that the deceased was unwell on Sunday morning, and she gave it, by mistake, a dose of laudanum. She thought the bottle contained paregoric, which was the deceased's proper medicine. A sister of the deceased said that shortly after the deceased had taken the laudanum, Barratt said to her, "See what I have done; I have given the child laudanum. Don't tell your mother; I will let her know when she comes down." Witness's mother did not come down till about an hour and a quarter afterwards, when the deceased, who went to the bottom of the stairs to meet her, seemed sleepy. Barratt then told her mistress what had happened, and the deceased was taken to a doctor. He appeared to be recovering from the effects of the poison, but on Monday evening was seized with fits and died. A verdict of accidental death was returned; and the jury censured Barratt for not immediately mentioning the mistake she had made to her mistress.—*Manchester Guardian.*

Suspected Poisoning by Arsenic.

On Saturday, August 24th, Mary Ann Cotton was brought up at the Bishop Auckland Police-court, charged with the wilful murder of Charles Edward Cotton, her step-son, at West Auckland, on the 12th of July last.

Mr. Thomas Scattergood, of Leeds, surgeon (lecturer on forensic medicine and toxicology at the Leeds School of Medicine), said: On the 26th of July last I received from my pupil, Mr. Lockwood, six jars and two paper parcels. They were all well secured and labelled. The bottles were numbered 1, 2, 3, 4, and 7, and beneath the seal of each was a slip of paper with the name of W. B. Kilburn written on it. One of the paper parcels was numbered 6, and securely sealed and labelled, and secured to the bottle. The other parcel was also sealed and labelled, but not numbered. The jar No. 1 contained some fluid drachms of a liquid purporting to be part of the contents of the stomach of the late Charles Edward Cotton. The jars numbered 2, 3, 4, 5 and 7, contained the stomach and part of the bowels, the spleen, kidneys, heart, and portions of the lungs and liver purporting to be those of the late Charles Edward Cotton. The parcel numbered 6 contained a napkin purporting to have on it the last evacuation from the bowels of the late Charles Edward Cotton. I have analyzed these, and found the stomach and upper portion of the smaller bowel for the length of 18 or 20 inches presented marks of inflammation of such a kind as are produced by an irritant poison. The redness was in patches, and in one or two places there was blood effused beneath the mucus membranes. I carefully examined the small intestine to see if there were any of those appearances which are met with in cases of enteric fever, but there were no such appearances. The stomach and small intestine were well preserved, so that the appearances of inflammation were quite distinct. I found arsenic in the contents of the stomach and in the contents of the bowels, in the substance of the stomach and of the bowels, in the liver, the lungs, the heart, and the kidneys. I did not find any in the spleen. There were brown stains of fæces on the napkin, and on it also I found arsenic. The amount contained in the nine fluid drachms of stomach contents was rather more than half a grain of white arsenic or arsenious acid. The amount contained in the other parts submitted to me I estimated at about one-fifth of a grain. I found no morphia in the contents of the stomach, but I found traces of bismuth. The remaining parcel, purporting to contain articles found in prisoner's house by the police, contained, first, a paper of arrowroot; second, a powder wrapped up as by a surgeon or chemist, which weighed above two grains, and consisted chiefly of borax, with a little morphia, and a little oily matter which might have been dropped on the outside of the paper cover; third, a tin canister containing a quantity of red lead; and, fourth, a box of pills. None of these articles contained any arsenic. After hearing the evidence of Dr. Kilburn and Mr. Chalmers, and taking into account the appearances I observed in the stomach and bowels, and the result of my analysis, I am of opinion that death resulted from poison by arsenic. The prisoner was formally committed for trial at the next assizes at Durham on a charge of wilful murder.—*Leeds Mercury.*

Poisoning by a Preparation of Cantharides.

Mr. William Emsley, the deputy-coroner of the borough of Leeds, held on Saturday afternoon an inquiry respecting the death of Charlotte Lavinia Bee, two years of age, the daughter of a labourer. It appeared that on Friday morning Mrs. Bee went to Holbeck to assist the wife of Mr. Clough, and took with her the deceased. Shortly after ten o'clock, while engaged in playing, the child ran into an outhouse, and taking up from the floor a bottle containing a preparation of oil of cantharides, drank a portion of the corrosive liquid. She was badly blistered about the face and mouth, and suffered very much. Mr. Mann, surgeon was summoned, and after a remedy had been applied, the child was, by his advice, removed to the infirmary. She remained in an insensible condition throughout the day, and her death occurred in the evening. It seemed that the occupants of the premises were ignorant of the bottle and its contents, but it transpired that the liquid had been obtained some years ago for the purpose of blistering horses. The verdict was "Accidentally poisoned."

Obituary.

FELIX ROBERT GARDEN.

We regret to record this week the death of a former member of the Council of the Pharmaceutical Society of Great Britain. Mr. Felix Robert Garden, late of 372, Oxford Street, died at Ventnor, August 2nd, 1872. Mr. Garden was educated at the London University College, where he received a good classical education. When a youth he selected the church for his future career. After a brief sojourn, however, with a clergyman in the country with whom he was placed to go through his preparatory studies, he changed his mind, and decided on following his father's calling as a chemist and druggist. Mr. Garden was for many years a member of the Pharmaceutical Society, and was elected a member of the Council. In consequence of delicate health, Mr. Garden was for several years unable to apply himself closely to business, and in January, 1863, he retired from it altogether. The name of his firm, however, was continued as Garden and Robbins until January, 1865. We believe that Mr. Garden's father was at one time a partner with the celebrated Mr. Accum, with whom he carried on business for some years in Compton Street, Soho. When Mr. Accum left the country, Mr. Garden settled in Oxford Street.

WILLIAM HUSKISSON.

The Pharmaceutical Society has lost another of its founders by death, in the person of Mr. William Huskisson, who died on Saturday last, August 24th. Mr. Huskisson was born in 1793 at the Old Bath House, Cold Bath Fields, Clerkenwell (since pulled down), and after leaving school, went into the chemical business of his father and cousin (Huskisson and Towers). On the commencement of the Pharmaceutical Society he became a life member, and always felt the warmest interest in the welfare of the Society. He was of a quiet and retiring disposition, and, though he enjoyed the private friendship of most of the distinguished chemists of the last generation, he rarely mixed with society. He joined heartily, however, in the scheme of his friend Dr. Birkbeck to establish the London Mechanics' Institution, and was a member from its commencement to the time of his decease. He lived for many years and died in the same house, in Mecklenburgh Square, which his old friend, Mr. Samuel Parkes (author of the Catechism), had occupied previously.

ALFRED UTLEY.

On August 26th, at Ryde, after a lingering illness, borne with great patience, Mr. Alfred Utley, Pharmaceutical Chemist, of Mount Vernon Road, Liverpool. Aged 32.

Notice has also been received of the following deaths:—

On the 22nd July, Mr. John Nicholas, pharmaceutical chemist, of Narberth, Pembrokeshire. Mr. Nicholas had been a member of the Pharmaceutical Society since 1853.

On the 17th August, Mr. John Beaton, pharmaceutical chemist, of 6, St. George's Terrace, Kilburn. Mr. Beaton had been a member of the Pharmaceutical Society since 1851.

On the 7th July, Mr. H. Miller, chemist and druggist, late of Battersea.

On the 9th August, Mr. G. H. Ellcome, chemist and druggist, late of Fareham.

On the 15th August, Mr. C. Goodbarne, chemist and druggist, of Brighton.

Correspondence.

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

EXAMINATION FEES.

SIR,—Three subjects of great importance are at the present time before the Pharmaceutical Council, and will beyond doubt receive the most careful and ample consideration of our representatives, viz., Provincial Education, Minor Examinations, and Examination Fees.

Upon Mr. Schacht's proposed scheme for provincial education on which you have invited and received many criticisms and suggestions, I will not at present enter. So far as I have been able to look into it, I confess myself but little enamoured with it, believing it will require very material alteration before it can possibly be made applicable to the work of our Society.

The wider scope of subjects for the Minor examination, to which I ventured to refer in my remarks at the last annual meeting, has now been officially brought before the Council by Dr. Greenhow in his report presented at the late meeting of Council, and this will, therefore, at once receive the attention it demands. The necessity for that examination being more searching will, I feel sure, be acknowledged by most persons, when it is considered that instead of its being looked upon as the stepping-stone to the Major, as was invariably the case in days gone by, it is now accepted as the legal evidence of full qualification; the result being that not only do those who go through the ordeal deceive themselves, but the real benefit intended for the public good by the compulsory examination is reduced to its very lowest degree.

But the point to which I more particularly desire to direct attention is that of examination fees. It is one of great importance, and I believe at present stands as a serious barrier to our progress as a Society, and to the real improvement of pharmacists generally. Mr. Mackay, in a letter lately addressed to this Journal, p. 118, remarks that "the time may come when such a course (lessening fees) might be deemed advisable for the interests of the Society; but a change such as this would require very great consideration before a step so serious could be safely taken." Mr. Frazer in the same Journal tells us he has already given notice of certain resolutions upon the subject to be considered at the September meeting of Council. With regard to Mr. Mackay's fears, I question whether, when an error has been discovered it is not better at once to face, and, if possible, remove it rather than to delay; but, on the other hand, whether the resolutions proposed by Mr. Frazer do not go too far, and would not be fraught with untold difficulties and inconveniences to the Board of Examiners I seriously doubt; to say nothing of the almost pauper class of students implied by the conditions suggested. These are, however, questions on which we must expect differences of opinion; but however widely we may differ therein, I cannot help thinking it a pity and want of good taste, to give expression to such uncalled-for sneers and personalities as have been seen of late in the correspondence column. Such utterances add no weight to the argument, and reflect no credit on the writer.

My earnest desire is to see the whole trade as far as possible united into one body, each member as such holding a responsible position, to be used for the benefit of the whole. It has been with this desire that I have ever advocated the adoption of a liberal policy towards those we are in the habit of regarding as outsiders; and it is for the furtherance of the same object that I desire now to see a radical change brought about in the examination fees.

Educational qualification has always been held as the *sine quâ non* of membership; upon due evidence of its possession (either assumed, as in the case of those who are admitted by virtue of having been in business before a certain date, or proved by examination), membership alone has been obtained. In future, those only who pass the Major examination will be eligible for election as members, but unfortunately the advantages of membership, as viewed by outsiders, are so few that a very small proportion only, of those who aspire to the higher grade of pharmaceutical chemist, deem it necessary or desirable to join themselves to the Society as members; the result being that our strength as a society is yearly decreasing, whilst the numerical and therefore political strength of outsiders is largely increasing, and the feeling of estrangement, instead of being wiped out, is perpetuated and extended to an untold extent, and must ultimately, if not removed, be productive of immense difficulty and evil.

The plan which suggests itself to my mind is *not* the reduction of examination fees, but such an alteration in them as shall present a substantial gain to those who, by persevering study, show their appreciation of the higher qualification and title, and shall thereby at the same time secure to the Society a body of enlightened and influential members. To this end I would propose the following scale:—

Fees.	£. s. d.	Annual Subscriptions on becoming connected with the Society.	£. s. d.
First or Preliminary (Registered as Apprentices or Students)	2 2 0	Eligible on application to the Council, to be elected Apprentices or Students of the Society	0 10 6
Minor (Registered as Chemists and Druggists)	5 5 0	Eligible, on application to the Council, to be elected Associates of the Society	1 1 0
Major (Registered as Pharmaceutical Chemists and Associates of the Society without extra fees) . .	10 10 0	Registered as Members of the Society on entering business on own account without extra fee	

by which it will be seen that all who pass the Major examination would not only be registered at once as Pharmaceutical Chemists, and as members of the Society, without any extra fees, upon going into business as masters, but would at once be put into possession of a tangible gain, by being henceforth free from fees of any kind whilst retaining their connection with the Society as Associates.

Here would be provided what I believe is now greatly needed, a substantial stimulus to the Major examination, something worth a little extra study and expense, something to encourage the rising generation to persevere in the path of learning.

One or two objections to this step I would at once very briefly meet. It will doubtless be argued that such a sacrifice would be ruinous to the Society financially, and a serious injustice to those who have paid or are paying their subscriptions.

Financially I believe it would be found a direct advantage, and that the Society would be enriched thereby, many being induced to pass the Major who are at present deterred from so doing by the fact, that, although they succeed in passing the examination, they would yet gain no further advantage without the payment of extra fees. As to injustice to old members, I believe the objection more imaginative than real, and that experience would prove the willingness of such to forward the general good, whilst those who have passed since the Pharmacy Act came into operation might fairly be admitted on payment of a five-guinea commutation fee.

Another, and perhaps more difficult, although not insurmountable, question would arise upon the supply of the Journal. This would probably require a complete change from the present free circulation. The Journal account has always formed a sore point in the annual statement, showing a considerable loss to the Society; that such should be allowed to continue is of itself highly improbable, and would, beyond doubt, independently of any such alterations which I have ventured to suggest, be a subject for the consideration of the present or future Councils; any alteration such as I suggest would but accelerate the step which is considered by a large number of our members to be inevitable, viz., the abandonment of the free issue of the Journal, letting it stand upon its own intrinsic merits. That such a step would be alike advantageous to the Society as proprietors, and to the readers as such, is the generally expressed opinion of most with whom I have spoken upon the subject.

I must apologize for the length of my letter, but trust the thoughts expressed may commend themselves to the serious consideration of the Council; believing that some such action is really called for in the interest of the Society.

Edwin B. Vizer.

63, *Lupus Street, Belgravia South,*
August 27th, 1872.

Chemists' Club.

Sir,—The letter in the Journal, published a few weeks since suggests an idea which, if adopted, would, I think, conduce more to the unity and concord of our fraternity than any institution which has hitherto been proposed.

The convenience and comfort of a "Chemists' Club" in London, to all who are connected with the trade, either in town or the provinces, must, on consideration, be manifest to all, at the same time, it would, being established, be inexpensive and self-supporting. Much may be said of the advantages which would attend it, and I hope much more will be said, and the subject well discussed and ventilated. With your correspondent, I also shall be glad to become a member, and if any of your readers approve of the suggestion, and will convene a meeting on the subject, I have no doubt a satisfactory result would be arrived at. Hoping to have the opinion of your correspondents on the subject.

One who will Attend the Meeting.

Appeal: Mrs. Stockman and Family.—The following subscriptions have been received in response to an advertisement which appeared in last month's Journal on behalf of Mrs. Stockman and family:—E. H. Matterson, £2; Lunar Caustic, 10*s.*; Mr. Berry, 2*s.* 6*d.*; A Poor Clerk, 3*s.*; F. H. Charles, 1*s.*; R. Rowe, 10*s.*; For Pity, 1*s.* 6*d.*; a Manchester Member, 2*s.* 6*d.*; E. Worth, 5*s.*; W. W. Clark, 10*s.*; Collected by Mr. John Wavell, Local Secretary for Ryde, £3. 3*s.* 6*d.* Mr. Wavell, in his letter says, "I should suggest if the local secretaries for other districts would kindly exert themselves in this matter, a very useful and serviceable amount could be raised for the bereaved family." A more distressing case was never submitted to the public. Mrs. Stockman and her eight children, through the suicide of her husband (a chemist at Gosport), under very painful circumstances, are entirely dependent on charity for support. She has been brought up to the drapery business; and if a sufficient sum can be raised, it will be invested by the trustees in the purchase of a small business of that description, as Mrs. Stockman is an active business woman. More than £100 have been already subscribed by friends in the neighbourhood and others, including £20 from the Benevolent Fund of the Pharmaceutical Society. A still larger amount is needed to carry out the above object; and it is thought it only requires the attention of the benevolent and well-to-do among the large number of chemists to assure such amount being received. The money will be judiciously invested by the trustees, G. Perfect, Esq., Havelock Park, Southsea, and Charles Mumby, Pharmaceutical Chemist, 47, High Street, Gosport, by whom subscriptions will be thankfully received.

"*An Assistant to a Physician.*"—The gentleman referred to has not only passed the Minor examination, which is compulsory, but also the Major, which is voluntary.

"*Not Happy.*"—Yours appears to be a case which unfortunately occurs too frequently of the improper apprenticeship of youths destitute of all elementary fitness for becoming qualified druggists. We are utterly at a loss to understand the latter portion of your history, or to reconcile your statements that you had served nearly four years "in a first-class West-end shop where there was nothing but dispensing," and that subsequently you failed to pass the Preliminary examination. In answer to your question what you should turn your attention to if you again fail to pass the Preliminary examination, we are unable to make any suggestion.

"*Quinia.*"—The sale would not be strictly legal, but we believe no objection would be raised to it.

R. G. H.—(1) You will find an article on the subject in the Calendar of the Pharmaceutical Society. (2) Apply at Stationers' Hall.

Z.—A description of the test may be found in almost any handbook on chemistry.

R. & J.—The colouration is probably due to some impurity dissolved by the naphtha.

Communications, Letters, etc., have been received from Mr. G. F. Schacht, Mr. W. Wilkinson, Mr. Pollard, Mr. Reynolds, Mr. Tichborne, Mr. Langridge, Mr. Harrison, Mr. Deane, Mr. Squire, Mr. Minett, Dr. C. Kidd, Mr. Treves, Mr. S. T. Severs, "Assistant to a Physician," "An Unqualified Assistant," "Ratæ," A. M. A. P. S., R. J. N.

THE MICROSCOPE IN PHARMACY.

BY HENRY POCKLINGTON.

(*Continued from page* 161.)

SASSAFRAS RADIX.—*Medulla.*—When present, the medulla is composed of irregular sub-globose cells, unpitted, containing small quantities of starch and usually also a dark red-brown colouring matter.

Wood Zone.—The wood is very light and porous, and is composed of pleurenchymatous cells, of vascular vessels, and the parenchymatous cells of the medullary ray. Viewed in cross section, the vessels are oval or circular, and in duplicate usually; the wood cells are irregularly shaped polyhedrons, the medullary rays composed of sub-cylindrical cells.

Wood Cells.—These when viewed longitudinally are seen to be of the true pleurenchymatous type, are long with pointed ends, and are intimately coherent. The vascular vessels are very large and clearly discernible by the unaided eye if a thin section be held up to the light. They are distinctly pitted, and have but moderately thick walls, which are very rarely completely perforate. The size, shape and arrangement of the pits are very varied. The larger vessels are somewhat minutely pitted, the pits being arranged with great regularity in close proximity with each other; are oval, their long axis being transversal to that of the vessel. These vessels form a very pretty object. Other vessels are coarsely pitted, the pits being "bars" rather than pits. The gradations between these extremes are gradual. The vessels are not reticulate, but certain of them manifest a disposition to tear longitudinally, as though they were formed by the adhesion of contiguous pitted wood cells.

The cohesion of the vessels in linear series is usually oblique, the septa is usually partially absorbed, a hernoid annulus remaining. When the septum has not been absorbed, it is pitted like the vessel.

The cells of the medullary rays are sub-cylindrical, and contain small quantities of starch and colouring matter. The starch is somewhat difficult of examination. The granules are rather small, ovate, and intensely doubly refractive.

A well-executed longitudinal section mounted in Canada balsam, after a prolonged soaking, forms a very beautiful polariscope object when viewed with a neutral violet, a cyanogen blue, or a purple selenite. When the selenite, polarizing, and analysing prisms are properly adjusted, the variety of colours seen will surprise any one but a very *blasé* polariscopist.

Cortical layers.—The presence of great quantities of colouring matter and other cell contents renders the examination of the cortical layers somewhat difficult. The sections must be carefully boiled, and then allowed to macerate, in alcohol before examination, if a close examination be desired. The parenchymatous cells of these layers do not present special features of interest. In shape they are irregularly modified sub-cylindrical cells; their walls are thin and unpitted.

Medullary rays are present in the innermost layers. The outer cells, the sub-epiblema are cubic, uncompressed cells with rigid walls and stained a dark brown, almost black. The flat cells of the exterior have no special features. The liber cells of the bark are cord-like, very long, and very tough. A cross section of them is not easy of accomplishment; they are then seen to be tubes almost wholly filled with sclerogenous deposits.

Canada balsam or dammar is the best medium in which to mount transverse sections. Longitudinal sections should be mounted in dammar and in glycerine. Before mounting them in balsam, they must be dried very gradually and carefully from the water in which they were immersed after being cut, and soaked in turpentine for some days.

THE RELATION BETWEEN THE ODOUR OF GASES AND THEIR POWER OF RESISTING LIQUEFACTION.

BY F. TREVES.

With regard to this singular and marked relation, it is, in the first place, to be noted that those gases alone have odour that can be reduced to liquids or solids by the application of pressure or great cold. And reviewing this relation in another aspect, it will be found also that every gas that is inodorous is likewise quite irreducible by either cold or pressure. In the second place, the intensity or strength of the odour of any gas bears a marked relation to the power required to reduce that gas to a liquid or a solid state, the strength of the odour being always in inverse ratio to the amount of force requisite for condensation. These relations—to which attention is now for the first time called—I have found to exist (with very few exceptions) in the case of all known gases. Of the four elementary gases—omitting fluorine—three, viz., oxygen, hydrogen and nitrogen, are quite inodorous, and at the same time, quite irreducible by either pressure or cold. Whilst the fourth gas, chlorine, which is possessed of a most suffocating smell, is easily condensed to a liquid. To take the case of some of the more common compound gases, it will be noticed that carbonous oxide, which is inodorous, is also incondensible, whilst carbonic oxide, which has a faint, pleasant and pungent odour, can be brought not only to a liquid, but also to a solid state. Nitrous oxide again, which possesses a very faint yet decided smell, can be liquefied and also solidified, but nitric oxide, which is an odourless gas, has never yet been reduced by any known means. Methyl hydride is not possessed of smell, and is not to be liquefied, whilst ethylene, with its faint garlic odour, liquefies at a temperature of 110° if under pressure. Acetylene, on the other hand, forms one marked exception to this general rule: it has a most distinct and far from pleasant smell and has as yet proved incondensible. In noticing, secondly, the ratio between the strength of the odour and the power required to reduce the gas, it will be seen that sulphurous acid, which possesses a smell more intense, perhaps, than that of any other known gas, being quite irrespirable, requires only a pressure of two atmospheres at 15°, or a temperature of 17·8°, to reduce it to a liquid, whilst, on the other hand, no less than fifty atmospheres at a temperature of 7·2° are required to reduce nitrous oxide, a gas almost inodorous, to a liquid condition. Again chlorine is easily liquefied under about five atmospheres, whilst hydrochloric acid, the odour of which is very much less intense than that of chlorine itself, requires the application of at least forty atmospheres for proper reduction. Ammonia and sulphuretted hydrogen require a temperature of 6·5° and 17°, respectively, to produce liquids, while ethylene, with other faint smelling gases, is only reduced under high pressure at 110°. A few gases—and strangely those in particular that are described as having a "fœtid" or "garlic" odour—present some slight exceptions to this singular ratio, but it holds good so generally, that a list of gases arranged in order according to their reducible properties, and a list arranged according to their properties of smell will show a rough but most marked coincidence.

ON THE CULTIVATION OF THE OLIVE, NEAR VENTIMIGLIA.

BY MR. L. WINTER.

(From a letter addressed to Mr. Daniel Hanbury, F.R.S.)

As you wish for a little information on the propagation of the olive in this part of Italy, I have drawn up a few remarks which, though not containing much that is new, may yet serve to complete or to confirm your own observations.

The different kinds of olive-tree we have in this country may be classed under three divisions:—

1. *Olivastro*, the Wild Olive, *Olea europæa, L.*, grows quite spontaneous, reproducing itself by seeds and suckers; leaves on young trees small and oblong,—on older trees a little larger and lanceolate; branches sometimes spiny; fruit small, oblong, and very bitter. This kind may be regarded as the parent of all the varieties.

2. Varieties reproducing themselves truly by seed, but not so freely as the *olivastro*, and having the fruit less bitter. Under this head may be placed the following:—

- α. *Pignuole.*—Branches greyish; leaves lanceolate, acute; fruits when ripe almost round, affording an oil of rather strong flavour. There are hundreds of these trees on the Capo Martino, near Mentone, quite wild.
- β. *Columbaïre* (Genoese dialect). — Branches brownish; leaves varying in shape, but mostly obtuse; fruit large, somewhat pointed.
- γ. *Spagnuole.*—Fruit more elongated than the preceding. These forms, α. β. γ., vary more or less *inter se.*

3. Varieties not reproducing themselves truly by seed, but returning to the *olivastro*. That these varieties degenerate when propagated by seed is the general assertion among the people here; but regular experiments have never, I think, been carried on, for raising the plant by seed is not advantageous, suckers being of more rapid growth. In this division I would place two varieties, viz.:—

- α. *Nilane.*—Fruit large, oblong. This occurs in abundance as far west as Cannes, whence along the whole French coast of the Mediterranean, another olive with still larger fruit is cultivated.
- β. *Punginaïre.*—This is another variety which we have in this country. It has long willow-like leaves, and produces a very large pointed fruit, chiefly preferred for salting.

The propagation of olive-trees belonging to this third division is effected by cleft-grafting on the stem of the *olivastro* at about six inches above the ground. When the scion has taken, earth is heaped around it, so as to stimulate it to shoot out roots. After three or four years the little tree begins to fruit, and arrived at an age of about 20 to 25 years, the roots which have been thrown out by the graft send up suckers, any which come from those of the parent *olivastro* being of course extirpated. These suckers, when about two years old, will be strong enough to bear separation from the parent-root and to be planted as independent trees. Such young trees fruit in three to five years after planting. When a sucker is thrown out from a large naked root, it may be surrounded by a heap of earth into which it will strike roots, and in due time may be separated as already explained.

The quality of the oil obtained from the cultivated olive very much depends on the degree of maturity of the fruit. The riper the latter, the better will be the oil it yields.

Near Marseilles the olives are gathered in October and November, while they are still unripe, and the oil is consequently of very inferior quality. This plan of anticipating the crop is adopted on account of the cold *mistral*, which spoils the olives sometimes completely, freezing them and rendering them nearly worthless for oil. To make the trees thicker in foliage, and thus capable of affording a natural shelter to their fruits, the peasants prune the tops every year after the gathering. In this district of Italy comparatively little pruning is needed, the trees on many properties being allowed to grow quite *au naturel.*

About La Mortola and the adjoining district of Latte, as well as on all the lower slopes of the Riviera, the olives are frequently attacked in the month of July by an insect called *moschino*, which lays its eggs in the berry.* The caterpillar developes itself in August, finding its nourishment in the pulp of the fruit. Olives thus infested drop from the trees while not yet fully ripe, that is, in October, November and December. On the mountains at some distance from the sea, the olives are scarcely at all affected by these insects; the fruits in consequence attain their perfect maturity, the crop being gathered between December and May. The oil yielded by such olives is very clear and of superior flavour, and it commands a high price. In proof of this latter fact, I may remark that the value of the oil produced at Latte contrasted with that of the mountain village of San Michele at the head of the valley is ordinarily as three to four, sometimes even as two to three.

THE AIMS AND INSTRUMENTS OF SCIENTIFIC THOUGHT.†

BY PROFESSOR CLIFFORD.

(*Continued from p.* 166.)

I said there were two ways in which a law might be inexact. There is a law of gases which asserts that when you compress a perfect gas, the pressure of the gas increases exactly in the proportion in which the volume diminishes. Exactly; that is to say, the law is more accurate than the experiment, and experiments are corrected by means of the law. But it so happens that this law has been explained; we know precisely what it is

* It appears not to lay more than one egg in each,—at least I have never found more than a single caterpillar in an olive.

† Lecture delivered before the British Association at Brighton, Monday, August 19th, 1872.

that happens when a gas is compressed. We know that a gas consists of a vast number of separate molecules, rushing about in all directions with all manner of velocities, but so that the mean velocity of the molecules of air in this room, for example, is about 20 miles a minute. The pressure of the gas on any surface with which it is in contact is nothing more than the impact of these small particles upon it. On any surface large enough to be seen, there are millions of these impacts in a second. If the space in which the gas is confined be diminished, the average rate at which the impacts take place will be increased in the same proportion; and because of the enormous number of them, the actual rate is always exceedingly close to the average. But the law is one of statistics; its accuracy depends on the enormous numbers involved; and so, from the nature of the case, its exactness cannot be theoretical or absolute.

Nearly all the laws of gases have received these statistical explanations; electric and magnetic attraction and repulsion have been treated in a similar manner; and a hypothesis of this sort has been suggested even for the law of gravity. On the other hand, the manner in which the molecules of a gas interfere with each other, proves that they repel one another inversely as the fifth power of the distance; so that we have found at the basis of a statistical explanation a law which has the form of theoretical exactness. Which of these forms is to win? It seems to me again that we do not know, and that the recognition of our ignorance is the surest way to get rid of it.

The world in general has made just the remark that I have attributed to a fresh student of the applied sciences. As the discoveries of Galileo, Kepler, Newton, Dalton, Cavendish, Gauss, displayed ever new phenomena following mathematical law, the theoretical exactness of the physical universe was taken for granted. Now when people are hopelessly ignorant of a thing, they quarrel about the source of their knowledge. Accordingly many maintained that we know these exact laws by intuition. These said always one true thing, that we did not know them from experience. Others said that they were really given in the facts, and adopted ingenious ways of hiding the gulf between the two. Others again deduced from transcendental considerations sometimes the laws themselves, and sometimes what through imperfect information they supposed to be the laws. But more serious consequences arose when these conceptions derived from physics were carried over into the field of biology. Sharp lines of division were made between kingdoms and classes and orders; an animal was described as a miracle to the vegetable world; specific differences which are practically permanent within the range of history, were regarded as permanent through all time; a sharp line was drawn between organic and inorganic matter. Further investigation, however, has shown that accuracy had been prematurely attributed to the science, and has filled up all the gulfs and gaps that hasty observers had invented. The animal and vegetable kingdoms have a debatable ground between them, occupied by beings that have the character of both and yet belong distinctly to neither. Classes and orders shade into one another all along their common boundary. Specific differences turn out to be the work of time. The line dividing organic matter from inorganic, if drawn today, must be moved to-morrow to another place; and the chemist will tell you that the distinction has now no place in his science except in a technical sense for the convenience of studying carbon compounds by themselves. In geology the same tendency gave birth to the doctrine of distinct periods, marked out by the character of the strata deposited in them all over the sea; a doctrine than which, perhaps, no ancient cosmogony has been further from the truth, or done more harm to the progress of science. Refuted many years ago by Mr. Herbert Spencer, it has now fairly yielded to an attack from all sides at once, and may be left in peace. When, then, we say that the uniformity which we observe in the course of events is exact and universal, we mean no more than this, that we are able to state general rules which are far more exact than direct experiment, and which apply to all cases that we are at present likely to come across. It is important to notice, however, the effect of such exactness as we observe upon the nature of inference. When a telegram arrived stating that Dr. Livingstone had been found by Mr. Stanley, what was the process by which you inferred the finding of Dr. Livingstone from the appearance of the telegram? You assumed over and over again the existence of uniformity in nature. That the newspapers had behaved as they generally do in regard to telegraphic messages; that the clerks had followed the known laws of the action of clerks; that electricity had behaved in the cable exactly as it behaves in the laboratory; that the actions of Mr. Stanley were related to his motives by the same uniformities that affect the actions of other men; that Dr. Livingstone's handwriting conformed to the curious rule by which an ordinary man's handwriting may be recognized as having persistent characteristics even at different periods of his life. But you had a right to be much more sure about some of these inferences than about others. The law of electricity was known with practical exactness, and the conclusions derived from it were the surest things of all. The law about the handwriting, belonging to a portion of physiology which is unconnected with consciousness, was known with less, but still with considerable accuracy. But the laws of human action in which consciousness is concerned are still so far from being completely analysed and reduced to an exact form, that the inferences which you made by their help were felt to have only a provisional force. It is possible that by-and-by when psychology has made enormous advances and become an exact science, we may be able to give to testimony the sort of weight which we give to the inferences of physical science. It will then be possible to conceive a case which will show how completely the whole process of inference depends on our assumption of uniformity. Suppose that testimony, having reached the ideal force I have imagined, were to assert that a certain river runs up hill. You could infer nothing at all. The arm of inference would be paralysed, and the sword of truth broken in its grasp; and reason could only sit down and wait until recovery restored her limbs and further experience gave her new weapons. I want in the next place to consider what we mean when we say that the uniformity which we have observed in the course of events is *reasonable* as well as exact.

No doubt the first form of this idea was suggested by the marvellous adaptation of certain natural structures to special functions. The first impression of those who studied comparative anatomy was that every part of the animal frame was fitted with extraordinary completeness for the work that it had to do. I say extraordinary, because at the time the most familiar examples of this adaptation were manufactures produced by human ingenuity; and the completeness and minuteness of natural adaptations were seen to be far in advance of these. The mechanism of limbs and joints was seen to be adapted far better than any existing ironwork to those motions and combinations of motion which were most useful to the particular organism. The beautiful and complicated apparatus of sensation caught up indications from the surrounding medium, sorted them, analysed them, and transmitted the results to the brain in a manner with which at the time I am speaking of no artificial contrivance could compete. Hence the belief grew amongst physiologists that every structure which they found must have its function, and subserve some useful purpose; a belief which was not without its foundation in fact, and which certainly (as Dr. Whewell remarks) has done admirable service in promoting the growth of physiology. Like all beliefs found successful in one subject, it was carried over into another; of which a notable example is given in the speculations of Count Rumford about the physical properties of water, to which the President has already called your attention. Pure water attains its greatest density at a temperature of about 39½° Fahr.; it expands and becomes lighter whether it is cooled or heated so as to alter that temperature. Hence it was concluded that water in this state must be at the bottom of the sea, and that by such means the sea was kept from freezing all through; as, it was supposed, must happen if the greatest density had been that of ice. Here then was a subtance whose properties were eminently adapted to secure an end essential to the maintenance of life upon the earth. In short, men came to the conclusion that the order of nature was reasonable in the sense that everything was adapted to some good end. Further consideration, however, has led men out of that conclusion in two different ways. First, it was seen that the facts of the case had been wrongly stated. Cases were found of wonderfully complicated structures that served no purpose at all; like the teeth of that whalebone whale of which you heard in section D the other day, or of the dugong, which has a horny palate covering them all up and used instead of them; like the eyes of the unborn mole, that are never used, though perfect as those of a mouse until the skull-opening closes up, cuttting them off from the brain, when they dry up and become incapable of use; like the outsides of your own ears, which are absolutely of no use to you. And when human contrivances were more advanced it became clear that the natural adaptations were subject to criticism. The eye regarded as an optical instrument of human manufacture, was thus described by Helmholtz; the physiologist who learned physics for the sake of his physiology, and mathematics for the sake of his physics, and is now in the first rank of all three. He said, "If an optician sent me that as an instrument, I should send it back to him with grave reproaches for the carelessness of his work, and demand the return of my money."

The extensions of the doctrine into physics were found to be still more at fault. That remarkable property of pure water, which was to have kept the sea from freezing, does not belong to salt water, of which the sea itself is composed. It was found, in fact, that the idea of a reasonable adaptation of means to ends, useful as it had been in its proper sphere, could yet not be called universal, or applied to the order of nature as a whole.

Secondly, this idea has given way because it has been superseded by a higher and more general idea of what is reasonable, which has the advantage of being applicable to a large portion of physical phenomena besides. Both the adaptation and the non-adaptation which occur in organic structures have been *explained*. The scientific thought of Dr. Darwin, of Mr. Herbert Spencer, and of Mr. Wallace, has described that hitherto unknown process of adaptation as consisting of perfectly well-known and familiar processes. There are two kinds of these; the direct process, in which the physical changes required to produce a structure are worked out by the very actions for which that structure becomes adapted—as the backbone or notechord has been modified from generation to generation by the bendings which it has undergone; and the indirect processes, included under the head of Natural Selection—the reproduction of children slightly different from their parents, and the survival of those which are best fitted to hold their own in the struggle for existence. If the naturalists here were able to talk to you for weeks, they might give you some idea of the rate at which we are getting explanations of the evolution of all parts of animals and plants, the growth of the skeletons, the nervous system and its mind, of leaf and flower. But what, then, do we mean by explanation? We were considering just now an explanation of a law of gases; the law according to which pressure increases in the same proportion in which volume diminishes. The explanation consisted in supposing that a gas is made up of a vast number of minute particles always flying about and striking against one another, and then showing that the rate of impact of such a crowd of particles on the sides of the vessel containing them would vary exactly as the pressure is found to vary. Suppose the vessel to have parallel sides, and that there is only one particle rushing backwards and forwards between them; then it is clear that, if we bring the sides together to half the distance, the particle will hit each of them twice as often, or the pressure will be doubled. Now it turns out that this would be just as true for millions of particles as for one, and when they are flying in all directions instead of only in one direction and its opposite; provided only that they interfere with each other's motion. Observe now; it is a perfectly well-known and familiar thing that a body should strike against an opposing surface and bound off again; and it is a mere every-day occurrence that, what has only half so far to go should be back in half the time; but that pressure should be strictly proportional to density is a comparatively strange, unfamiliar phenomenon. The explanation describes the unknown and unfamiliar as being made up of the known and the familiar, and this, it seems to me, is the true meaning of explanation. Here is another instance. If small pieces of camphor are dropped into water, they will begin to spin round and swim about in a most marvellous way. Mr. Tomlinson gave, I believe, the explanation of this. We must observe to begin with that every liquid has a skin which holds it; you can see that to be true in the case of a drop, which looks as if it were held in a bag. But the tension of this skin is greater in some liquids than in others; and it is greater in camphor and water than in pure water. When the camphor is dropped into water, it begins to dissolve and gets surrounded with camphor and water instead of water. If the fragment of camphor were exactly symmetrical, nothing more would happen; the tension would be greater in its immediate neighbourhood, but no motion would follow. The camphor, however, is irregular in shape; it dissolves more on one side than the other; and consequently gets pulled about, because the tension of the skin is greater where the camphor is most dissolved. Now it is probable that this is not nearly so satisfactory an explanation to you as it was to me when I was first told of it, and for this reason. By that time I was already perfectly familiar with the notion of a skin upon the surface of liquids, and I had been taught by means of it to work out problems in capillarity. The explanation was therefore a description of the unknown phenomenon which I did not know how to deal with as made up of known phenomena which I did know how to deal with. But to many of you possibly the liquid skin may seem quite as strange and unaccountable as the motion of camphor on water. And that brings me to consider the source of the pleasure we derive from an explanation. By known and familiar, I mean that which we know how to deal with, either by action in the ordinary sense, or by active thought. When, therefore, that which we do not know how to deal with, is described as made up of things that we do know how to deal with, we have that sense of increased power which is the basis of all higher pleasures. Of course, we may afterwards by association come to take pleasure in explanation for its own sake. Are we then to say that the observed order of events is reasonable, in the sense that all of it admits of explanation? That a process may be capable of explanation, it must break up into similar constituents which are already familiar to us. Now, first, the process may itself be simple, and not break up; secondly, it may break up into elements which are as unfamiliar and impracticable as the original process.

It is an explanation of the moon's motion to say that she is a falling body, only she is going so fast and is so far off that she falls quite round to the other side of the earth, instead of hitting it; and so goes on for ever. But it is no explanation to say that a body falls because of gravitation. That seems that the motion of the body may be resolved into a motion of every one of its particles towards every one of the particles of the earth, with an acceleration inversely as the square of the distance between them. But this attraction of two particles must always, I think, be less familiar than the original falling body, however early the children of the future begin to read their Newton. Can the attraction itself be explained? Le Sage said that there is an everlasting hail of innumerable small ether-particles from all sides, and that the two material particles shield each other from this and so get pushed together. This is an explanation; it may or may not be a true one. The attraction may be an ultimate simple fact; or it may be made up of simple facts utterly unlike anything that we know at present; and in either of these cases there is no explanation. We have no right to conclude, then, that the order of events is always capable of being explained.

There is yet another way in which it is said that nature is reasonable; namely, inasmuch as every effect has a cause. What do we mean by this?

In asking this question we have entered upon an appalling task. The word represented by *cause* has sixty-four meanings in Plato and forty-eight in Aristotle. These were men who liked to know as near as might be what they meant; but how many meanings it has had in the writings of the myriads of people who have not tried to know what they meant by it will, I hope, never be counted. It would not only be the height of presumption in me to attempt to fix the meaning of a word which has been used by so grave authority in so many and various senses; but it would seem a thankless task to do that once more which has been done so often at sundry times and in divers manners before. And yet without this we cannot determine what we mean by saying that the order of nature is reasonable. I shall evade the difficulty by telling you Mr. Grote's opinion. You come to a scarecrow and ask, what is the cause of this? You find that a man made it to frighten the birds. You go away and say to yourself, "Everything resembles this scarecrow. Everything has a purpose." And from that day the word *cause* means for you what Aristotle meant by *final cause*. Or you go into a hairdresser's shop, and wonder what turns the wheel to which the rotary brush is attached. On investigating other parts of the premises you find a man working away at a handle. Then you go away and say, "Everything is like that wheel. If I investigated enough, I should always find a man at a handle." And the man at the handle, or whatever corresponds to him, is from henceforth known to you as *cause*, and so generally. When you have made out any sequence of events to your entire satisfaction, so that you know all about it, the laws involved being so familiar that you seem to see how the beginning must have been followed by the end; then you apply that as a simile to other events whatever, and your idea of cause is determined by it. Only when a case arises, as it always must, to which the simile will not apply, you do not confess to yourself that it was only a simile and need not apply to everything, but you say, "The cause of that event is a mystery which must remain for ever unknown to me." On equally just grounds, the nervous system of my umbrella is a mystery which must remain for ever unknown to me. My umbrella has no nervous system; and the event to which your simile did not apply has no cause in your sense of the word. When we say then that every effect has a cause, we mean that every event is connected with something in a way that might make somebody call that the cause of it. But I at least have never yet seen any single meaning of the word that could be fairly applied to the whole order of nature. From this remark I cannot even accept an attempt recently made by Mr. Bain to give the word a universal meaning, though I desire to speak of that attempt with the greatest respect. Mr. Bain wishes to make the word *cause* hang on in some way to what we call the law of energy; but though I speak with great diffidence, I do think a careful consideration will show that the introduction of this word *cause* can only bring confusion into a matter which is distinct and clear enough to those who have taken the trouble to understand what energy means. It would be impossible to explain that this evening; but I may mention that *energy* is a technical term out of mathematical physics, which requires of most men a good deal of careful study to understand it accurately.

Let us pass on to consider with all the reverence which it demands, another opinion, held by great numbers of the philosophers who have lived in the brightening ages of Europe; the opinion that at the basis of the natural order there is something which we can know to be *unreasonable*, to evade the processes of human thought. The opinion is set forth first by Kant, so far as I know, in the form of his famous doctrine of the antinomies or contradictions, the nature of which I will endeavour to explain to you. Kant said then that space must either be infinite or have boundary. Now you cannot conceive infinite space; and you cannot conceive that there should be any end to it. Here, then, are two things, one of which must be true, while each of them is inconceivable; so that our thoughts about space are hedged in, as it were, by a contradiction. Again, he said that matter must either be infinitely divisible, or must consist of small particles incapable of further division. Now you cannot conceive a piece of matter divided into an infinite number of parts; while on the other hand you cannot conceive a piece of matter, however small, which absolutely *cannot* be divided into two pieces; for however great the forces are which join the parts of it together, you can imagine stronger forces able to tear it in pieces. Here again, then, are two statements, one of which must be true, while each of them is separately inconceivable; so that our thoughts about matter also are hedged in by a contradiction. There are several other cases of the same thing, but I have selected these two as instructive examples. And the conclusion to which Kant was led by the contemplation of them was, that on every side when we approach the limits of existence a contradiction must stare us in the face. The doctrine has been developed and extended by the great followers of Kant; and this unreasonable, or unknowable, which is also called the absolute and the unconditioned, has been set forth in various ways as that which we know to be the true basis of all things. As I said before, I approach this doctrine with all the reverence which should be felt for that which has guided the thoughts of so many of the wisest of mankind. Nevertheless I shall endeavour to show that in these cases of supposed contradiction there is always something which we do not know now, but of which we cannot be sure that we shall be ignorant next year. The doctrine is an attempt to found a positive statement upon this ignorance, which can hardly be regarded as justifiable. Spinoza said, "A free man thinks of nothing so little as of death;" it seems to me we may parallel this maxim in the case of thought, and say, "A wise man only remembers his ignorance in order to destroy it." A boundary is that which divides two adjacent portions of space. The question, then, "Has space (in general) a boundary?" involves a contradiction in terms, and is therefore unmeaning. But the question, "Does space contain a finite number of cubic miles, or an infinite number?" is a perfectly intelligible and reasonable question, which remains to be answered by experiment. The surface of the sea would contain a finite number of square miles, if there were no land to bound it. Whether or no the space in which we live is of this nature remains to be seen. If its extent is finite, we may quite possibly be able to assign that extent next year; if, on the other hand, it has no end, it is true that the knowledge of that fact would be quite different from any knowledge we at present possess, but we have no right to say that such knowledge is impossible. Either the question will be settled once for all; or the extent of space will be shown to be greater than a quantity which will increase from year to year with the improvement of our sources of knowledge. Either alternative is perfectly conceivable, and there is no contradiction. Observe especially that the supposed contradiction arises from the assumption of theoretical exactness in the laws of geometry. Now the other case that I mentioned has a very similar origin. The idea of a piece of matter, the parts of which are held together by force, and are capable of being torn asunder by greater forces, is entirely derived from the large pieces of matter which we have to deal with. We do not know whether this idea applies in any sense to the *molecules* of gases even; still less can we apply it to the *atoms* of which they are composed. The word force is used of two phenomena; the pressure which, when two bodies are in contact, connects the motion of each with the position of the other; and attraction or repulsion; that is to say, a change of velocity in one body depending on the position of some other body which is not in contact with it. We do not know that there is anything corresponding to these phenomena in the case of a molecule. A meaning can, however, be given to the question of the divisibility of matter in this way. We may ask if there is any piece of matter so small that its properties as matter depend upon its remaining in one piece. This question is reasonable; but we cannot answer it at present, though we are not at all sure that we shall be equally ignorant next year. If there is no such piece of matter, no such limit to the division which shall leave it matter; the knowledge of that fact would be different from any of our present knowledge, but we have no right to say that it is impossible. If, on the other hand, there is a limit, it is quite possible that we may have measured it by the time the Association meets at Bradford. Again, when we are told that the infinite extent of space, for example, is something that we cannot conceive at present, we may reply that this is only natural, since our experience has never yet supplied us with the means of conceiving such things. But then we cannot be sure that the facts will not make us learn to conceive them; in which case they they will cease to be inconceivable. In fact, the putting of limits to human conception must always involve the assumption that our previous experience is universally valid in a theoretical sense, an assumption which we have already seen reason to reject. Now you will see that our consideration of this opinion has led us to the true sense of the assertion that the order of nature is reasonable. If you will allow me to define a reasonable question as one which is asked in terms of ideas justified by previous experience, without itself contradicting that experience, then we may say as the result of our investigation, that to every reasonable question there is an intelligible answer, which either we, or posterity, may know.

We have, then, come somehow to the following conclusions. By scientific thought we mean the application of past experience to new circumstances, by means of an observed order of events. By saying that this order of events is exact, we mean that it is exact enough to correct experiments by, but we do not mean that it is theoretically or absolutely exact, because we do not know. The process of inference we found to be in itself an assumption of uniformity, and that as the known exactness of the uniformity became greater, the stringency of the inference increased. By saying that the order of events is reasonable, we do not mean that everything has a purpose, or that everything can be explained, or that everything has a cause; for neither of these is true. But we mean that to every reasonable question there is an intelligible answer, which either we or posterity may know by the exercise of scientific thought. For I specially wish you not to go away with the idea that the exercise of scientific thought is properly confined to the subjects from which my illustrations have been chiefly drawn to-night. When the Roman jurists applied their experience of Roman citizens to dealings between citizens and aliens, showing by the difference of their actions that they regarded the circumstances as essentially different, they laid the foundation of that great structure which has guided the social progress of Europe. That procedure was an instance of strictly scientific thought. When a poet finds that he has to move a strange new world which his predecessors have not moved, where nevertheless he catches fire from their flashes, arms from their armoury, sustentation from their footprints,—the procedure by which he applies old experience to new circumstances is nothing greater or less than scientific thought. When the moralist, studying the conditions of society and the ideas of right and wrong, which have come down to us from a time when war was the normal condition of man, and success in war the only chance of survival, evolves from them the conditions and ideas which must accompany a time of peace, when the comradeship of equals is the condition of national success,—the process by which he does this is scientific thought and nothing else. Remember, then, that it is the guide of action; that the truth which it arrives at is not that which we can ideally contemplate without error, but that which we may act upon without fear; and you cannot fail to see that scientific thought is not an accompaniment or condition of human progress, but human progress itself. And for this reason the question what its characters are, of which I have so inadequately endeavoured to give you some glimpse, is the question of all questions for the human race.

GLYCEROLE OF ASSAFŒTIDA.

The following formula for the above preparation is published in the 'American Journal of Pharmacy,' by Mr. A. Robbins. He states that he has used it many times during the last ten years and always found it to give a good article of milk of assafœtida:—

℞.	Assafœtida	℥ ij.
	Glycerine, q. s., ft. . . .	f. ℥ viii.

Select the best assafœtida and cut it quite fine; put it into an eight-ounce bottle, and add five fluid ounces of glycerine; cork well and suspend in a can of water, which place on the stove where the heat will be very moderate; let it remain so a day or two, shaking the bottle frequently; then strain through a coarse cloth, and return the residue to the bottle with three fluid ounces of glycerine; let stand as before, and then strain into that first obtained, and make up to eight fluid ounces by adding glycerine.

One fluid drachm of this added to seven drachms of water will make milk of assafœtida containing the proper quantity of the drug.

The author has also used glycerine with gum ammoniacum, and while the solution was not as perfect as that of assafœtida, he found upon examination that the amount of ammoniacum taken up is about the same as when the mistura ammoniaci is made by the officinal U.S. formula. With myrrh he did not succeed well, but still obtained a passable preparation which he has no doubt could be, by continued experiment, much improved.

Oil of Cloves for Microscopical Preparations.—Dr. Webber, of Boston, recommends the use of oil of cloves in preference to turpentine, as it is not so volatile, and allows of preparations being kept a day or two for examination. It also allows the Canada balsam to be used without the previous washing of the preparation, which is necessary if carbolic acid be used.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 7, 1872.

Communications for this Journal, and books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Elias Bremridge, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

DISPENSING AND DRUG-DEALING SURGEONS.

Not unfrequently our medical contemporaries are very much exercised respecting the conduct of those whom they are pleased to describe as "prescribing druggists." On such occasions there is a great deal of respectable horror expressed at the wickedness of the man who, with no more qualifications than are necessary to secure him a place on the Register of Chemists and Druggists, presumes to supply a customer with a bottle of mixture or a box of pills for the cure of a passing stomach-ache, or a cold in the head. Of course, it would be mere affectation on our part to pretend to be ignorant of the fact that such a practice is sometimes carried to a point where it encroaches seriously upon the domain of the medical man. But the next time that any of our medical friends feel disposed to rush into print anent this question, we would recommend them to discuss the subject under two heads, and if they devote the first part of the treatise to the fustigation of the "prescribing druggist," then, in a second part to treat with impartial zeal an analogous offender, we mean the "dispensing and drug-dealing surgeon."

Towards the satisfactory accomplishment of so desirable an object, we call attention to the present state of the relations between medical men and pharmacists in some of the towns of Scotland, as disclosed in a letter to the 'Glasgow Herald' for August 28th. We are there informed that in Glasgow there are two shops for the sale of salts, senna, seidlitz powders, etc., kept by medical practitioners for every one kept by a chemist and druggist. "In "Airdrie and Coatbridge, I believe, there is only "one druggist to some eighteen or twenty surgeons "keeping open shop; in Paisley there are some "seven druggists to between twenty and thirty "surgeons' shops," and so on. Notwithstanding the writer's statement that "in England no such thing as an open surgery is known," we are sorry to say that the custom also obtains, and that extensively, in this country. In many a district any inclination that a chemist and druggist might have to avoid poaching on the medical man's preserves, is severely tried by the knowledge that the medical man is his closest competitor in his more proper business.

Now we do not wish to depend upon the *tu quoque* argument, but it must be evident that if a man is unfairly and severely pressed in competition, his ethical views will probably be blunted, and he will be induced to do that which under more favourable circumstances he would not have countenanced. This remark applies to both sides of the question; and therefore we think it would tend to the elevation both of the medical man and the chemist and druggist if, instead of competing with and scolding each other, some neutral ground could be found for the rectification of their grievances.

But what is to be said with respect to the *vexata quæstio* of dispensing? It is notorious that the greater part of the dispensing of medicines in this country is done by medical men themselves. But how far this is from the proper upholding of the dignity of the profession may be estimated from the fact, that in this custom Great Britain stands almost alone. How frequently it transgresses the spirit of the law of this country is shown by a case recently before the Sheffield County Court, and reported at p. 178 of last week's issue, where a decision of the Judge caused the abandonment of numerous claims made for the supply of medicines by a gentleman who was a surgeon, but not an apothecary. To this legal decision may be added a quotation from an "Abstract of the Principal Laws Affecting the Medical Profession," by R. G. Glenn, Esq., LL.B., Barrister-at-Law, which is prefixed to the "Medical Directory" for 1872.* "A medical "practitioner, not being a qualified apothecary, is "prohibited from selling, or keeping an open sur- "gery for retailing, dispensing or compounding "poisons, under penalty of £5, unless he was either "registered before August 11th, 1869, or has been "registered since that date, after passing an examina- "tion in pharmacy, in order to obtain his diploma "for such registration."

Every year that passes weakens the old plea that the medical man is unable to depend upon his prescriptions being correctly dispensed, in consequence of the heterogeneous nature of the body of chemists and druggists. The uneducated chemist and druggist is becoming every day more and more a thing of the past. And we believe that if those medical men who are able to appreciate how useful and intelligent a handmaiden to medicine pharmacy may become, would, by example and precept, use their influence to obtain for her votaries that fair share of the work for which they are specially trained, the result would go far towards extinguishing both the "prescribing chemist" and the "dispensing and "drug-selling surgeon."

We learn from the *Times* that the University of Munich, at its recent 400th anniversary, conferred upon Mr. Simon the honorary diploma of Doctor of Medicine, "propter præclarissima de sanitate publicâ tuenda atque augendâ merita."

* See Pharm. Journ. [3] ii. 572.

THE BENEVOLENT FUND ELECTION.

It will be seen in another part of this page that a *third* candidate for an annuity from the Benevolent Fund was placed on the list at the meeting of the Council this week. As there are but two annuities to be given, there will necessarily be a contested election, which will take place on Friday, October 25th. It should be remembered that the benefits of this fund are not confined to members of the Pharmaceutical Society, but are equally extended to necessitous registered chemists and druggists. We hope, therefore, that not only those who usually subscribe, but also many who have not hitherto done so, will send subscriptions in time to take part in the forthcoming election.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

September 4th, 1872.

MR. T. H. HILLS, TREASURER, IN THE CHAIR.

Present—Messrs. Betty, Bottle, Greenish, Hampson, Schacht, Savage, Urwick, and Williams.

The minutes of the last meeting were read and confirmed. A former member of the Society having paid up the arrears of his subscriptions, and subscription for the current year, was restored to membership.

Elections.

MEMBERS.

The following Pharmaceutical Chemist was elected a Member of the Society—

Beasley, Frederick ....Clapham.

The following Registered Chemists and Druggists were elected Members of the Society—

Hughes, John Griffith........Thornbury.
Ker, Richard ....Stranraer.
Oldham, William ....Burslem.
Robson, John Binnington ....Filey.
Ruston, Joseph ....Maryport.
Snowdon, George Walker ....Thornton Heath.

Associates.

The following, having passed their respective examinations, were elected "Associates in Business" of the Society—

Minor.

Smith, Edward ....Brighton.

Modified.

Clark, Simon Prince..........Glasgow.
Oldham, James...............Hull.

The following, having passed the Modified examination, was elected an Associate of the Society—

Insull, Edward Samuel ....Shelton.

Jacob Bell Memorial Scholarship.

A letter was read from one of the recently-elected Junior Bell Scholars, stating that his engagement with his employer did not terminate until Christmas, and asking to be allowed to commence his laboratory instructions at that time.

Mr. Williams said he had received a communication from the young man's employer to the same effect, and stating that it would be very disadvantageous to himself to relinquish his assistant's services.

After referring to the regulations bearing on the point, it was

Resolved unanimously—That the gentleman elected must conform to the conditions imposed, and attend the laboratory through the entire session, or resign the Scholarship.

Finance Committee.

The report of the Finance Committee was received and adopted, and sundry payments were ordered.

Benevolent Fund.

The report and recommendation of the Benevolent Fund Committee were received and adopted. The name of Elizabeth Wilkes, of Bromyard, the widow of a member, was placed on the list of candidates for election as an annuitant in October next.

Vermin Killers.

Mr. Betty stated that a little difficulty had arisen with regard to the carrying out of the resolution passed at the last Council meeting, authorizing the issue of a circular of amended regulations with regard to vermin killers. The difficulty had arisen in consequence of the use of the word "Preparation" in the schedules, and he suggested that the matter should be further considered by the Parliamentary Committee before the proposed circular was issued. A resolution to this effect was passed unanimously.

Lady Pharmacists.

The Secretary read a letter from a lady asking if ladies were admitted to the lectures of the School of Pharmacy and to the laboratory. He stated that some years ago Miss (now Dr.) Garrett applied for admission to the lectures, and the professors, seeing no objection, she paid the fees and attended the course. On the matter, however, being brought to the attention of the Council, some members thought such a proceeding was irregular, and a resolution was passed prohibiting the admission of ladies to the lectures in future He did not know whether the present Council would be inclined to reconsider the matter.

Mr. Hampson said he was very glad such a letter had been received, and gave notice that at the next Council meeting he would bring forward a resolution for rescinding the one referred to by the Secretary.

British Pharmaceutical Conference.

Mr. Savage, on behalf of the Local Committee of the Pharmaceutical Conference at Brighton, presented the Council with a photograph of the members attending the Conference, suitably framed.

A resolution of thanks to the Local Committee, both for the photograph and for their kind reception of members was, on the motion of the Chairman, passed unanimously.

BENEVOLENT FUND.

Subscriptions and Donations Received during July and August, 1872.

SUBSCRIPTIONS.

London.

	£.	s.	d.
A Friend	1	1	0
Brookes, Samuel, 62, Lisson Grove, N.W.	0	10	6
Jackson, John, 83, Southampton Row	1	1	0
Marshall, C. E., 66, Bedford Street, Mile End, E.	0	5	0

Country.

	£.	s.	d.
Aberlour, Smith, John	0	5	0
Amlwch, Hughes, William	0	10	6
Deal, Green, John	0	10	0
Eastbourne, Hall, Samuel	0	10	6
Farnham, Higgins, William (2nd subscription)	0	10	6
Gosport, French, Benjamin	0	10	6
Gravesend, Drury, George S.	1	1	0
Long Bennington, Bemrose, John	0	10	6
Manchester, Lowe, Walter	0	10	6
Mold, Evans, William	0	10	6
Oswaldtwistle, Haworth, William	0	10	6
Saffron Walden, Machon, Henry	0	10	6
Sydney, New South Wales, Hughes, James	1	1	0
Southport, Sibbald, Robert	0	10	6
,, Foulds, Jabez	1	1	0
Sheffield, Crawshaw, Henry	0	10	6
Ventnor, Isle of Wight, Weston, Charles	1	1	0
Wylam-on-Tyne, Bradley, John	0	5	0
Wisbeach, Bradley, William	1	1	0

Donation.

	£.	s.	d.
Dewsbury, Matterson, Edward H.	5	5	0

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

Tuesday, August 13th, 1872.

(*Continued from page* 178.)

Election of an Honorary Member.

The President: Before we begin the discussion of the Education question I wish to repair an omission which was made this morning. Owing to the want of precise information the Executive Committee were not aware, until Professor Markoe stated it, that we had present here another American pharmacist of eminence—Professor Wayne, of Cincinnati. I am about to ask you to elect Professor Wayne an honorary member of this Conference, and to express some regret that we were not so well informed beforehand of his movements as to be able to bring his name forward at the first sitting of the Conference. I do not think I need say more. Professor Wayne is not merely the professor of pharmacy in the Cincinnati College of Pharmacy, but he is widely known as a chemist and mineralogist. These facts of themselves, even were it not for his presence here at our meeting, would be sufficient to absolve us from going through our usual custom of recommendations of this sort coming up from the Executive Committee; I ask you, therefore, to elect Professor Wayne, of Cincinnati, an honorary member of this association.

Mr. Schacht said that he had been requested, as a matter of form, to second the nomination of Professor Wayne, though the acclamation with which that gentleman's name had been received rendered unnecessary any further comment on the subject.

The motion was then carried by acclamation.

Professor Wayne said: I cannot but thank you for the honour you have just conferred upon me in electing me a member of the association. It was a matter I was not prepared for at all. Further, I would say, it gives me great pleasure to meet the pharmacists of Great Britain in convention.

Discussion on Pharmaceutical Education.

The President then invited a discussion on the subject raised in Professor Attfield's paper, requesting the gentlemen who spoke to condense their remarks so far as consistent with free expression of opinion. There were present two or three gentlemen well versed in questions affecting education and scientific examinations who were not accustomed to attend these meetings. The Conference would gain much by hearing the views of Professor Michael Foster, of Cambridge, for instance, as well as some others he saw present, on the matters in debate.

Mr. Schacht: Mr. President and gentleman, my views upon this question are, I hope, pretty well known; I have already taken means, and others have taken means, to make you acquainted with them, and I came here with the resolution to take no part in your proceedings, *de novo*, but to listen to the views of others, and confine any remarks I might have to make to what might be suggested by them. I candidly confess that although I have made an effort to handle well the threads of the matter which has been introduced, and to keep them distinct, I feel myself somewhat bewildered by the many different views which have been put forth. But there are two or three words which help me considerably to arrange the matter in my mind, and those words you will all remember to have heard frequently uttered. They are, examination, education, cram. Perhaps these three words will serve to direct the discussion. But before even I venture to follow the suggestions which those words afford, it seems to me that there is one consideration above all others which we should take into account. There has been hinted the idea that the Pharmaceutical Society has nothing to do with education. Now if that be an idea which prevails generally among the members of the Pharmaceutical Society, it seems to me that there is an end of the necessity of any discussion as to methods and processes. It lies at the root of the whole question, whether it is worth while to entertain any scheme whatever, or whether it would be better to leave the whole subject to the commonplace process of supply and demand. A portion of Professor Attfield's paper goes very largely, as it appears to me, in this direction: rather to compel education, but not to supply it. Now, if this doctrine has a general echo in the minds of those who constitute the Society, I say once more, let us discuss the matter no more. It must be left then to individual effort, and as far, at least, as the Pharmaceutical Society is concerned, collective effort is useless. That, however, is not my opinion. I oppose it absolutely and *in toto*, and heartily echo that other portion of Professor Attfield's paper which hardly seems to be in accordance with the one to which I have alluded, and which has traced the action of the Pharmaceutical Society from its commencement to the present time, and proved that that action has been identical with the theory that it is a part of the duty of the Pharmaceutical Society to promote pharmaceutical education. Holding, then, that view, I enter upon the consideration of the three questions suggested by the three words I have named. In the first place with regard to the examinations of the Pharmaceutical Society, I should like simply to make this remark—that possibly they may not be perfect. We will even admit that they are largely capable of improvement, though whether by each of the two processes that have been indicated, or by any other, does not materially signify. It is possible that by ejecting our twelve present examiners, and substituting twelve individuals of that impossible character imagined, but never seen, by Mr. Tait, we might improve the quality of our examination. If we had twelve perfect examiners, it is possible that we might have a perfect examination. But the Professor in candour admits that this is almost an impossibility, and, therefore, does not encourage us to hope that much change will take place by modifying the Board of Examiners at present existing. But he leads us rather to hope that improvement would be effected if we adopted the other alternative, of supplementing the present condition of examining by making it necessary that each candidate should bring with him a certificate of attendance at certain courses of lectures. I am not quite sure whether he includes the fact of his having been apprenticed for a certain number of years in the trade.

Professor Attfield: Yes.

Mr. Schacht: Now, I ask you just to observe this fact—that in proportion as you make it necessary by Act of Parliament, or by the procedure of the Pharmaceutical Society, that that examination should be difficult to pass, and that the candidate should have attended certain lectures, in that proportion do you act the part of an arbitrary tyrant;—you put the man in the difficulty and dilemma in which you would place a beggar, supposing that you were to pass a law that none but those who wore velvet gowns should be considered citizens, and be entitled to the privileges of citizens; unless at the same time you give the beggar, in the one case, or the pharmaceutical student in the other, the opportunity of fulfilling these conditions which you say shall be necessary before you bestow the privilege which he seeks. It seems to me that in that part of his argument, the writer is simply strengthening the position of those who are claiming for pharmaceutical students, wherever they may be, some sort of opportunity for systematic instruction. It is very little use to say that they must have a certificate, if they have had no opportunity of attending lectures as to which certificates are required.

Well, then we are brought to face the question, How shall these courses of lectures be supplied? If you make them compulsory, and admit that it is part of the duty of the Pharmaceutical Society to assist in the promotion of this all-important matter, the question is narrowed to —How shall these various courses of lectures be supplied? You have had that scheme which we now have a fair right to attribute to Mr. Reynolds; or, without going so far as to attach an individual name to it, you have had offered to you that scheme which was presented two years ago by the committee appointed by the Pharmaceutical Society. By recent references we believe that that was mainly the work of Mr. Reynolds. You had that suggestion put before you, and that has been echoed by several gentlemen lately, not simply at the present meeting, but by writers in the PHARMACEUTICAL JOURNAL within the last few months. Broadly speaking, it consists in the recognition of a few schools throughout the country. Professor Attfield limits the number to about five, and whether it is five, six, or seven, it is a limited number. The doctrine supposes a limited number of schools to be distributed in a few centres throughout the country. You have had also a proposition to which is attached my name; and though I felt some hesitation in allowing that to appear, and to be especially alluded to as Mr. Schacht's scheme at first, I have certainly less hesitation now, seeing that it has come in for a good share of rough handling, which, at any rate, makes it less bad taste for me to father it. The principle of this scheme is, instead of limiting the schools, to make them as far as possible numerous. Well those are two very opposite doctrines. For my own part I suppose it will not be deemed very wonderful that I should adhere to the idea which I deliberately adopted, that it is the duty, if we do anything in the direction of promoting education, we should do it as broadly and not as narrowly as possible. I am aware that one opinion is as good as another opinion if merely uttered in words, uncorroborated by any proof, but I ask for proof the other way, and I have a fair right to ask for proof the other way if the assertion is made that it will be money thrown away, and that the effort will be so much waste of energy. I have a right to ask on what ground those conclusions are arrived at. I have not heard them stated further than the one general ground that few schools of science are remunerative and self-supporting. I am quite prepared to admit it. Further than that, I wish to make a very strong observation upon that point, because there has been more than once during to-day a kind of idea uttered that those who accept aid from the Pharmaceutical Society are degrading themselves into the position of paupers or charity boys, a view which I oppose most vehemently and emphatically, and I think with good right, for I would like to ask any gentleman here to tell me what large educational establishment does not place its students in a similar predicament, and yet no one accuses a senior wrangler of Cambridge with being a charity boy, although it is more than probable that he has had a very large proportion, if not the main part, of his education paid for by other people. He is no charity boy for having earned the benefit of those endowments which enthusiastic people, and philanthropists, and large-hearted people (I will not use the disagreeable word charitably-minded people) have left for his benefit. It is not to be thrown at him that he has adopted and absorbed the charity of others for the purpose of his own aggrandizement. He has simply availed himself of those opportunities which are given for the great cause of education, and the fostering of learning, which was really and truly the purpose which those great men of old had in founding their endowments. Sir, I am myself a pupil of the Pharmaceutical Society, and am delighted to remember the fact. Moreover I rejoice to acknowledge an obligation to those who organized the school at Bloomsbury Square. I paid my fees, well-knowing those did not represent the money value of the education I obtained. Yet I decline to admit myself either a pauper or a charity boy. It is only at small private schools in which the students pay for what they get, and they do pay for what they get, and precious poor stuff it is. Where there is anything like good education, it is always in the great establishments where the munificence of founders has enabled the governors of those institutions to provide means of education vastly superior to any that could be obtained if current fees paid for the entire expenses of the establishment. One word more with reference to the subject cram. Now I must ask you to observe—or, rather, to remember, those of you who have read my scheme,—that the whole process adopted there is to avoid the possibility of cram. Professor Attfield having been very vehement, as he was perfectly right in being, against the atrocities of cramming, after using the emphatic words he did, naturally felt that he was bound to put a limitation on the word against which he had launched those invectives, and he wished us to understand that the word cram did not apply to the process of private tuition which we all know more or less about. Now let me ask you also to remember that in the sense in which other people may use the word cram, every process which is short of a thorough systematic and complete course of education is cramming. Of course, it has more or less degree of darkness this ugly black thing; and in some manifestations it presents a more ugly colour to look at than in others. Now, remember, I do not use any such vehement expressions about this as some do; but let me remind you that in your own establishment at 17, Bloomsbury Square, cramming is quite possible. I was lately looking over the number of students who had systematically attended, or who had for any portion of the time attended the instruction at Bloomsbury Square, and I was not a little surprised to find that the number who had fulfilled a complete course was very far short of the number who were registered as students. They varied in the time of their attendance, from a complete course of ten months to a very far less complete course of one month. Now, if it is attempted to thrust into one month that amount of study which is understood naturally or ordinarily to occupy ten months, I cannot help thinking that that is cramming; and as we know that it will not fulfil its purpose, this establishment at 17, Bloomsbury Square more or less lends itself to the process of cramming. Now, I do not wish to make more of this fact. I do not point to it angrily or disagreeably; I merely point to the fact that it is possible. But I ask you whether, on the other hand, the scheme suggested in the report bearing my name is not pointed in a diametrically opposite direction? It offers not one single sixpence of the Society's property in return for anything which is not absolutely performed. Not one single penny is asked on speculation; not one single penny is asked to be given for a promise; not one single penny is given ultimately except for results earned by legitimate processes. It is required not simply that a man can pass an examination, but that he shall pass that examination as the result of a regular systematic training on the subject on which the examination takes place. I think that that is a point really and truly deserving of consideration. Following, as my observations do, upon the reading of papers that have been especially aimed to point out that the fundamental error of the present system is that it becomes, in point of fact, a premium for imperfect education, I think that the process which is exactly the reverse of that deserves special consideration. My purpose to-day, as it has been ever since the publication of my own few ideas, was rather to take the opinion of others. I wish not to enforce my own in the smallest degree. I only wish that it should stand fairly upon its own merits, and that it should come in for a fair and judicious criticism and not a hasty one. As you know, this scheme bears some comparison and some relationship to the Government scheme of aiding scientific education throughout the country. Indeed, I am quite free to admit that it is founded upon the Government scheme; but it is not the Government scheme, and those who suppose that I have adopted it because it is the Government scheme are making a strange and foolish blunder. It is not the same, but the principle is identical with it; and I am quite willing to admit that I owe everything to the suggestions which that scheme has given. And allow me to add that I do not consider it at all an argument for the weakness and uselessness of the scheme, as it stands, that it has stood the test of a great many years' trial at the hands of the Government authorities. As I have said two or three times, any one who is in the smallest degree interested in this subject can find the whole details in the volume issued by the department year by year, for the price of sixpence. I really do not like to allude to charges which are unsubstantiated by a name, for anonymous charges are things which one would rather leave alone; but there have been assertions made that the scheme of the Government has only just escaped a collapse, that every one who knows anything of it is disgusted—pupils and teachers alike, and that there is this year only one sixth of the number of pupils there was in recent years. I ask any one who has seen those assertions to be kind enough, in simple candour, to look at that book. If he does not feel disposed to take the trouble, I can tell him that I have gone carefully over the numbers, and though I do not claim a right to defend the Government scheme, I think it is only fair that I should take this opportunity to state that there have been more classes in the last year than in any year that has preceded it,—that there are something like 34,000 students in the classes now, and that there were 7600 more in the last year than in the year before. Those are figures which are as easily as possible ascertained by any one who will take the trouble to turn over the pages of that book. Be that as it may, sir, the question for us to consider is, of course, what will suit our purposes the best. I should myself be very glad indeed to adopt the best process whatever it may be. I mean to advocate it as far as my power on the Council will enable me to do so. Mr. Reynolds is here, and several gentlemen who endorse his views are here. Let us by all means gather why we should expect so much better results to show themselves, when our schools for scientific culture are limited to a few, rather than when we endeavour, if possible, to extend the aid of our Society generally and systematically throughout the country.

Mr. Stoddart said: Both the proposed schemes hinge upon the same thing, namely, that we who are in the country should aim to give our younger friends the benefit of a good education so far as regards pharmacy. If we were about to make a commercial speculation, we should count the cost, and would rather seek a real basis to work upon than an imaginary one. Therefore, if we have this money to spare in Bloomsbury Square, I should prefer spending it in the way by which I should get the most reliable results. I think, and have often thought, that we make two errors, and those errors are very common I know, because I hear them expressed very frequently as I am moving about the country. There is this first of all—that we ought to, as it were, make everything straight for a lot of young men to enter into our profession. Now, once for all, I am diametrically opposed to that. I say it is not correct. We want to make our profession a good profession. We want to raise the status here as well as in other parts of the country. We who are now in business will probably never reap so much benefit from this as our sons and grandsons will; but, nevertheless, we want to leave them a good heritage, and I do not see at all, if we make pharmacy a good profession worth having, why we should collect all the young men we can and coax them into it. If they wish to come, let them come, but they must prove themselves good enough to come, because it is self-evident that if we take just anybody we never shall improve our status. It will continue to be like what it is in the present day, when we have all sorts of people with us. But, if a hundred young men were to come to me and say to me, "We do not want to shirk the examination; will you help us?" I would help them with the greatest pleasure in the world, but I would not make these examinations so low and so easy that they could not help passing them. I hope that no person here or elsewhere will ever take a pupil or an apprentice who has not passed the Preliminary examination. In the city in which I live I am frequently called upon to go into the different schools to examine the boys, and it is an invariable practice with me when I go there never to ask them anything difficult. For instance, if I am going to examine them in arithmetic I know very well that if I were to ask them an abstruse question, it would be answered in a moment; but, I say, "You go into the market and buy so many pecks of potatoes, and I will give you a £5 note—what is the change?;" and, I will wager, I should not get a correct answer. I assure you such is the fact. Only last week a gentleman came and gave me a suggestion. I said, "Really, I can hardly credit it." He said, "Come with me into a school where there are 200 boys—boys that have passed an examination in the most wonderful way." They were able to answer difficult questions which, perhaps, I should have made a mistake in. First of all my friend gave them a question to solve, which they did without the slightest hesitation. Then I said, "Buy me a dozen apples at so and so, and a dozen pecks of potatoes, and here is a five-pound note; what will be the change?" and there was not one that could tell me. It is the same with our Preliminary examinations. I appeal to anybody here who is a local secretary, and he will say that it is in the simple things, the ground-work of education, that neglect occurs. Now, I say, let us never take a pupil unless he has passed a Preliminary. Say to him, "When you have done that, come, and we will take you, and we will do our best to help you along." Now comes what I consider to be the basis of the scheme we ought to adopt. I do not care at all, as Mr. Schacht says he does not care, whether it is his scheme or Mr. Reynold's scheme or anybody else's. Like him I simply want the best. Now Mr. Schacht's scheme I like excessively. It is that we must not do the work for them. Let those in the country help themselves, and then we will help them along afterwards, but we must not go and found a school for them. Mr. Schacht knows as well as I do the work we have done in Bristol, and he knows very well that we have been very successful. Mr. Giles will tell you the very same thing; and he will tell you that the plan we go upon there is to make every one do the best, and then we help him; but we do not help them to take any illegal step. Now, with regard to this horrid word "cramming," it sets one's teeth on edge to hear it so many times. It is a very disagreeable word, and the thing is one not to be upheld for a moment. But I understand the word in a somewhat different sense from that in which it has been used by Mr. Schacht. I do not think that cramming in the practical sense is putting three months knowledge into one month. I may have a pupil to whom I give two lessons a week, the course extending over three months; but suppose he is a hard-working pupil, and says, "I will work every day; I will do it all in a month:" that is not the kind of cramming which Professor Attfield means. What he speaks of is an illegitimate way of doing it, which is cheating and nothing else. I should have thought the examiners could easily find out whether a boy was taught properly or not. Having been in the business for nearly a third of a century, I would not hesitate to say that if any young man in the world were to come to me, and I gave him a pestle and mortar and a pair of scales to dispense a prescription, before he weighed out the very first item I should know whether he had been properly instructed. The very way he would hold the scales would be sufficient for me. If you have put a pair of scales into a tyro's hands, you have noticed that he laid hold of the scales in the wrong place, and instead of weighing accurately he could not weigh a drachm within five or six grains, because he would destroy the balance of the scales by holding the top of it; and before such a young man had put the first part of the ingredients into the mortar I should say, "You know nothing about it." Therefore, whether there are two schools or a dozen, if they set to work in a legitimate way to teach young men in their neighbourhood, I think they will have a claim on the Pharmaceutical Society. I think Mr. Reynold's scheme is perfectly right. I never understood him to say for a moment that he would send down to such and such a place a certain sum of money to begin a school. They must begin for themselves legitimately and fairly, and then we will help them. I was one that took part in the committee that formed that scheme, and I don't think that it has failed at all. The difficulty was this—that in a large town where we had a lot of pupils, we did not want exactly the same that a small town did. It was wanted in a different manner, and we treated each one on its own individual merits. Now, that will answer very well, but the cry has been that we want something that will apply universally; and that is where Mr. Schacht's scheme answers; or if it does not answer—if it is impracticable—it is because the people have not done sufficient to help themselves. I heard it asked this morning, "What is a village to do which has not more than five pupils in it?" Well, I say that young men ought not to go there to learn their business. They go with a full knowledge of the opportunities which the place affords; therefore, I do not see that we should have any blame for it. I, for one, will take part in making this a profession really of some value, and not simply a money-making business. Of course we must have one as well as the other; but still there is no reason at all why we should not have as high a status as we possibly can. There is one thing which I would very strenuously insist upon, and that is a proof that the young man who comes has had experience in the business. Our Transatlantic friends will tell us that that is a *sine quâ non* with them.

Professor Markoe, of Boston, U.S., said: Mr. President, and gentlemen of the British Pharmaceutical Conference,—I have come altogether unprepared to speak before you, and all that I can say with regard to the American system, is simply to give you a detail of the practical working of the Massachusetts College of Pharmacy, which I will take as a type of the rest of the American Colleges of Pharmacy, inasmuch as all the Colleges of Pharmacy in the United States have adopted the same standard. There is usually one College in each of the States where pharmacists have sufficient influence to start a college. The various pharmaceutical colleges have generally three chairs—Chemistry, Materia Medica and Pharmacy, and Botany. The lectures are almost always in the evening. Lectures in the day time have sometimes been tried, but, in general, that time has not been suited to the American system of doing business. There is no preliminary examination required in either of the schools, but there is one basis upon which all the American colleges are in union, namely, in exacting an apprenticeship of at least four years to some practical pharmacist. Mere service in a wholesale store will be of no avail at all. It makes no difference how long or how many lectures a student may attend, for, if he cannot bring to the Examining Board his certificate, signed by some respectable pharmacist, he will not be admitted to the examinations. A practice has prevailed also which has acted somewhat as your Minor examination, if I may term it so,—that at the end of the lectures each of the professors submits his class to an examination on the subjects treated in the course of lectures. This examination is now pretty uniformly a written examination, and consists of about fifty questions, of course the character of the questions being unknown until the evening of the examination. The whole class is examined in each of the departments, and in our own school we require 66 per cent. of correct answers in each of the professorial examinations. Those young men who have passed this examination successfully, are then required to deposit with the Dean of the Faculty a certificate from their respective employers certifying that they had served the proper amount of apprenticeship. They are also required to produce a thesis, or dissertation, upon some subject of pharmacy, materia medica, or some related subject. This must be written neatly; and if the thesis gives evidence of insufficient English education, even if the other examinations are satisfactory, we reject the candidate. So much for the preliminary or professors' examinations, as we term them. The young man then, after having brought a written certificate, goes before the directors of the College of Pharmacy. He goes before the Committee of Trustees in the Massachusetts College, and in the Philadelphia College they have an Examining Board which takes the place of the other bodies. He is then subjected to an examination, part of which is written and part oral, and he is required to recognize specimens of pharmaceutical substances, and also of materia medica; but what we insist upon is that he shall have had four years behind the counter. In addition to that the student must attend the lectures. We generally keep a check list. One great advantage that we derive from the professors' examinations is that we sift out all the weak men, so that it is very rarely that one who has passed the professors' examinations fails to pass the other; but even then some of the weakest ones are sifted out at the second examination. There were at the completion of our last session last spring eight young men who passed the junior, or professors' examination, and, out of that number, two were rejected at the last examination. A word or two with respect to pharmaceutical education. The subject of pharmaceutical education in the States I think has taken a very promising turn indeed. We have now in full operation a college of pharmacy in the city of Philadelphia, at which last year something like 250 pupils attended, and the number is likely to increase. In the Maryland College of Pharmacy they have 75 pupils. At Chicago the session would have started with quite a full class, had not the unfortunate disaster there broke up the school for a time, but, with the wonderful enterprise of that city, the managers have got organized again, and they already announce a course for next session. The New York College of Pharmacy has for many years been very inefficient, having very small classes of from 25 to 50, but after the passing of the Irving Act, which resulted from the Tammany Ring, by which a most unjust measure was put upon the New York pharmacists, they united and succeeded in defeating it, and now they have got a very excellent Act. In Philadelphia the Pennsylvania legislature passed an Act which is also satisfactory, and the practical execution of that Act is in the hands of the College of Pharmacy. In Massachusetts the legislature has endeavoured to pass two Acts, and both have been lost by a small majority, but there is every reason to hope that next year a Pharmacy Act will be passed in Massachusetts. Similar Acts have been passed at Ohio and Illinois. Our Acts are all remarkable for their brevity. They are not so complicated as the English Pharmacy Act. It would be impossible to pass anything so long as that in the States, and we find that we practically gain all the good, although we have very much shorter Acts. Now the first Pharmacy Act of any value at all was for the city of Baltimore, which was passed by the Maryland legislature. The circumstances were these: an effort was made to pass an Act for the entire State of Maryland, but the petition asking for it was mainly signed by the city of Baltimore, and it was lost. Profiting by that experience, the Baltimore pharmacists got a petition signed by all the pharmacists of Baltimore—the good, bad, and indifferent—and another from all the leading physicians, and a third from all the influential citizens, and those petitions asked for the passing of a Pharmacy Act for the city of Baltimore alone. All the country members of the legislature who opposed the previous Act said, "If the city of Baltimore wants this Act only for itself, let it have it." That measure passed without any trouble, and the Act has only about five sections. The principal points were that on and after the passing of the Act no person should be allowed to open a pharmacy unless he had observed a regular apprenticeship of four years and passed an examination before the Examining Board, or unless he could produce a certificate with the degree of graduate in pharmacy from some recognized college of pharmacy, that certificate being dependent on a four years' apprenticeship. By that means they effectively killed off the diplomas given by some of the cheap colleges, who, finding it profitable, had given their diplomas to some persons who had merely attended lectures and never had anything to do with the practical work of pharmacy. Furthermore, the different Pharmacy Acts do not recognize the right of a person holding the degree of M.D. to practise Pharmacy. They consider both professions perfectly distinct. Most of our schools, successful as they are, have relied mainly upon the intelligence of the community and on moral influence. We have not in Massachusetts now—we would rather not have—legislation. If it comes we simply take an interest in it. We have influence enough in the legislature to defeat any Act that would not suit us, and we have done so already several times, when political hucksters were going to make capital out of pharmacy.

Mr. Haselden said: I had no intention to offer one word upon education, because I came here more with the idea of listening, in order that I might obtain a knowledge of the wishes of the community at large connected with pharmacy, and also because I was afraid that anything that I might say, being President of the Pharmaceutical Society, would be taken as a *dictum*. Now I hope that the few words that I say will be taken in my capacity as a private member of the Conference, and not as President of the Pharmaceutical Society. I rise more particularly to speak upon the subject of the examinations, because I have heard the word "examination" a great many times, and I have heard no gentleman say a word either in favour of the examinations or against them, except in so far as they have been mentioned in our Professor's paper. I believe, and it is the opinion also of Dr. Greenhow, that for the present our examinations are sufficient. The Doctor has stated that they are conducted in as satisfactory a manner as they could possibly be conducted. Indeed, to use his own words, he said they are as near perfection as human nature can arrive at, and yet I am told to-day that they are a long way off perfection. I was for some time an active member of the Board of Examiners, and, of course, as President of the Society I am now *ex officio* Chairman of the Board of Examiners. I have paid great attention to the examinations and great attention to the examiners and their capabilities, and I must say that I am quite of opinion that for the present they are sufficient for all our wants. Doctor Greenhow says that the Minor examination which turns a gentleman out fully qualified to commence business, and consequently, to a certain extent, having the lives of Her Majesty's subjects in his hands, should be a little more practical. There I quite agree with him; but he also says, "before you carry that out give twelve months' notice, and let the candidates know what they will have to undergo." I think the Doctor is right there also. I am very sorry for what Professor Attfield says as to the standard of the examination, because I cannot agree with him. He says that it has been lowered enormously. Now I maintain that it has not been lowered at all. The printed directions for the examiner's guidance are what they were formerly when the examinations were voluntary, but with this addition, that in the Minor examination for pharmacy the candidates are required now to know something about the decimal system of weights and measures in accordance with the Pharmacopœia. That portion of the examination being carried out, the standard cannot be lowered. It is rather increased than otherwise. In practical chemistry candidates are required now in the Minor examination to give proof that they are acquainted with the system of testing. I cannot, therefore, agree that there is any diminution in the examination. I go further, and say that in practical dispensing and reading prescriptions I am certain that the examination is quite stiff enough for any of those who come up. If I were to bring forward anything to support this opinion, I might simply mention that in the last examination for the Minor there were, I believe, 38 candidates, and no less than 24 of them were plucked. As regards the qualifications of an examiner, which have been specially pointed out, I suppose, in some measure for our guidance, I must say that I think they are very good as far as they go, and that it is not merely necessary that an examiner should know his subject to its fullest extent, but he should also have a certain amount of discernment and discretion in working the candidates that come before him. It is also said that we should have special examinations, and that the subject should be carried out to a greater extent over a large area. Well, gentlemen, if we were to go much further than we do, or at least if we were to occupy much more time than we do, we should never get through the examinations, unless you gave us fewer candidates and many more hours to deal with them. Now there are two classes of candidates who always obtain a larger amount of time. I know that a botanical examiner does now, and he did on former occasions, when he finds a young gentleman well up in his subject, carry him on for the pleasure of the thing, to see how far he can go. And then there is another class of candidates not well up, and the examiner says, "I must have a little patience with this man, and I must give him five or ten minutes longer than the ordinary men, in order to find out what he has any doubt about, and to make an allowance for nervousness, or something of that kind." Then it has also been said that the School of Pharmacy in Bloomsbury Square should be separated from the examinations. I know there is a disposition to separate them, but the examinations are conducted by quite a different party of gentlemen from the educational portion. The educational portion is conducted by professors: the examination is conducted by ourselves. You may call pharmacy a profession if you like; I call it a business at present. We are men in business, and who is better qualified to examine candidates to become chemists and druggists than a man who is in the business and knows the business? Well, it has also been stated that it is not a good plan that the education should be picked up here, there, and everywhere. Now, I believe that it is a good plan. I do not care myself where a man has been educated, if he has only the knowledge which I wish him to have. If you educate your young people by a certain routine, and by a set class of professors, and by those professors alone, what will the consequence be? They will know these professors' books by heart, and they will know no other. It was stated formerly in the examination regulations that the candidates should be acquainted with 117 pages of Bentley, as regards the vegetable kingdom, and also three other pages as regards reproduction. Well, what was the consequence? When you asked a candidate any question not in those 117 pages, he said, "That is not in Bentley's 117 pages." Such is the result of compelling your young men to be educated by a certain class of men only. Now, with regard to Bloomsbury Square, and what Bloomsbury Square has done. I have said it before, and I say it again, that it took a long time to do what has been done. It took 30 years to establish Bloomsbury Square properly. But look at the gentlemen on the platform. Two-thirds of them were students at Bloomsbury Square, and you tell me that the examination was not strict enough. The regulations put down in the paper could be made so strict that nine men out of ten could not pass them. I have had a good many gentlemen pass through my hands. I have had some who are in this room now; and I would ask them whether, although I was tolerably good-natured, if I did not at the same time give them quite as much as they wished to have. But to come back to Bloomsbury Square and compulsory education. It is said that Bloomsbury has done nothing to make education compulsory. Why, Bloomsbury has done the only thing that could make education compulsory. Bloomsbury passed your Act of 1868; and without that Act pharmaceutical education never would have been compulsory. That Act compels examination; examination enforces education. How can a man be examined, with a hope of success if he is not educated? But there is also another point which should be borne in mind. Our Professor quotes our examination, and he compares it with the examination and the rules of the examiners of the other scientific bodies—the Colleges of Physicians and Surgeons. But then he forgets this one circumstance: that the examinations of physicians and surgeons have been compulsory more than half a century, whereas ours have been compulsory only for four years; therefore, you should not compare our regulations with their regulations. And then there is another point which you must bear in mind. Although the Act could render the examination compulsory, the Act could not alter the character of the men or boys who were already in the business. There are men in the business who had these boys in their care previously; and there must be time allowed to work out all that. We are all agreed about the Preliminary; and I have no doubt that that will come as a matter of course. But when we speak of the Minor examination, I believe that in a few years, and a very few years, too, the youths will come up from their apprenticeship in a condition to pass that examination. Their masters, or the gentlemen taking apprentices, will improve with the times; and if they cannot give them all the information necessary, they will give them all that they can, and they will advise them to go to other sources to finish their education, and to get all the extra knowledge which is necessary to pass the Minor. You will thus get in time good practical men of business, who have learnt the practical part of their business in the shops and not at the lectures. I will not trespass on your time any longer, gentlemen, because I did not intend to occupy it in any way whatever. I approve of Mr. Reynolds's scheme with the amendment which the Council added to it at the end of the session. I also approve, to a certain extent, of Mr. Schacht's scheme. I do not care which system you adopt. You might even employ both systems so long as you adopt something which will help young men to get qualified; but if you attempt to supply the education which the parents should give in the first instance, and the master in the second, it will be a failure.

Mr. M. Carteighe said: I fancy that Mr. Haselden has been somewhat hard upon Professor Attfield, because he has to some extent misinterpreted him, but at the same time I must honestly say that the tone of this communication and the strong language used justify some of us in thinking that it merits strong condemnation; but the real question in Professor Attfield's paper is, assuming cram to exist, can it be prevented? He states so positively throughout that cram does exist, that I presume we must take his *ipse dixit* for it. His statements read to me so superlative and so innocent that I really began to wonder whether there be cram in Civil Service examinations—whether there be cram in other departments of the State—whether indeed there be cram at South Kensington about which Dr. Foster can tell us anything. The fact is that cram has been rampant ever since examinations have been in existence. You cannot get rid of it, but the Professor has very kindly educated us to day as to the best way of reducing it to a minimum. Well, he has initiated three propositions. The first is Preliminary examinations. Well, we have had them for some time. The next is a certificate that the candidates have been for four years with a duly registered chemist and druggist. Well, I apprehend that this suggestion has occurred to many over and over again. If there be one defect in our examinations that is just the crucial one. We do not insist upon that particular practical knowledge which represents, after all, the *summum magnum* of our examinations. Examinations at the best can only be tests of a certain amount of knowledge, and if we were to extend the time from twenty minutes to two hours, it would be impossible for any professor, be he Professor Attfield or Professor Tait, to state precisely that man's value in the science in which he was being examined. You must take a certain amount of knowledge for granted on the facts before you, and it is quite possible that in some cases, nay even in many cases, you may be mistaken; but in all examinations of this kind, there is always a large margin allowed for nervousness and irritability of temper either on the part of the examiner, or on the part of the candidate. Well, now we may admit, as I said before, that there is cram, although I am not at all prepared to admit a large part of what is here written without the evidence which should have been brought forward to convince us that the Board has been passing inefficient men for so long a time. But as the Professor's object is one which we all have at heart, that is, to make the examination as useful as possible, it is not worth while to cavil about the evidence. The remedy is the point to which we come, and that remedy is obtaining a certificate of having been four years with a duly registered chemist and druggist, and of having attended certain lectures. Well, as regards the first, the certificate from the chemist and druggist. Perhaps Professor Attfield is not aware that this subject has been discussed over and over again both at the Council table and at the Board of Examiners, and that resolutions have been proposed and submitted that arrangements to that effect should be carried out. The Board have sent up recommendations to the Council on more than one occasion, and as lately as last year they sent up a statement that it would strengthen their hands very much if they could get certificates from chemists and druggists that a candidate had been engaged for four years in daily preparing himself and accustoming himself to the routine of his business. But there have been difficulties in the way. Now if the Professor's paper should help us to get over them he will, in my judgment, be amply rewarded. Besides the four years, the Board desired to insist upon every candidate's being 20 or 21 years of age. Well, as a matter of expediency, the Council gave us to understand, although I do not believe any resolution was passed that it is not desirable to insist upon a four years' certificate or a fixed age. The age is very important, because the cram which I have found is that *which is obtained as the candidates pass through the Society's own laboratory.* We have found it among those young men who have tolerably well-to-do parents or guardians, and who go to a shop for six months, get rather above it, and are then sent to the School of Pharmacy. These young men come to us very fair chemists and botanists, but they know next to nothing about the particular part of the business by which we gain our daily bread, and they fail to pass. We are ordered by the Act under which we conduct our examinations to examine in half-a-dozen subjects, but I presume the Professor alludes more particularly to chemistry. I repeat that we have found the cram to be most rampant in those young men, otherwise brilliant, who have never been in a shop for any lengthened period of time, and the Board was and is of opinion that it would be of immense advantage to insist upon 20 or 21 years as the minimum age at which a candidate should come up for the Minor examination. It was conceived that in all probability such an one must have obtained a certain amount of practical experience, and that the errors which must necessarily occur in every examination would be, to some extent, reduced. Well, this question was also remitted to the Council, as already mentioned, and their solicitor's opinion was asked, and he reported on the subject. I do not know what the final report to the Council was, but I have made an appeal to more than one member of the Council since, to take the bull by the horns, and interpret the Act in a liberal spirit, and insist upon the age of twenty or twenty-one (twenty-one I prefer) as the minimum of age at which a candidate shall acquire the legal privilege of a chemist and druggist. It does seem to me that to insist upon this is essential in the interests of the public as well as ourselves. In the Act itself it states that a man to be eligible for the Modified examination shall be of full age, and have been three years engaged in business; but for the Minor examination we have no guarantee, and candidates come up at the age of sixteen or seventeen deficient in practical knowledge, but full of cram. This proposition then is a safeguard that would tell in the Professor's direction. Well, the last thing he proposes —and that is the only new proposal in the scheme—is that there shall be a certificate of having attended lectures, and he says, "I am of opinion that thus 95 per cent. of the cramming now practised will be prevented." I was brought up in a medical school. There was an attendance-book, and it was necessary for every candidate to send in his schedules to the examining body. Where the candidates were by nature idle or stupid, they had ample opportunity to, and very often did, walk out of the room immediately after they had signed the book, or within a few minutes. I have myself seen as many as twenty students get up from a lecture immediately after signing the book. Wherever there is an inducement for moral fraud, it is very difficult indeed to control it, and I do not think that the certificates proposed by Professor Attfield would materially prevent cram. You would get some excellent men, but others would still sidle out of the room, and, when the time came for examination, seek any man who would assist them, ON A NEW PRINCIPLE, for money. The fault, the Professor thinks, does not rest with the examiners. Well, I must say, in spite of what the President of the Pharmaceutical Society has told you, that I do not think the examination for the Minor by any means perfect. It is quite capable of improvement, and I believe it to be possible for the board to correct some of the evils of which Professor Attfield complains. Any process by which that would be brought about would involve a complete change in the system of our examinations, and I think it could be done without increasing the stringency. In opposition to the statements in the paper, I may mention that not long ago the Board had an opportunity of meeting with a gentleman who had been in Professor Attfield's laboratory for one or two years. He was an excellent chemist, a very good botanist, and well up in materia medica. In fact, he possessed all the knowledge that could be obtained by work in a laboratory or by reading. Well, he had to appear no less than twice for the Minor, and three times for the Modified, before he could pass in prescriptions and practical dispensing. But we all know that crammers are very skilful, and it is necessary to vary the mode of examination and the questions. I think it would be an immense gain if the examinations, instead of being monthly or oftener, were held once a quarter, and conducted from day to day. It would give us then only four examinations in the year, and it would, I think, prevent the frequent recurrence of stock questions, some of which it is almost necessary in certain subjects to put to every candidate. It would also present an immense advantage—an advantage of which some of my colleagues as well as myself would avail ourselves, viz., that of resigning our seats to some of our provincial friends. I ought in justice to the Board to rectify one omission on the part of Mr. Haselden. He forgot to mention that about three months ago a committee was appointed to consider the question of cram at these examinations, and to decide whether anything could be done in the way of checking it. That committee is actually extant. There is a scheme drafted for the consideration of that committee, and I think this fact shows that the examiners are really alive to the evil, and that, so far as they are concerned, they are disposed to do all they can to check it. But it is very important that the examiners themselves should bear in mind the particularly transitional state in which we are. I hear complaints about the number of failures. If you were to see the hands and faces of those who have come up for the last three years for the Minor examination, you would say that most had just been shut out from the Modified. These are men who became registered under that inefficient Preliminary which was extant before the passing of the Pharmacy Act; and who only want just that modicum of knowledge which is necessary to ensure registration as chemists and druggists. As soon as that class is got rid of, and you get men who have passed a respectable Preliminary, I am sanguine enough to believe that fewer persons will resort to the cramming establishments alluded to by Professor Attfield, and therefore I think it would be far better to let the whole of this question stand over until this transitional period is passed.

The question of provincial *education* is essentially a political one. It is said that we have no objection to assist those who are assisting themselves. But there is this enormous divergence of opinion—that while, on the one hand, some say that you should only assist temporarily because the circumstances require it; on the other, say they, you should do it in perpetuity. I have not read the scheme of Mr. Reynolds in the latter sense, but if Mr. Schacht in his scheme means that we are to continue to carry on this process of examination and payment for results as part of the regular system of the Society, I for one decidedly object to it, and would oppose it. I object altogether to being taxed to educate apprentices for whose education means should be found by their friends. I think it would be wrong altogether in principle to ask a master to take money out of his pocket to educate his own apprentice. The shoe pinches just where pointed out by Mr. Schweitzer. If a man has passed the Minor examination, and takes an apprentice, he ought to be able to prepare his pupil in the ordinary course of business, so that at the end of his time, without going to any professor, he could pass the Minor examination of the present time. Some of the very best men who pass, some of the men who know the principles of chemistry best, are just the men who have not learned their pharmacy. If they have learned chemistry pure and simple, I do not think that we actually want what is called pharmaceutical chemistry, but we *do* want pharmacy, which should in all cases be taught by the master.

Professor MICHAEL FOSTER: I should have preferred having the opportunity of listening to the remarks of speakers to saying anything myself, because what I have to say can only be said from the general points of view. I will confine myself, if you please, to two observations. One is that it seems to me as an outsider that many of the questions that you have discussed to day have very decidedly a financial aspect. One sympathizes entirely with all your efforts to raise, as you have done, the status of the chemist and druggist, but you must remember that however high you may become by efforts of that kind, you can only become powerful and numerous as your occupation becomes more and more remunerative. I speak now not as a representative of the profession to which I belong, but entirely as an individual. I rather wonder that your efforts have not become more unanimously and strenuously directed towards taking away from the profession to which I belong that practice of medical men of dispensing their own medicines, which certainly does not properly belong to them. It seems to me that when that is thoroughly established, a great many of these problems with which you are dealing today will meet with their solution tolerably readily. And now for one other remark about examinations. As your President said, I have had recently and for some years past, a great deal to do with examinations. I have never had the pleasure of meeting Professor Tait, and if I had I am sure I should not be a third to add to those two with whom he has already had to do. But I have made my observations as I have gone along, and I tell you plainly that the more I examine, the less secure and the less safe and the less satisfied do I become with the task of examining. The word cram, which was introduced with an apology by your President to-day, is a word which is before me always. It is a nightmare to me and worries me all my life long. From day to day, and from week to week, and from month to month, I find myself doing nothing but fighting against this fearful system of cram. I have no doubt Professor Attfield thinks very badly indeed of the cram, which is manifested at your pharmaceutical examination. I do not know; it may be worse than the cram which manifests itself at the Civil Service examination. Very certainly that same spectre is to be seen at South Kensington; and, alas! I meet it again and again even in those wonderful walls of the London University. You have no idea of the energy which is spent by a certain number of men in cheating the examiner—energy which might be far better bestowed. The process of cramming means that you send up a lad, and you make him appear to the examiner as if he knew that which he does not know. The first thing that the cram-man or grinder does is to make himself acquainted with the mind of the examiner—acquainted with all his little foibles and peculiarities. For instance, if a cram-man had to prepare a pupil for the gentleman at the other end of the platform [Mr. Stoddart], he would say to the pupil, "Be very careful how you hold your scales." They understand all those little means by which the examiner arrives at a conclusion. You may depend upon it that if you only have a short examination or a hurried one, the cram-man, the grinder, will beat you. If you give the examiner time enough, and allow him, especially, a practical examination, then he will have a greater power over the candidate. I cannot at all understand Professor Attfield saying, in his paper this morning, that it is easier to cheat at the practical examination than at the theoretical one. I know of no examination at which it would be easier to cheat than at the examination in chemical riddles, as they may be called, which, to my mind, afford no examination in chemistry at all. But a real practical examination, depend upon it, puts greater difficulties in the way of the grinder than anything else. The great element, however, is time, whether it be an examination with written papers, or a *vivâ voce* examination. If you have a *vivâ voce* examination, half your time has to be spent in putting the candidate into a comfortable position. You have two things to do. You have to cheer up the nervous man. He may possess the knowledge you are seeking, or he may be putting on the nervousness in order to cheat you. You do not know, and you have to wait and see whether it is real nervousness or not; and you require a very great deal of time in order to conduct the examination thoroughly and satisfactorily. I cannot say what your arrangements may be —whether they are such as to admit of your examinations being lengthened very considerably. I have heard something about a quarter of an hour or ten minutes. That seems to me gone at once in an examination. I want hours; I want days; nay, if I were to speak my whole mind, I should say I required weeks of examination before I should say that a man was fit to pass. You say that is impracticable, and it is to a very large extent. And here comes another opinion, which certainly has been growing up in my own mind with increasing force for some time past; that is, the necessity of having some evidence before the lad comes up of his having been taught. I do not mean attending lectures. I was a medical student, and I am perfectly aware of the ridiculous folly of attending lectures. I attended lectures with a kind of official conscience, which was common at least in my days in various hospitals, and I know myself I have been signed for attending lectures which I could not possibly have attended, except with the destruction of my medical education. Very frequently the students occupy the time of the lecture in drawing caricatures of the lecturer and reading books, and so on. You cannot do any good by simply requiring attendance on the lectures; but this you can do. Suppose a boy has been taught for a length of time by a conscientious man who loves the subject which he is teaching. There is no man better fitted to tell the worth of that boy's knowledge than the man who has taught him for such a length of time; but you cannot trust the man alone, because men will put a little strain on their conscience, and give their friends a certificate. How can you get over this? It is practicable to join together the examiner and the teacher. Let every lad have a testimony from a teacher in whom you have confidence of his having studied the subject well and thoroughly for a certain length of time. If you do that, you can then give him a far shorter examination at the hands of a technical examiner; and if the two results agree, I would put any amount of money on the result that he is a fit boy who knows the subject on which he has been examined. But then you must have a certain number of recognized teachers. And here allow me to make one observation, and that is, that it seems to me, with regard especially to schools of pharmacy, that it is not necessary that you should establish big schools like that in Bloomsbury Square. Do not take yourselves away altogether from the efforts which have been made to establish science schools in various parts of the country. You require botany and chemistry. I am not aware that the chemistry which belongs to the pharmaceutist is different from that chemistry which a chemist himself possesses, or which a medical man possesses. Why not let your lads get their chemistry from recognized chemistry teachers? And the same with botany. I was very glad to hear one gentleman say that he did not believe in pharmaceutical chemistry. No more do I. Surely you will achieve the end in view, if you have chemistry and botany taught thoroughly by teachers upon whom you can depend in all parts of the kingdom.

Mr. R. W. Giles: In common with every one in this room I have listened to that address of Dr. Foster with the greatest pleasure and satisfaction, and I have found that he has entirely and eloquently expressed those opinions which have long influenced my mind upon this subject. I am not proposing now to discuss this question thoroughly, but I wish to call attention to a point which appears to me to be an essential point lying at the origin of our discussion, and which has been rather slightly treated of to-day. I fancy that, practically, the question which we have to consider is really, what are our relations, as a corporate body in another place, to this question of education? I apprehend, sir, that there is no difference amongst us about the fact that education is essential for the rising generation of pharmacists; and I imagine also, that there is no difference of opinion amongst ourselves as to our readiness and our desire to promote education, although it may not be an absolute obligation which we have undertaken. But we feel personally anxious to co-operate in affording those facilities which are essential for those who enter the business, whether before entering the business they have claims upon us or not. That question of our corporate relations to this question of education appears to me not to have received the attention which it deserves. I think it would be a mistake if we were here to discuss the financial affairs of Bloomsbury Square at great length. That would be decidedly out of place. At the same time we know that we are intimately related in our individual capacity with that institution, and we can speak of scarcely any question affecting pharmacy without involving the position and relations of Bloomsbury Square. In saying this I am saying that which is highly eulogistic of that institution. I deny that the institution at Bloomsbury Square has ever charged itself with the task, or is properly chargeable with the task, of providing the education of future pharmacists. And, I not only say that it is not properly chargeable with it but I say that it is utterly impotent to discharge such an obligation. At the same time it can do much in the way of co-operation, and much in the way of sympathy and encouragement. I am the man who made the foolish blunder of supposing that the scheme which Mr. Schacht propounded had some connection with the Government institutions for the promotion of science; and therefore I was specially delighted to hear the good advice independently offered by Professor Foster that we should adopt that education which is sown throughout the land in diverse establishments.

Professor Foster: I did not mean that exclusively. I meant that for general teaching.

Mr. Giles: Well, it appears to me that that is the best source of pure scientific teaching which is extant; and is within our reach, and has been made available for us, and that generally throughout the country. We should rely upon that, but we cannot rely upon it for the complete education which we find in Bloomsbury Square, and which I hope we shall find before long elsewhere. Now I have been delighted to hear observations in the papers and from previous speakers as to the propriety of establishing certain other leading schools of pharmacy; and I do think that, having regard to the financial position of Bloomsbury Square, the time has arrived when we should think of establishing a school of pharmacy in North Britain. I think that is the place where we should commence; and I consider that in contemplating an extension of a system of pharmaceutical education it would be unwise to proceed *per saltum*, and that we should proceed more gradually, not committing ourselves to any risks and disastrous expense. By observing this we should test the amount of demand for pharmaceutical education which is existing about the country, and we should then see whether the want of students at Bloomsbury Square is caused partly as a matter of locality, and through the difficulty of youths finding homes in London which may be remote from their own homes, and whether they might not be more conveniently accommodated in a centre nearer themselves. The result of that experiment would certainly influence us in our future proceedings. We should be able to judge whether it was desirable to establish a school in the Midland counties or elsewhere. But I think we should certainly foster or encourage some means for preliminary scientific education, and I do think, as I have thought ever since our experience in Bristol has taught me so, that the schools of science and art founded by the Government are most available means for our purpose. Although that instruction has not been specifically referred to, yet I find that Mr. Schacht has admitted that his recommendations are largely influenced by his experience in Bristol. I think I understood that, and there we certainly have acted upon those opportunities. We have availed ourselves of them, and however encouraging our experience there may have been, certainly it depends upon the facilities which these institutions have afforded us. I think that is as much as we could wisely do now instead of at once undertaking a national system of education throughout the length and breadth of the country. I think that the time has probably arrived when we may contemplate the institution of another important school of pharmacy, but I think we should make a mistake if we undertook to start at once, in centres not metropolitan, extensive schools of pharmacy at all like that in Bloomsbury Square, or at all capable of affording such a high standard of education.

Mr. Reynolds: Mr. President and gentlemen, you would feel it more unnatural were I not to wish to claim your indulgence for two or three minutes, than that I should now rise. The task of defending what was brought forward in 1870 as a proposition for meeting the wants which we all acknowledge would be in very bad hands were it left to me alone to defend what was then done. The able testimony of such experienced educators as Mr. Proctor and other gentlemen has been given in favour of what was then brought forward. I may state that the scheme of 1870 is by no means to be regarded as the work of myself or of one individual, for a great deal of consultation took place amongst the members of the Provincial Education Committee, and it is the contribution of various persons; so that whilst for a matter of convenience I would not protest against my name having been connected with it, it is only just that that this explanation should be given. I do hope that very great good will result from our devotion of to-day to this subject. I think that we can see our way somewhat more clearly than we did when Professor Attfield introduced the matter by his paper in which two salient points were brought before us, and we had the alternative of whether our Board of Examiners should be relied on for checking this system of cram, or whether we should be compelled to go to the other serious alternative of requiring schedules of attendance on lectures. I dare say that the opinion in this room is almost unanimous that we need not take that latter alternative, and that we have both the disposition on the part of the Board of Examiners and also the power in their hands to do a great deal towards what we all wish to be done. There are one or two things to be noticed in connection with setting up any additional schemes of education, or I may say aiding them, because it is a question of aiding rather than of initiating these schools. The question whether this is to be a permanent thing or not ought not to be shirked by the present Council nor by anybody concerned. In 1870 we did not hesitate to give a direct expression of our opinion that the transitional condition of the students who had been caught in 1868 in an unprepared condition justified the help which was given; and this is consistent with the feeling which I believe is general in this meeting—that we ought not permanently to tax the existing body of chemists and druggists in order to bring up those who are to supply their ranks. Now, Mr. Schacht concluded with the challenge to those who preferred the scheme of 1870 to his own, to show why it was better that money should be given to a few places rather than that it should be distributed and produce more good. I will say that there is nothing remarkable in the fact that many persons should think that the more concentrated use of that money would do the greater good. We know that we are acting in a more conservative spirit. We are following the example which was laid down by a previous generation when they established one school in Bloomsbury Square; and we have been satisfied as long as that has seemed sufficient for our requirements. But it is a revolutionary change to endeavour to spread the aid in a very diffuse manner over the country, and although it is not a task which I am anxious to go deeply into, I must take exception to Mr. Schacht's scheme that it does not carry out what the phrase "payment for results" would indicate. Now, Mr. Schacht would give sums of money to schools that were able to send up students who could pass in chemistry and in botany. Well, these are two subjects, and one of the examiners told us that no less than six subjects are required by the Board. I do not call it a "result" to pass only in chemistry and botany. If you pay for that you are getting only a third of the result that is asked for by the Board. I know it is extremely tempting, and I make this public confession that I started with the impression in 1870—the full belief that the payment-for-result system was the ground that we had to work. The result of consultation with various other members of the Society led me to the conviction that, whilst very tempting in appearance, it was not the soundest basis for giving us permanent schools in the country. I hold that opinion very strongly still.

Dr. Edwards: I shall detain you but a very few minutes, Mr. Chairman; but there are some matters which have presented themselves to my mind in a light which I think will enable me to indicate two or three of the strong points, and perhaps some of the weak points of the discussion. In the first place, in reference to our friend Professor Attfield's excellent paper. It has evidently conveyed to us the result of a very great deal of careful thought, and it is also a very interesting history of the progress of pharmaceutical education. I think that one strong point is conveyed in a word used by yourself on another occasion, and that is the insistance upon the word *thorough*. I read in it, and I read in that expression by yourself, the pith of Professor Attfield's strong point. The value of the education given in Bloomsbury Square may be appreciated rather by its thoroughness than by the number of students And, therefore, it is with very great regret that I find that the average of attendance which used to be some ten months, in the case of the larger number of students who entered, has been reduced to such a very small period. Regarding the present value of the education given there, it is certainly unfortunate that the education should be distributed over so large a number, and the thoroughness be so very obviously reduced in proportion. Then, I think, the weak point of Professor Attfield's paper is his reliance upon lecture certificates. I remember my experience as a professor in a medical school of some years' standing. I must say that I can place no reliance whatever upon the production of lecture certificates. Perhaps, also, as a teacher of pharmacy for some years I may say the same thing. I have really found that attendance for considerable periods of time upon lectures, or merely upon oral instruction, has very much less value than it appears to have on paper; and I estimate as of the very greatest importance in pharmaceutical education the practical work in the laboratory. I place this practical work in the laboratory, manipulative chemistry, far beyond oral instruction. As regards what fell from my friend Professor Markoe on the American system of education, there is one point which is a strong point, and which might be with advantage added to the examination at Bloomsbury Square, and that is the preparation of a thesis; I believe in requiring from every man who comes up for the Major examination some attempt at mastering a subject, especially such a one as manipulative chemistry. He might write on some substance, giving all the information he can from his own experiments on the matter. It is of immense advantage to the man, besides which it would be the opening of future research, and gives the man the opportunity of expressing to his own mind the way in which he arrived at information which would afterwards be valuable to the whole community. It would enrich not only the Society, but the body of pharmaceutists at large and such institutions as the Pharmaceutical Conference, if every one of the students who had to pass a Major examination were required to produce a thesis—to give some account which he has composed himself, and which is founded, to some extent, upon researches he has made in his laboratory. And then for the weak point. I am quite satisfied that mere evening instruction, whether it be in the laboratory or lecture-room, is extremely weak. A man can never feel upon his legs in learning such a subject as chemistry unless he can afford some portion of the time—two or three or five months—in which he will devote his whole energies to the science of learning. A man who is occupied entirely by the business of the day, and simply comes to a night school of chemistry, never acquires that kind of information which will thoroughly fit him for his future duties in life as a pharmacist. That is, I think, the weak point of the College of Pharmacy at Massachusetts. We have had a little experience of that kind in Canada. We endeavoured to sweep away the absurdity of a medical curriculum for our students which required a two years' attendance and a six months' course of chemistry and two years and three months of botany and Materia Medica, which were all required in the province of Quebec. The chemists having taken it in hand, endeavoured to substitute something else for it. They took the principle of the Pharmaceutical Society that they would not require attendance on lectures, and only required certain standards of examination. When those standards of examination were discussed I felt it incumbent upon me to retire entirely from this voluntary association, because I could not subscribe to their terms of examination. The idea was to push a man through a purely commercial examination, and with so little previous education, that I felt compelled to throw up my appointment on the Board of Examiners, and declined to sit any longer and sign their certificates. This I did out of justice to my *alma mater*. Now, we ought to go a little beyond the ranks of our profession with regard to this question of apprenticeship, and endeavour to educate the public mind on the subject. I think we do not sufficiently avail ourselves of a frank and open press. I think we give all the information we can in the Pharmaceutical Journals, but we do not give sufficient information to the public, who, as parents and guardians, have young men for whom they have to provide instruction. As to the requirements of the body of pharmaceutists, occasional articles appear here and there; but we might follow up such meetings as this, and such as we have from time to time in different parts of the country, by interesting a portion of the press, and giving them from time to time information from the secretaries as to what is passing in the pharmaceutical world. There is frequently something that is really interesting to the public in such facts. In this manner the way might be prepared for a better class of young men to come in and pass a preliminary examination. The public, as a whole, are not sufficiently aware of the necessity for this preliminary examination for entrance into the business. I would also offer as a suggestion that, in addition to the knowledge of classics, it is very desirable in the Preliminary examination that the subject of accounts and bookkeeping should take a larger place. In our Preliminary examination, it should not be merely a question of arithmetic; but I think that even in our Minor examination we ought to require a higher standard of bookkeeping and accounts than is at present required. We overlook that matter, but I think it is one of the sciences which it would be desirable to increase in stringency in the examination. As to apprentices, I rather disagree with Professor Attfield. I think that the day for paying premiums for apprentices is past, and you have to look at that as one of the old customs of the country which have passed away like the curfew.

The President intimated that it would now be necessary to close the discussion, unless the Conference decided to sit on Thursday.

Professor Attfield said that he had no intention of replying to the discussion under the present circumstances, for by doing so he should be bringing himself far too prominently forward in connection with the subject. This paper on the subject had been only one among many contributions to the discussion of the matter. He should probably reply through the Pharmaceutical Journal to some of the views which had been adduced.

The Conference then adjourned to the next day.

Correspondence.

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

Pharmaceutical Education.

Sir,—May I, as a member of the rising generation of pharmacists, venture to give brief expression to some of my opinions and experiences anent the question of the hour.

In the first place, sir, experience has taught me that nine months of steady, systematic work in a small country village, where no help but self-help is obtainable, will enable one, with ease, to pass the "Minor" in honours; and out of my experience there has grown up an opinion that the cry for help which comes up with so doleful an intonation from our young men is not deserving of the tender consideration it receives. Ever since examination became compulsory they have been making this plea of inadequate educational appliances an excuse for lazy inaction, and if they are so deficient of brain and so wanting in energy as to be unable to obtain the legal qualification of a chemist and druggist without special organizations and pecuniary aid, I cannot but think that it will be for their own comfort and our credit if they decide to retire to the nearest eligible crossing, in which case they will probably ask a grant for besoms. Now it is doubtless true that under Mr. Schacht's scheme very many of these gentlemen might be dragged through the Minor wicket-gate, and left to swell the number of the rather motley company already to be found within the fences which the Act of 1868 has raised, but I think it behoves us to ask whether their presence is likely to "advance the interests of the sciences of chemistry and pharmacy;" and whether men of good education and active brain are likely to be attracted to our ranks when we beat up for recruits in the back lanes and casual wards. I once lived in a town where there existed a small but very efficient and admirably disciplined volunteer corps, which numbered among its members the best men of the neighbourhood. But some enthusiastic gentlemen, whose generosity exceeded their judgment, subscribed amongst themselves a fund sufficient to establish in the corps a very liberal system of "payment by results." In a very short time the discipline and efficiency had wofully decreased, and the uniform was so disgraced that no gentleman would wear it.

I am only "a young man from the country," and ought not, perhaps, to speak so strongly, but I cannot help feeling that we are in present danger of inaugurating a most suicidal policy. Does it not seem absurd that we should allow our subscriptions to be used in furtherance of a scheme which will glut the labour market and tend to multiply the number of small druggists, cloudy in their notions of pharmaceutical ethics, and untrustworthy in the matter of prices? If our status is to be raised, it must be done by the increase among us of men to whom the "grand old name of gentleman" is not a "mere attraction," and who will not be likely to treat the Queen's English with that careless freedom in which the authors of some of our trade circulars seem to glory. We are assured, however, that the country members of the trade are now thoroughly roused. I rejoice to hear it, and would humbly suggest that, as soon as they have had time to recover from the novelty and suddenness of the great change which has come upon them, they shall, as you, sir, have said, "come forward and zealously co-operate with the Society in the endeavour to make the necessity of education more generally appreciated." Such a pharmaceutical revival is our great want, and would prove of far greater value than any attempt to multiply the number of small associations, deficient, as I believe they must be, in spirit, system and teaching power.

Let the Pharmaceutical Society organize branches in one or two of our great trading centres, and maintain the highest standard of efficiency in all its departments; and let all our masters, assistants and apprentices once become fully alive to the absolute necessity of education and the possibility of effort, and then, sir, I venture to think that pharmacy, as a science and as a profession, will be in a more hopeful condition than it can be under any system of eleemosynary nursing.

Newton Chifney.

Tooting, S.W., August 13*th*, 1872.

Sir,—I have read Professor Attfield's paper with great interest, and cordially agree with many parts of it, but one suggestion I must confess staggers me, viz. "that every candidate for the Minor should produce a certificate of having attended a course of instruction at some recognized school of pharmacy." This would suit a select few no doubt, but how many men from remote country places would be able to comply with this regulation? Living miles from any of the great centres of pharmaceutical instruction, they must endeavour by their own exertions to pass the ordeal. Now the expense of a three months' course of training at Bloomsbury Square, or elsewhere, might represent £50 or £60; an outlay which many young men can ill afford; and what is the business after all? Does it pay even now for the trouble and expense? Let us, therefore, maintain a bold front, and resent any further encroachment upon our liberty. I have been myself a student at Bloomsbury Square, and am able to speak in the highest terms of Professor Attfield's system of teaching, and the kindliness and patience invariably manifested to the most backward as well as the more advanced students, so it is evident I am no advocate for cramming or I should have gone to the nearest establishment and been coached for the occasion.

An Ex-Student at Bloomsbury Square.

August 21*st*, 1872.

Another Side to the Educational Question.

Sir,—For a long time the educational question seems to have been an all-absorbing one to those whom we are accustomed to look up to as leaders in the ranks of pharmacy. It is no doubt one of vast importance, and in its proper solution must lie the grand secret of future prosperity and success.

At present, so many new plans and individual schemes are ventilated week after week through the medium of the Pharmaceutical Journal, that he must indeed be a far-sighted individual who could give a satisfactory answer to the question—how will it end? One thing seems certain, and it is, that all are agreed on the point of a "higher standard," the cry has gone forth "Upward! onward! excelsior!" and therefore the question at issue is, "How is this to be done? It is not my aim for a single moment to grapple with it, for I am merely one of those who are looking on, and waiting with curious interest the result of this most important discussion. I am a student, and, as it is for our especial welfare that so much concern is manifested, I feel that it will not be out of place to pen a few thoughts from a student's point of view, and as I am certain that in doing so I shall be only writing those of hundreds of my fellow-students, there can be no need of apology.

With men of such high intellectual capacity and professional standing as we have at our head, there ought not perhaps to be the shadow of a doubt but that all will be ultimately settled for the best. We are proud to have such men to emulate, but we also know that their position in life is gained, and our only fear is that, for this reason, they will treat as a secondary consideration what after all is to us the primary, viz., pecuniary affairs. However high it may be their intention to raise us as body by a raised system of education, there is still a question which must inevitably occur, Will it pay to do so? Yes; we must come to the sober reality; we have chosen pharmacy as the means by which we may be enabled to gain a livelihood, and to do so honestly and creditably must be our chief concern. Even now the outlay necessary to bring up a youth as a chemist is something considerable, and methinks it is for this reason that apprentices are already being regarded as a scarce commodity. I take it that to a large majority the question of increased outlay is a serious one, to some, I fear, a complete barrier; and, in the event of an alteration, some allowance ought certainly to be made to those who have already embraced the study of pharmacy as existing under the present regulations.

A higher system of education means increased outlay; for increased outlay we must demand increased remuneration; for higher mental power, less of physical must be expected. Will employers be willing to meet these demands? Will the public be willing to pay for them? if so, then I, in common with very many more, will be only too glad to do my utmost, in order to attain to that standard which will enable me to reap these benefits; but if not, the advanced educational scheme must be treated as a house with no foundation —it must surely fall to the ground.

Penzance, September 2*nd*, 1872. C. B. A.

Examination Fees.

Sir,—I was very pleased on reading Mr. Frazer's excellent letter in a recent Journal on the above subject. That he will be successful in reducing the fee for the Major I feel confident, if the Council will take into consideration the expenses we as assistants voluntarily incur in order to pass; such as paying for laboratory instruction, chemical apparatus, lectures and examination fees, books, board, lodging, and the whole of our time for about four months.

Mr. Urwick's resolution, "That all registered chemists and druggists be admitted members of the Pharmaceutical Society without paying even the entrance fees," is, to say the least of it, a very partial business indeed. What have these gentlemen done for the welfare of pharmacy that they should be dealt with so leniently?

Should Mr. Urwick succeed, "members" will be so general, that comparatively few will think it worth their trouble to present themselves for the Major, unless prompted by the love of extra knowledge to do so.

Much is said just now about provincial education. I say, in the first place, help those who try to help themselves by reducing the examination fees; then let them do what they can for the provinces. If you will insert this I shall feel obliged.

Wales. Machaon.

Pharmaceutical Chemists and Members of the Pharmaceutical Society.

Sir,—Permit me to express my humble disapproval of the proposed plan of admitting Registered Chemists to be Members of the Pharmaceutical Society by payment of an annual subscription.

I admit that it would considerably increase the funds of the Society, and this pecuniary benefit is all that I can see in the adoption of such a method. This, however, I think is completely overbalanced by a pecuniary advantage of the Major Associate, which might be proved by asking almost any respectable and even educated person, unassociated with the regulations of the Society, the following question:—What is the difference between a Pharmaceutical Chemist and a Member of the Pharmaceutical Society? The majority of people imagine that the word Pharmaceutical implies or signifies that the person to whose name it is attached has obtained it by passing stringent examinations; they think such a man will be perfectly competent to make up prescriptions, and so he obtains their patronage. Seeing, then, that a member by examination and a member by payment are viewed in the same light by the public, we shall be placing a thoroughly competent Chemist on the same footing with a man who knows little, or next to nothing about his business. Can a surgeon become a member of the College of Physicians by payment?

In conclusion, I think it would be well if candidates for the Modified examination were allowed to present themselves for the Major without passing the Minor. J. L.

Vermin Killers.

Sir,—In the Journal for August, I read, in the case of "Poisoning by a Vermin Killer," that the Coroner for Leeds would consider it his duty to order the prosecution of any chemist who should sell "Battle's Vermin Killer" without entering it in the 'Sale of Poison's Book' in accordance with the 17th section of the Act of Parliament. Before we can obey the law we must know its meaning, and I cannot see how a "Vermin Killer" (though it may contain "Strychnine or any of the poisonous vegetable alkaloids and their salts," as stated in Schedule A, part 1, or "The preparations of strychnine," as stated in the Additions to Schedule A, can be deemed a poison, requiring to be registered in accordance with Schedule F of the same Act. "Battle's Vermin Killer" is a proprietary article, and as such we sell it. We are not supposed to know its contents; and if we were supposed to know the formula, I think even then it would come under the second part of Schedule A. If it does not, I think the words "Vermin Killer" might be properly struck out, for the majority are made with strychnine, as being the most concentrated and surest poison for vermin we have.

But even supposing it is necessary in accordance with law to register all "Vermin Killers" containing strychnine, why are not our sheep-dipping compositions, our fly powders, and our maggot lotions entered in accordance with Clause 17, when it is well known they contain respectively arsenic and bichloride of mercury, and yet are sold by the hundred-weight? Or, to come more closely home, why are not our cough stuffs, sold in bottles at 1*s.* 1½*d.* and 2*s.* 9*d.* (which so frequently contain morphia, emetic tartar, or prussic acid) obliged to be registered in our poison book?

I apologize for trespassing on your time and space, but should be glad if you would kindly give publicity to this, as I think if the Coroner for Leeds was to consider himself a chemist, and look at it in this light, he would then see that a "Vermin Killer," though it may contain strychnine, is not required to be registered any more than a cough elixir which contains emetic tartar, or a maggot lotion which contains corrosive sublimate. E. S. Balchin.

Sir,—There appears much doubt respecting the sale of poisons, and various opinions given, and from the observations of the Coroner in the case of death from Battle's Vermin Killer, reported in a recent Journal, it appears requisite for purchasers of Vermin Killers to sign for the same. If that be correct, will you have the goodness to inform me if the same applies to Sheep Dressing containing arsenic, also Brown's Chlorodyne, and other preparations containing articles in the first part of the Poison Act; also if cough mixtures, lozenges, etc., containing morphia or poppies, must be labelled "Poison?" I think, for the satisfaction of the trade, some plain rule should be laid down, and not subject parties who are desirous of obeying the law to be censured in the way they frequently are. Inquirer.

August 3rd, 1872.

Sir,—In reference to your note on page 94 of the Pharmaceutical Journal, I would beg to ask whether you have seen the "Regulations" issued by the Council, and a copy of which is now before me, in which "Vermin Killers" (every compound containing a "poison" and sold for the destruction of vermin)" are distinctly placed in part 2 of the Schedule? I have always considered that they were so defined, and have acted upon that supposition, and I can say such is the universal practise in this district.

As, however, your definition seems to clash so decidedly with the generally received interpretation of the matter, it would be very desirable to have an authoritative statement by the Council upon the question, that the chemists throughout the country may know what to do.

Carlisle, August 3rd, 1872. W. Moss, Local Secretary.

R. I. N.—The opacity may arise from the cinnamon and cloves in the vin. opii rather than from the tinct. kino. The manner of mixing would also have somewhat to do with it. If the tinct. kino, vin. opii, and mucilage be added separately one after the other to the cinnamon water, the mixture will be fairly bright and reddish; but if the tinct. kino, vin. opii, and mucilag. acaciæ are mixed briskly, and the cinnamon water added to them, the mixture will probably be turbid. In the P. B. 1864, the aromatics were omitted in the vin. opii, and restored in 1867. Does our correspondent make his own tincture and wine, and thus ensure uniformity in them?

Mr. J. Gamgee.—We consider the substance of your letter more suited for an advertisement than as a satisfactory decision of the question referred to in our issue of last week. The testimonial that you enclose from Professor Wanklyn has been forwarded to the writer of the article.

G. Cathcart.—The solution ought not to deposit any sediment. We should advise you to analyse the white sediment you speak of, in order to ascertain what it consists of.

W. H. Dingle.—The practice is much to be deplored, but we do not think it advisable to give it publicity by referring to it more particularly.

Communications, Letters, etc., have been received from Mr. C. Fryer, Mr. M. Elwood, Mr. G. A. Keyworth, Mr. R. W. Giles, Mr. D. Jenkins, Mr. J. Barker, Mr. Barton, Mr. Atkins, Mr. Ekin, Mr. Deane, Mr. Haffenden, Mr. Sutton, Mr. Groves, J. A., T. G. S., A. C., "One of the Laity."

The following journals have been received:—The 'British Medical Journal,' August 31; the 'Medical Times and Gazette,' August 31; the 'Lancet,' August 31; the 'Medical Press and Circular,' August 31; the 'Chemical News,' August 31; 'English Mechanic,' August 31; 'Gardeners' Chronicle,' August 31; the 'Grocer,' August 31; the Journal of the Society of Arts,' August 31; the British Journal of Dental Science' for September.

MONOBROMATED CAMPHOR.

BY JOHN M. MAISCH.

Monobromated camphor was discovered by Th. Swarts, in 1861,* who obtained it by heating Laurent's bibromide of camphor ($C_{20}H_{16}O_2Br_2$), in a sealed tube, to 100° C. After several hours, the colour of bromine disappears, hydrobromic acid is formed, and a brownish oil, which gradually becomes crystalline, and contains the new compound. If bromine and camphor, in the proper proportions, are heated in a sealed tube for three hours, in the water-bath, the same compounds are formed. The crystalline mass is washed with water, recrystallized from alcohol after treatment with animal charcoal, washed with an alcoholic solution of potassa, to free it from hydrobromic acid, then with much water, and finally recrystallized from a mixture of alcohol and ether.

After the publication of Professor Deneffe's account† of the medicinal properties of this compound, I attempted to prepare it, at the request of Professor Wm. A. Hammond, of New York, and followed at first the above process, not being aware at the time of the researches of W. H. Perkin, to which I shall presently refer.

Laurent prepared bibromide of camphor by dissolving camphor in cold bromine, and freeing the crystals, which form after some time, by rapid expression between bibulous paper. Gerhardt states that these crystals decompose on the application of heat into bromine and camphor, which, however, has been refuted by Perkin. I can confirm this observation of the latter, and have also satisfied myself that Laurent's statement, that camphor crystallizes unaltered from its warm solution in bromine, is incorrect, as the copious evolution of hydrobromic acid proves.

Monobromated camphor is formed according to the following equation: $C_{20}H_{16}O_2+2Br=C_{20}H_{15}BrO_2+HBr$. If prepared in a closed tube, it is evident that at all stages of the process the pressure must be very considerable; at first, in consequence of the volatile nature of both camphor and bromine, and subsequently on account of the presence of the gaseous hydrobromic acid. When operating on a small scale, with suitable precautions, there was little difficulty in obtaining the compound. But when using several ounces of bromine at once, the tubes were usually shattered, and it became evident that this process could not be used with advantage on a large scale. The observation that on slightly heating the mixed camphor and bromine, the heat increases after the withdrawal of the fire, and the vessel contains considerable quantities of hydrobromic acid, suggested the idea that the camphor might be bromated without using closed tubes, simply by digesting the bibromide at an elevated temperature, or by allowing bromine to act upon camphor at a higher temperature, with the precaution to return into the retort any bromine and bromide of camphor which might be volatilized, while the disengaged hydrobromic acid might be absorbed by a solution of an alkali.

The neck of the retort was raised and connected with a reversed Liebig's condenser, which being found unnecessary, was afterwards substituted by a glass tube. If the reaction was not allowed to become too violent in the beginning, no bromine volatilized, but a yellowish-brown substance condensed in the neck, flowing back into the retort like oil; gradually this became lighter in colour, and golden-yellow needles were observed in the upper part and neck of the retort after cooling. Whether these needles are a bromide of camphor or a hydrobromate of monobromated camphor has not been determined.

The heat was raised after the first reaction was over to a temperature varying in the different experiments between 100° and 132° C. (212° and 270° F.). The higher temperatures were found better adapted for rapidly generating the monobromated camphor; but in all cases a considerable quantity of an oily compound was found in the mother-liquor from which the monobromated camphor had crystallized. This oil contained more or less of the latter compound in solution, which was obtained by reducing it to a low temperature. The mother-liquors containing the oil, in consequence of the frequent application of heat, turned black and left, after the evaporation of the menstruum, a black oil, which, in the course of several weeks, became granular; the oil still present in the magma could not be removed by different solvents which would also dissolve the crystallized granules. On being expressed between bibulous paper a grey solid mass was left behind, which was permanent in a temperature of 32° C. (90° F.), but became soft and oily when exposed to the direct heat of the sun, which was above 38° C. (100° F.) This compound is not monobromated camphor; its composition has not yet been investigated.

Attempts to separate the whole of the monobromated camphor from this oily substance by sublimation were not successful; the whole mass, after a slight white sublimate had been obtained, near 132° C. (270° F.), turned black, and after cooling sometimes did not separate any crystals, but remained liquid and oily, while at other times dark blackish-grey crystals were obtained.

It was noticed that the mother-liquors of the first crystallizations of monobromated camphor contained considerable hydrobromic acid, which also adhered to the crystals. The endeavour to remove it by washing with hot water was not entirely successful, and necessitated the drying of the solid portion previous to recrystallization from alcoholic solvents. To avoid these difficulties, the removal of the acid by means of a weak alkali (carbonate of lime) suggested itself, and, instead of alcohol, petroleum benzine was experimented with as a suitable menstruum for recrystallization.

The first crystallizations, whether obtained from alcohol or from petroleum benzine, contained notable quantities of the oily matter mentioned above, in consequence of which bromine was liberated on exposure to the light. The greatest portion of this oil could be removed by pressure between bibulous paper, and the remainder by subsequent recrystallization; but the loss of monobromated camphor was considerable, owing to its being partly absorbed by the paper with the oil, and to its remaining to some extent in the mother-liquor with that portion of the oil not absorbed by the paper. Gasoline or petroleum naphtha was found to be a good solvent for this oil, and to dissolve at the same time much less of the monobromated camphor than alcohol, ether, or petroleum benzine. Accordingly, when the crystals as

* 'L'Institut,' 1862-63. Kopp and Will's 'Jahresbericht,' 1862, 462.

† American Journal of Pharmacy, 1872, 84.

first formed have been drained in a funnel, they may be obtained nearly pure simply by washing them with gasoline, and require then one crystallization from alcohol or petroleum benzine to be entirely pure and unaltered in the light. The monobromated camphor dissolved by the gasoline may be recovered by evaporating most of the solvent spontaneously, washing the crystals with a little gasoline and re-crystallizing. The remaining mother-liquors, if not used as solvents in subsequent operations, may be worked up with the oil left by the first crystallization.

While experimenting with bromide of camphor, W. H. Perkin,* in 1865, obtained monobromated camphor by treating the oily matter obtained from the action of bromine and camphor with hot solution of potassa, and subsequently heating the product in a retort, collecting that portion of the distillate separately which comes over above 364° C. (508° F.).

T. Swarts,† however, prefers the process suggested by him to that of Perkin, regarding the former as more satisfactory; he also states that when moist monobromated camphor is distilled, or it is left in contact with hot water, bromine and hydrobromic acid are evolved, and camphor free from bromine is separated. The regeneration of camphor under these circumstances has never been observed by me; on the contrary, when the monobromated compound is boiled in a retort of water, a white crystalline sublimate resembling snow-flakes is slowly formed in the neck of the retort, and these crystals contain bromine, and have all the behaviour of monobromated camphor.

Perkin observed that monobromated camphor, treated with alcoholic ammonia in a sealed tube, at 180° C. (356° F.), undergoes a slight decomposition, with the formation of an organic base and of ammonium bromide. Fearing that the prolonged action of hot potassa solution upon the oil which already contains monobromated camphor might induce its decomposition, and my time not permitting to investigate it, I had resort to carbonate of lime (white marble), which, as previously observed, was found to answer the purpose well, as far as the removal of hydrobromic acid was concerned. On heating the remaining oily matter gradually, it was found to turn blackish when nearing 150° C. (300° F.), the colour became darker as the temperature rose, and a little oil distilled over, which solidified after a while and turned red from the liberation of some bromine. Meanwhile, the flake-like sublimate in the neck of the retort increased considerably, and the hot liquid boiled actively between 260° and 261° C. (500° and 502° F.), disengaging considerable quantities of hydrobromic acid, and separating also so much charcoal that the retort cracked. Eight ounces of bromine had been used in this experiment, the black residue of which, when dissolved in alcohol and filtered, yielded white crystals, requiring to be re-crystallized once, while the mother-liquor had a strong acid reaction, due to free hydrobromic acid.

Although this experiment was not very favourable for Perkin's process, in its application to the prepation of this compound on a large scale, it suggested a method of utilizing the oily residue which had accumulated from the mother-liquors of the first crystallization of monobromated camphor prepared at a lower temperature. The grey granular mass, left by expressing a portion of the solidified oil, as stated above, was slowly heated to 260° C. (500° F.), and after the disengagement of most of the hydrobromic acid, was dissolved in petroleum benzine, treated with marble and filtered, when monobromated camphor crystallized. The oily residue, containing some of the granular compound, was next treated in the same way, with a similar result. In both cases some of the oily mass was left in the mother-liquor, which may undoubtedly be utilized in a subsequent operation.

(To be continued.)

* 'Journal of the Chemical Society,' new series, iii. 92; Annalen d. Chem. u. Pharm. Suppl. iv. 124; and Will's Jahresbericht, 1865, 570.

† 'L'Institut,' 1866, 287. Will's 'Jahresbericht,' 1866, 622.

LABORATORY NOTES.*

BY EDWARD SMITH, F.C.S.

Bromide of Potassium.—This salt is generally found in commerce of a high degree of purity. This is not, however, always the case, a sample sent to me proved to be contaminated with chloride of potassium. The amount of chloride was estimated as follows, iodides, iodates, and carbonates having been previously ascertained to be absent:—

·0640 grains of the dry salt were titrated with $\frac{n}{100}$ solution of silver nitrate, potassium chromate as indicator, 55·5 c. c. of $\frac{n}{100}$ silver were required to complete the reaction, and

55·5 × ·00119 = ·0660; the volume of silver solution used is therefore in excess of that required for pure potassium bromide, for ·0640 (amount taken) should require 53·78 c. c., since ·0640 ÷ ·00119 = 53·78 and

51·0 c. c. $\frac{n}{100}$ silver × ·00119 = ·06069 K Br.

4·5 c. c. $\frac{n}{100}$ silver × ·000745 = ·00335 K Cl.

55·5 c. c. = ·06404 K Br + K Cl.

and ·00335 ÷ ·0640 × 100 = 5.20

·06069 ÷ ·0640 × 100 = 94·80

The sample, therefore, contained 5·2 per cent. of chloride and 94·8 per cent, of bromide of potassium.

Acetic Acid.—Iron is not usually mentioned in the text-books as an impurity in this acid. A small amount of iron proves very tiresome, since, if the acid be used for preparing mindererus, the iron is constantly and gradually depositing. On examining some acid which had been partly used in making mindererus, I found it to contain iron and manganese, the proportion of the former metal was 2·67 grains to an imperial pint. The manganese was not estimated, but was very readily detected in the iron sulphide (thrown down by ammonia sulphide from the neutralized acid) before the blow-pipe. In every other respect the acid was satisfactory.

Glycerine.—The high price of English glycerine has encouraged the introduction of foreign supplies. English glycerine, as a rule, stands the Pharmacopœia tests of gravity, etc., well. Continental samples, although professedly pure, and "equal to Price's," are not always reliable; either the gravity is low, or they are not odourless, or perfectly free from metallic impurity. One specimen, apparently pure, I found to contain a notable amount of some sulphur compound (not determined) probably arising from H_2S having been used to free the glycerine from metals. It had a sp. gr. = 1·250, without odour, free from metallic impurity, and generally stood the usual tests. On warming gently with dilute acid,

* Read at the Brighton meeting of the British Pharmaceutical Conference, August 14, 1872.

H_2S was given off in sufficient quantity readily to react upon lead paper, and to discolour metallic solutions.

A mixture composed of dilute acid and this glycerine and water became highly offensive within a couple of hours at the ordinary temperature. As glycerine and dilute acid frequently enter into the composition of mixtures and lotions, the occurrence of sulphur in the former is a possibility which dispensers should bear in mind. Its presence may readily be detected as above indicated.

Bismuth.—The common impurities of metallic bismuth are arsenic, antimony, copper, and lead. I have very rarely met with lead, but my experience is perhaps somewhat limited. The amount of arsenic and antimony is generally small, and will not require here any especial attention, since the greater portion (if not quite all) of these two metals is eliminated during the subsequent treatment for the removal of copper, which latter is the most difficult metal to get rid of.

In the purification of commercial bismuth, instead of following the B. P. method of fusing with nitre, I have adopted the process of Hugo Tamm,* which has proved in my hands exceedingly efficient and satisfactory. The treatment consists simply in fusing the coppery bismuth with potassium sulphocyanide. Tamm says, "The sulphocyanide which I use is prepared by mixing eight parts of cyanide of potassium and three parts of flowers of sulphur. One part of this mixture is thrown over sixteen parts of the metal melted at a low temperature." A bright red heat is sufficient, such as may be readily obtained by almost any Bunsen burner.

In order to satisfy myself of the thorough elimination of the copper by this process, a sample of coppery metal and the resulting purified button were carefully examined as follows:

3·2585 grains of the impure bismuth were dissolved in dilute nitric acid, ammonium chloride added, and the bismuth precipitated as oxychloride by the addition of a large volume of water, excess of ammonia was now added, the precipitate thrown in a filter, well washed, and the acidified filtrate divided into two equal portions, α β.

Through α, H_2S was passed to excess, the precipitate so formed collected, washed, and ignited. The residue thus obtained is a mixture of copper sulphide, oxide, and sulphate. To remove the latter, it was again carefully ignited with ammonium carbonate, and the resulting mixture of copper sulphide and oxide weighed. The weight $=$ ·0115 grains, this $\times 2 =$ ·0230 grains in quantity taken (3·2585 grains) and ·0230 gr. $=$ ·01836 grain copper $=$ ·563 per cent. copper in sample examined. As the percentage of copper in copper sulphide and oxide is identical, a mixture of the two is of no consequence in estimating the amount of metallic copper.

The portion β of the filtrate was treated in a similar manner, by passing H_2S through, but the resulting precipitate was dissolved in nitrohydrochloric acid, evaporated to dryness, and the residue dissolved in dilute hydrochloric acid. From this solution the copper was precipitated as metal by zinc in a platinum dish in the usual way. The weight of metal obtained was equal to ·558 per cent. of quantity taken. The mean of the two experiments $=$ ·563 $+$ ·558 $\div 2 =$ ·560 per cent.

48·45 grains of impure metal were then fused with a mixture of 2·5 grains pure K Cy, and 1·0 grain S for fifteen minutes. The fire was then removed, and after a few moments, to allow the slag to separate, the crucible being gently tapped to agglomerate the metal, the latter was poured out, and the button when cold weighed:

Weight of button $=$ 44·25 grains, the loss was therefore 4·20 grains $=$ 8·6. per cent.

This loss is, however, much too great, the fact being that I did not succeed in obtaining the whole of the metal in the button, brilliant metallic specks being visible after cooling, disseminated through the slag. A second fusion of the latter yielded a small button, but on examination it was found to be contaminated with particles of slag, and consequently gave evidence of the presence of copper.

Subsequent operations have proved that the loss should never exceed five per cent.

I must here remark, that the proportions laid down by Tamm work well if *pure* cyanide be used, but if ordinary commercial fused cyanide be employed, then a larger proportion is necessary. Practically, I have found that 50 parts of impure metal required from 3·5 to 4 of cyanide with 1 of sulphur. If a deficiency of cyanide be used, sulphide of bismuth is formed, thus involving a second fusion, or entailing a serious percentage loss of metal in the button, but this need not happen if the above precautions be observed.

A weighed portion of the button first obtained was dissolved, and after the separation of Bi. as before, treated with H_2S, but *not a trace* of Cu. was revealed. Excess of ammonia to the acid solution did not produce the slightest coloration, nor did any of the usual specific tests for Cu. indicate the slightest trace of that metal. The coppery bismuth had, therefore, been completely freed from the Cu. by the very simple process of Tamm.

Since writing the above, I have met with a paper by Mr. Schacht,* wherein he gives the results of some of his experiments in removing Cu. from Bi. by fusion with nitre. It is stated that the whole of the Cu. cannot be removed by the B. P. process. This statement is doubtless correct, repeated fusions are certainly necessary. The process of Tamm, so far as my experience goes, is unquestionably by far the more perfect, and I think leaves nothing to be desired, A little sulphur may be left with the metal, but this is practically of no consequence. With regard to percentage loss, Mr. Schacht states "that the loss varies with the duration of the process from 7 to 17 per cent." In his experiment, 1000 grains of coppery bismuth, after three fusions with nitre, lost 170 grains, and "still yielded abundant evidence of copper." In this respect, therefore, as well as in the more thorough efficiency, the process of Tamm may well supersede that of the present Pharmacopœia.

* 'Chemical News,' vol. xxv. p. 100.

*PHARMACEUTICAL JOURNAL, April, 1868.

NEW DERIVATIVES FROM MORPHINE AND CODEINE.†

BY C. R. A. WRIGHT, D.SC. LOND.

Lecturer on Chemistry in St. Mary's Hospital Medical School.

During the past year further experiments have been made on the derivatives of these two alkaloids, in continuation of the results briefly described at the last meeting of the Conference. The principal results are as follows:—

It was shown previously that compounds are obtainable from codeine (by the action of hydrobromic acid) which may be regarded as formed by a polymerizing action, the resulting products containing four times as much carbon in their formulæ as the original base; and that analogous substances are formed by the action of hydriodic acid in presence of phosphorus, hydrogen being also added on in this case. Further examination has confirmed these results in the main, with this difference, however, that the action of hydrochloric acid on codeine and morphine appears to indicate that the formulæ of these bases are double of those usually ascribed to them; while polymerides exist containing respectively twice, three times, and four times as many atoms in their formulæ as the original bases; so that the following series may be written:—

† Read at the Brighton meeting of the British Pharmaceutical Conference, August 4, 1872.

Codeine	$= \overline{C}$	$= C_{36}H_{42}N_2O_6$
Dicodeine	$= \overline{C}_2$	$= C_{72}H_{84}N_4O_{12}$
Tricodeine	$= \overline{C}_3$	$= C_{108}H_{126}N_6O_{18}$
Tetracodeine	$= \overline{C}_4$	$= C_{144}H_{168}N_8O_{24}$
Morphine	$= \overline{M}$	$= C_{34}H_{38}N_2O_6$
Dimorphine	$= \overline{M}_2$	$= C_{68}H_{76}N_4O_{12}$
Trimorphine	$= \overline{M}_3$	$= C_{102}H_{114}N_6O_{18}$
Tetramorphine	$= \overline{M}_4$	$= C_{136}H_{152}N_8O_{24}$

Each of these bases is apparently capable of giving rise to a large number of derivatives. In the codeine series both the polymerides themselves and many of their derivatives have been obtained. In the morphine series, the polymerides themselves have not been formed as yet; nor have the derivatives of trimorphine been obtained with certainty; but derivatives of tetramorphine and dimorphine have been obtained, some being formed by the removal of the elements of water from the polymerides themselves; the dehydro- or "apo-" derivative of the latter polymeride is apparently the *apomorphine* examined some few years ago by the late Dr. A. Matthiessen and the author.

When hydriodic acid and phosphorus act on codeine, methyl is eliminated as iodide and a series of substances are obtainable, all of which are expressible by the general formula—

$$(\overline{M}_4 + H_{16}) + nHI \pm p\,H_2O$$

By pushing the treatment further, other substances are formed having the general formula—

$$(\overline{M}_4 + H_{16} - O_8) + nHI \pm p\,H_2O.$$

When morphine is subjected to the same treatment, products are formed which are apparently absolutely identical with the corresponding codeine products. Much fewer derivatives are, however, obtainable from morphine, the fact of their being no methyl to eliminate and thus place the substance in a quasi-nascent state, being probably the reason for this difference. Thus the morphine derivatives hitherto obtained all belong to the first series—

$$(\overline{M}_4 + H_{16}) + nHI \pm p\,H_2O,$$

none of the other series containing less oxygen having been obtained as yet from this base. These derivatives have no marked physiological action, considerable doses (up to eight grains) being given to an adult she-terrier without producing any result other than a purging action lasting for a few hours.

It is noteworthy that both from morphine and codeine the same compound $(\overline{M}_4 + H_{16}) + 9HI - 4H_2O$ is derivable. The formula of this substance ($C_{136}H_{161}IN_8O_{20}$, 8HI) is incapable of being halved, and indicates that the iodized bases are really C_{136} compounds, and not C_{68}, as was supposed at first. On account of the similarity in physical properties between these iodized derivatives and the bromotetracodeine, chlorotetramorphine, etc. obtained by the action of hydrobromic acid on codeine, the formulæ of these latter substances are also considered to be double of those formerly attributed to them, *i.e.*, they are viewed as $C_{136} - C_{144}$ compounds and not $C_{68} - C_{72}$ bodies. Inasmuch, however, as they still contain four times as much carbon as the codeine and morphine (when these two are doubled as above explained), the old names are still applicable; and this class of bodies, which are characterized by the property of being amorphous and insoluble in ether, may be conveniently alluded to as the "*tetra bases.*"

To obtain the polymerides of codeine themselves without alterations by further secondary reactions, the action of acids other than hydracids was examined. Phosphoric acid when heated to about 200° (by boiling down the aqueous solution of codeine in excess of glacial phosphoric acid) yields *dicodeine* soluble in ether, amorphous, but forming crystalline salts, and *tetracodeine*, much resembling in its properties all the other "tetra bases" examined, being insoluble in ether and amorphous, and forming amorphous salts. These two bases appear to be identical respectively with the "isomer of codeine" of Armstrong, and the "amorphous codeine" of Anderson, both prepared by the action of sulphuric acid on codeine. On examining this reaction, a third polymeride was also found to be formed, which is amorphous and soluble in ether, but which forms amorphous salts. On account of this body being in many properties and respects intermediate between dicodeine and tetracodeine, it is considered to be *tricodeine.*

The proof of the correctness of the formulæ attributed to dicodeine and tetracodeine is as follows: when dicodeine is treated with hydrochloric acid it undergoes the following reaction:—

$$C_{72}H_{84}N_4O_{12},4HCl + HCl = H_2O + C_{72}H_{83}Cl\,N_4O_{11},4HCl.$$

The resulting body is soluble in ether and gives *amorphous* salts, whereas dicodeine hydrochloride is crystalline. Hence this body is not a tetra base, and hence the inference is that dicodeine has a C_{72} formula. When codeine itself is similarly treated, the first product of the reaction contains chlorine and carbon in the ratio 1 to 36, whence codeine is a C_{36} body. Tetracodeine evidently belongs to the same general group as the substances termed "tetra bases;" and as these have been shown to be C_{144} compounds, it follows that tetracodeine has double the formula of dicodeine, which again is double that of codeine: whence the names. Tricodeine is considered to be such on account of its properties, which are intermediate between those of dicodeine and tetracodeine; the action of sulphuric acid on dicodeine does not give rise to tricodeine, but does to tetracodeine, so that tricodeine is formed directly from codeine. The action of hydrochloric acid on tricodeine is, however, quite different from that on codeine and dicodeine; the elements of water are removed, and the product contains *no chlorine at all.* Tetracodeine, on the other hand, undergoes no change when heated for a long time with hydrochloric acid.

The action of hydriodic acid on codeine, dicodeine and tetracodeine is again very different, as exemplified in the following reactions:—

Codeine $4\overline{C} + 36HI = 8CH_3I + 4H_2O + I_{16} + (\overline{M}_4 + H_{16} + 12HI - 4H_2O)$.

Dicodeine $2\overline{C}_2 + 25HI = 8CH_3I + 4H_2O + I_8 + (\overline{M}_4 + H_8 + 9HI - 4H_2O)$.

Tetracodeine $\overline{C}_4 + 18HI = 8CH_3I + 2H_2O + (\overline{M}_4 + 10HI - 2H_2O)$.

With the codeine H_{16} is added on to $\overline{M}_4$; with the dicodeine H_8 only; and with the tetracodeine no H at all; a tetra base results in each case. The product from dicodeine has the formula $C_{136}H_{153}IN_8O_{20}$,8HI, which contains C_{136} and is incapable of being halved. Sulphuric acid converts dicodeine into tetracodeine, no tricodeine being produced thereby; hence tricodeine is a polymeride formed directly from codeine, and is not produced by the metamorphosis of dicodeine previously produced; the reverse being true for tetracodeine.

Dr. Stocker finds a considerable difference in the physiological actions of these different polymerides; the higher polymerides usually produce vomiting or diarrhœa (in cats and dogs), while codeine produces a peculiar hypersensitiveness and cerebral congestion not noticeable with the others.

When morphine is treated with phosphoric acid, two products are obtained corresponding in properties to dicodeine and tetracodeine; these are not, however, the polymerides themselves, but are derivatives therefrom derived by abstraction of the elements of water. One is soluble in ether, and forms crystalline salts, though amorphous itself. This is produced only in small quantity, and appears to be identical with apomorphine, which is accordingly viewed as a derivative of dimorphine.

$$2\overline{M} = 4H_2O + (\overline{M}_2 - 4H_2O) = 4H_2O + C_{68}H_{68}N_4O_8.$$

The other is a tetra base, and is formed by this reaction—

$$4\overline{M} = 2H_2O + (\overline{M}_4 - 2H_2O) = 2H_2O + C_{136}H_{148}N_8O_{22}.$$

This latter base gives rise to new derivatives when treated with hydrochloric or hydriodic acid; it is quite as powerful an emetic as apomorphine, and being obtainable in much larger quantity, may possibly come into use in medicine. According to the experiments of Dr. Stocker it does not seem to produce so much after-depression as apomorphine. Hitherto it has been administered by hypodermic injection, but it could probably be conveniently given as a pill.

A large number of the compounds examined have not yet been named, on account of their complex compositions. The term *diapotetramorphine* has been given to the last described base, on account of its having the composition of tetramorphine minus two proportions of water, $\overline{M}_4 - 2H_2O$. Adopting the same kind of nomenclature, ordinary apomorphine would be termed *tetrapodimorphine,* having the composition of dimorphine minus four proportion of water $\overline{M}_2 - 4H_2O$.

A large number of other products have also been partially obtained, and are now in course of examination; it is hoped to extend the investigation of the opium alkaloids to some of the lesser known ones, such as narceine and papaverine. In reference to this point, the author cannot conclude without acknowledging the extreme kindness and liberality of Messrs. Macfarlane and Co., of Abbey Hill Chemical Works, Edinburgh. During the course of these researches these gentlemen have furnished gratuitously large quantities of several alkaloids, including the rarer ones, and amounting in the aggregate to several pounds weight of materials of the highest degree of purity; without the help thus liberally bestowed, the investigations would have been impossible.

KOEGOED.*

BY MR. GEORGE ALEXANDER KEYWORTH, HASTINGS.

A plant growing very abundantly in Bushmanland, on the borders of Namaqualand, South Africa. Mules and horses there, through drinking brackish water, have inflammation of the stomach. The remedy is a pint of decoction of this plant (made by boiling a handful of it in a quart of water to a pint) with half a teacupful of brandy. It acts as a slight purge. The natives chew it for the same purpose. Chopped up and mixed with oats, etc., for cattle, it serves as a condiment. Koegoed is pronounced Koukwood; "goed," in Hottentot Dutch, means "wood."

The specimen exhibited was brought to this country last year by C. J. Small, Esq. The plant has been examined by B. J. Austin, Esq., member of the Reading Microscopical Society, whose report is added. I am not aware that the plant has previously been much noticed. Its therapeutical value also remains, I believe, to be ascertained.

Mr. Austin says, "After looking carefully, and more than once, over the specimen you sent, in hope of finding a blossom that would assist in determining the relation of the plant, I could find none; and, indeed, have found but one leaf, which it would be rather presumptuous to set down as belonging to the plant just because it was met with among fragments. The pieces seem to me to have been soaked in salt water;† the taste is saltish, and, indeed, crystals of salt form in the distilled water in which I softened some of the root fibres.

"The fibrous nature, too, of the root—for the specimen seems to consist wholly of roots*—may be due to this. The wood zones are quite separated, and so also is the cortical exterior. This has made it very difficult to cut sections. All the leaf-fragments too are completely skeletonized. I have, however, made the best sections possible, and find the usual pitted ducts in the wood. The chief peculiarity is the thickened margin of the wood cells in the outer portion, similar to what is seen in woody fibre of root of ginger, and a delicate spiral structure exists in some of the cells. There appear to be no definite starch granules, although there are some cells which appear to be of an albuminous character. These are numerous, but show no trace of striæ, nor does polarized light produce any effect. These cells are probably the remains of a milky juice, and to them I attribute the readiness with which the root tinges water of a brownish-yellow.

"Raphides abound in the central part of the root, and they vary in shape, some being acicular, others prismatic with flat ends, and others with oblique ends.

"The only leaf I found presented no very marked feature, the venation showing it to be exogenous, which, of course, guides but little."

* Read at the Brighton meeting of the British Pharmaceutical Conference, August 14th, 1872.

† This arises from the brackish soil of Namaqualand, impregnated with nitrate of soda, which whitens it.

* Mr. Small does not remember seeing any leaves or flowers. The roots are creeping and matted upon the surface of the ground. He considers the effects to be "slightly narcotic or sedative, slightly stimulant, stomachic and carminative."

ORGANIC CHEMISTRY AND THERAPEUTICS.†

BY A. W. HOFMANN.

(Continued from p. 163.)

I will here trace some of the advantages which have accrued to therapeutics from the study of chemical metamorphoses. There is an entire series of bodies which formerly could only be obtained in small quantity, often in an indifferent state of purity, and which were extracted with more or less difficulty from natural sources. But the study of chemical metamorphoses has revealed methods for now preparing these substances in a state of perfect purity, in considerable quantities and at a moderate price. Some of these discoveries belong to the most interesting episodes in the history of the development of organic chemistry.

During the last thirty or forty years a great proportion of chemical labour has been devoted to the study of alcohol; it might be said, that during this period the progress of organic chemistry has been principally represented by the study of alcohol and its derivatives, and there are two names, those of Liebig and Dumas, honourable mention of which must not be omitted in speaking of this epoch. In conjunction with Peligot, Dumas discovered in wood spirit a new alcohol, possessing properties analogous to those of spirit of wine or ethylic alcohol, and which he classed by the side of the latter under the name of methylic alcohol. Then chemists commenced to realize that in ethylic and methylic alcohols they had the prototypes of a vast class of substances, the most important among organic compounds. This idea gave a new direction to research, and the chase was commenced with an ardour that has not relaxed to the present day; every part of organic chemistry has been explored with the greatest care, but it was principally from the saccharine bodies, whence was derived the alcohol of wine, that it was hoped to obtain new alcohols. Research so energetic did not long remain without result. In an oily liquid obtained in distilleries as

† Lecture delivered at the Medical Chirurgical Institute of Berlin.

an accessory to the fermentation of sugar, and which, in consequence of its bad odour, the manufacturer carefully separated from the spirit of wine, Cahours discovered a third alcohol; and thus a substance which hitherto had taken much trouble to get rid of, acquired at once a great scientific importance. This body was amylic alcohol, contained also in potato spirit. It was soon found that it presented all the properties of the alcohols already studied, and that under the influence of oxidizing agents it produced an acid, just as methylic acid was converted into formic acid and ethylic alcohol into acetic acid. But what was the astonishment of chemists when it was recognized that this acid, obtained for the first time by Dumas and Stas, was identical with the substance which the study of valerian root had superficially made known! So long as valerianic acid was extracted from valerian, as that root contained only very small quantities, it was not possible to use it generally in consequence of its high price; but no sooner had science demonstrated that it could be prepared from potato spirit than it became an object of manufacture, and its salts, especially the valerianates of zinc and bismuth, were employed in medicine.

Among the organic acids which were best known to chemists was lactic acid. First observed in sour milk by Scheele, this acid was afterwards found in a series of acid liquids, in the gastric juice, in sour krout, and in the juice of cucumbers. But it was only when the relation which existed between lactic acid and sugar was discovered, when it was demonstrated that it was formed in the majority of cases at the expense of saccharine matters, and when the conditions under which sugar is transformed into lactic acid were determined; in fact, only when the chemist had given a method which allowed of its fabrication industrially, that the use of this acid was introduced into therapeutics, where now, under the form of lactate of iron, it plays so important a part.

I ought to mention here succinic acid, although its employment in medicine is not to be compared with that of lactic acid. The former method for the preparation of succinic acid by the dry distillation of amber yielded but a small quantity of acid, and it was difficult to rid it from the impurities with which it was contaminated. But no one would think now of preparing it by a method so costly. Analysis has demonstrated that the molecule of succinic acid only differs from that of malic acid by having one atom of oxygen less. Dessaigne has demonstrated that the berries of the mountain ash (*Sorbus aucuparia*) will give an abundant supply of malic acid, which can be transformed into succinic acid by a simple process of fermentation. All the succinic acid of commerce is prepared in this manner.

No less remarkable and important for the progress of chemical research is the revolution which has been effected in the manufacture of benzoic acid. The existence of this acid had been indicated from the fourteenth century, but it was not till the latter years of the last century that its nature was ascertained. It was first obtained from benzoin. Although it had been met with in other resins, and especially in balsam of tolu, benzoin was until the last few years the chief material from which benzoic acid was manufactured; to-day only a small portion of that used in pharmacy and in the arts is prepared in this manner. In 1829 Liebig discovered in the urine of herbivorous animals hippuric acid, a peculiar nitrogenized acid, which by fermentation is transformed into benzoic acid. Later, Dessaigne showed that the same transformation could be effected by boiling hippuric acid with concentrated hydrochloric acid, a reaction in which a most interesting secondary production is formed, viz. glycocol. The present manufacture of benzoic acid is based on these reactions.

Formic acid is another acid meriting notice, although less important therapeutically. It is scarcely necessary to say that in the distillation of oxalic acid, chemists have a source which furnishes the acid much more easily and in a state of greater purity than the organism of the insects from which it takes its name.

I needly hardly speak of glycerine, the marvellous properties of which are every day utilized in some fresh way in pharmacy. Glycerine is, however, properly speaking a pharmaceutical conquest; for Scheele discovered it in 1783 while preparing lead plaster. But it is only since science has demonstrated its nature, and the classic labours of Chevreul upon the fats have enabled us to understand in all its simplicity the mechanism of saponification, that the industrial manufacture of the fat acids and of glycerine could be undertaken with success. It was reserved for our time to be a witness of the great modification which the introduction of saponification by water has caused in the fat industry, the conception of that process having been impossible before the development of organic chemistry. Since the adoption of aqueous saponification, glycerine has become very easily obtainable, and as it is found in the market in a state of purity which leaves nothing to be desired, it is not easy to assign any limit to its employment.

(To be continued.)

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION AND SCHOOL OF PHARMACY.

The Council of the above Association, desiring to meet the expressed requirement of increased accommodation, have taken and furnished rooms at 37, Blackfriars Street, Manchester, in the centre of the city, and within easy distance of all the railway stations. The reading-room and museum are supplied with an excellent collection of materia medica specimens, book of autograph prescriptions, and a valuable library of works on pharmaceutical subjects. The class-room is capable of accommodating a large number of students. The rooms are to be open for study and reference on Tuesdays and Fridays, from 5 till 10 p.m., and on Mondays, Wednesdays, and Thursdays from 7 till 10 p.m. The following courses of lectures and classes have been arranged for the coming session:—

Pharmaceutical Chemistry.—Twenty-five lectures, by Mr. Louis Siebold, on Tuesdays, from 8 to 9.30 p.m. Fee 12*s.* 6*d.* To commence October 8th.

Materia Medica.—Twenty-five lectures, by Mr. Louis Siebold, on Fridays, from 8 to 9 p.m. Fee, 12*s.* 6*d.* To commence October 11th.

Pharmaceutical Botany.—Fifteen lectures, by Mr. Louis Siebold, on Fridays, from 9 to 10 p.m. Fee, 7*s.* 6*d.* To commence October 11th.

Pharmaceutical Latin (*Elementary*).—Ten lessons in elementary Latin, by Mr. J. J. Smith, B.A., on Wednesdays, from 7 to 8 p.m. Fee, 5*s.* To commence October 9th.

Pharmaceutical Latin (*Advanced*).—Ten lessons in more advanced Latin and reading and translating prescriptions, by Mr. J. J. Smith, B.A., on Wednesdays, from 8.30 to 9.30 p.m. Fee, 5*s.* To commence October 5th.

Students willing to attend the three first courses (viz., Chemistry, Materia Medica, and Botany), may do so for a reduced composition fee of 30*s.*

Tickets may now be obtained of Mr. F. Baden Benger, Hon. Sec., 1, Market Place, or of Mr. Louis Siebold, Oxford Street, Manchester.

In addition to the above lecture courses, monthly meetings will be held from October to March, for the reading of papers on, and discussion of, subjects interesting to the trade.

A very considerable outlay having been made in preparing for the coming session, the committee earnestly invite the co-operation of masters, assistants and apprentices, without which the facilities now offered to pharmaceutical students in Manchester and district cannot be maintained.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 14, 1872.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE VALUE OF PHARMACEUTICAL EDUCATION.

IT speaks well for the hopefulness and good feeling of Manchester pharmacists, that while yet the statement of Mr. HAMPSON, as to a former effort to found a school of pharmacy in that city having ended in comparative failure, is yet fresh in our recollection, such an announcement should be possible as that on the preceding page. Not the less so, since we are told, that on the former occasion funds were abundant, but the students were not forthcoming. While ready, however, to recognize to the fullest degree the persevering kindness shown, we are not altogether prepared to admit that the new prospectus is free from liability to criticism.

Scientific and technical lectures at sixpence each may be very desirable from a student's point of view, in certain cases, though we believe such cases are exceptional. But whether the proffer of lecture instruction at such a rate would conduce to the elevation of pharmacy is, we think, quite another question. It is true that in one notable instance even this degree of cheapness has been surpassed. But if it be desired to make any scheme of provincial pharmaceutical education permanent, it is evident that there must be some correspondence between the expenditure involved by the delivery of a course of lectures and the fees to be paid by the students. We are sorry to say experience has shown that if a qualified teacher is to be fairly paid for his labour —as he certainly should be—no town in this country, not even excepting London, would under existing circumstances supply a sufficiency of students to pay the bare expenses, if the fee for twenty-five lectures were no higher than 12*s.* 6*d.* The result would be either that a deficiency would have to be made up from some outside source, or there would be insufficient funds to command the services of a properly qualified lecturer. Gratuitous or partially paid teaching—even if effective—there is no right to expect.

Four years have now elapsed since the passing of the Pharmacy Act. The claim which certain classes of persons in the trade then seemed to have for assistance in passing the compulsory examinations is fast diminishing with the lapse of time. In the discussion at Brighton, as well as in these columns, there has been a decided opinion expressed, that those who in future wish to enter the pharmaceutical ranks should be prepared to pay adequately for their technical education. This appears to be a healthy sign, indicative of good for the pharmaceutical community of the future as well as for the public.

The argument is often heard that the cost of education for entering the business is not repaid by any profits which are afterwards made in it. No doubt there is too much ground for this complaint. But the remedy for this state of things we believe to be very much in the hands of pharmacists themselves; and for confirmation of our opinion we would refer to Professor MICHAEL FOSTER's remarks recently at Brighton. Lightly won, lightly prized, is old experience. So long as persons entering pharmacy are led to expect that they will be provided with technical education far below cost price, so long will there be a class, with whom others will have to compete, who will be ready to throw in their experience with the wrapping paper, and supply the public with their wares at a percentage of profit not higher than the ordinary huckster. An illustration of what we mean is furnished in the persistency with which is urged by certain chemists and druggists, that in a shop full of customers the time required for registering the sale of vermin killers could only be given to the detriment of the vendor. With a public willing—nay, anxious—to restrict the sale of such poisons to the qualified pharmacist, surely it would be better policy to find time for such an operation, and to charge for it too.

THE CHICAGO COLLEGE FUND.

IN accordance with the intimation given when the subscription list to this fund was closed, the Committee consulted the Council of the Chicago College respecting the disposition of the balance in hand. It was found that all chemical and galenical specimens would be presented by American manufacturers; that glassware and other containing vessels would be provided by themselves; and that German books would be sent from Germany; but that chemical and physical apparatus of any kind would be acceptable. Professor ATTFIELD, therefore, as Treasurer and Secretary of the Fund, and with the consent of the Committee, has purchased a selection of optical, electrical, thermal, pneumatic, and chemical apparatus, the manufacturers of which have, in all cases, granted liberal reductions. This collection of apparatus, added to the collection of books (partly presented and partly purchased), will constitute the offering of British pharmacists to their Chicago brethren; the estimated value when safely housed in Chicago will be about five thousand dollars.

The gratifying duty of announcing the completion of the Committee's labours to the members of the Council of the Chicago College fell to Professor

Attfield, and on the 11th July he forwarded a letter containing a list of the apparatus, with a notification that it would be sent off in a few days. To this letter he has now received the following reply:—

Chicago, Illinois, United States,
August 17, 1872.

Prof. J. Attfield, Ph.D.,
Treasurer and Secty. of the Chicago College Fund.

Sir,—We have the honour to acknowledge the receipt of your letter of July 11th, announcing the result of the subscription which has been contributed by British pharmacists and now so generously presented to the Chicago College of Pharmacy.

As officers and trustees of the College we have observed from time to time the great efforts and the untiring zeal our friends in England and elsewhere have manifested in the endeavour to aid us in re-establishing our College, so the receipt of your communication was not an absolute surprise, but, sir, the perusal of the letter, showing, as it does, the extent of the donation, the peculiar care and judgment that has been exercised in its selection, and the large number of contributors, comprising not only pharmacists and scientists, but even their assistants and apprentices, from every part of Great Britain and Ireland, combine to excite in us feelings of profound amazement and gratitude.

May we hope, sir, that all who have contributed to this Fund will believe that we duly value and appreciate the sacrifices they have made for us, and all be pleased to receive, in the name of the Chicago College of Pharmacy, our sincere acknowledgments and thanks; although we would not have one contributor feel that we underestimated the service he had rendered us, we should think our duty incomplete did we not specially thank you, sir, the various members of Committees, and all who took the initiatory steps in this matter; you have indeed cause for congratulation that such marked success should have attended your efforts.

We accept your munificent gift as a valued trust, to be carefully and sacredly administered for the benefit of all who shall seek improvement within the walls of our College. We hope to hand it down to our successors complete and unimpaired, except as time and good usage shall cause them to decay; and when the student, as he seeks or follows the inspiration of knowledge now dwelling upon the page of lettered science, or holding, with unpractised hand, the instrument that shall unfold wonders to his full, eager mind, he, and all, shall know that these aids to knowledge were placed within his reach by brother pharmacists of Great Britain and Ireland, and given in the holy names of sympathy and brotherly love.

Reciprocating these sentiments—
We have the honour to remain, sir,
Your obedient servants,
George Buck, President,
formerly M.P.S.G.B.
T. H. Patterson, 1st Vice-President.
Jas. W. Mill, 2nd Vice-President.

Albert E. Ebert,
Corr. Secty.

We understand that the second edition of Professor Attfield's Manual of Chemistry, published in this country, as well as the third edition, published in America, having been exhausted, it is intended to issue a new English edition in October, and a new American one as soon as possible after the issue of the new United States Pharmacopœia.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

Wednesday, August 14th, 1872.

(Second day.)

The proceedings were resumed this morning at about ten o'clock.

Election of Honorary Members.

The President said that the Executive Committee had just determined to bring forward the name of Dr. Carl Schacht as an honorary member of the Conference. That gentleman was the chairman of the German Pharmacopœia Committee, and also a member of the technical commission appointed to assist the German Government in matters connected with pharmacy.

The name of Dr. L. A. Buchner, of the University of Munich, was submitted by Mr. Hanbury. Both gentlemen were unanimously elected honorary members.

Sixty candidates for election as members of the Conference were then submitted to the meeting, and their election was unanimously agreed to.

A paper on "Calabrian Manna" was then read by Mr. Daniel Hanbury, F.R.S. At the request of the author, the publication of this paper is delayed for a short time.

The next paper read was—

On the occurrence of Manganese in Plants, especially in Drugs of the Zingiberaceous Order.

by professor flückiger, bern.

Black oxide of manganese was known to the ancients, but considered to be an ore of iron; that it is a compound of a peculiar metal was one of the splendid discoveries of the most eminent pharmacist who ever lived. The laboratory of the small pharmaceutical establishment at Upsala, where in 1774 the great Scheele first pointed out the existence of manganese, was probably of the most humble character. There he not only traced the prominent characters of that metal, or at least of its oxygenated compounds, but he was already aware that it is in some instances a constituent of the ash of vegetables. He says that some chemists before his time had frequently observed that the ash of what they called *alkaline salts* assumed a bluish or greenish colour. But they were unable to explain the reason, whereas Scheele, in his famous paper on peroxide of manganese, devoted to this fact a chapter entitled "Presence of Brunsten, or Magnesia nigra (as he called the peroxide), in the Ash of Plants." He showed that the green ash yields an aqueous solution of the same colour, which, on addition of any acid, turns red, and after some time deposits a brown powder. Scheele was quite correct in attributing these reactions to the presence of manganese; he observed very little of it in the ash of *Serpyllum*, more of it in the ash of wood.*

Since Scheele's time, manganese has been very frequently met with in plants, most commonly in company with iron. The latter metal is one of the indispensable elements of vegetable life, at least in phanerogams, whereas manganese is wanting in many plants. No plants, however, have ever been proved to perish by want of manganese which they actually do so soon as iron is absolutely excluded. Whether, on the other hand, the iron in plants can or cannot be replaced by manganese has likewise not yet so far as I know been determined.

In numerous instances, the amount of manganese in the ash is exceedingly small; in several plants belonging to various natural orders, however, it has been met with

* C. G. Scheele, *Opuscula chemica et physica*, i. (1778) 227 ad 281.—German translation by Hermbstädt II. (Berlin, 1793) 85–87. Cap's 'Biographical Notice on Scheele,' in *Journal de Pharmacie et de Chimie*, 43 (1863), 337.

in a somewhat larger quantity. Among these latter the order *Zingiberaceæ* claims a prominent place, as the following experiments will show.

All the *Cardamoms* at my command afforded ashes of distinctly green colour even by incineration of the smallest quantity of the drug. This is also most striking in Grains of Paradise where the manganate of potassium is so largely formed, that I deliberated whether an accidental admixture of some compound of manganese had not occurred. I therefore examined the *fruits* of *Amomum Melegueta*, Roscoe, from Sierra Leone, with which I had been presented by my friend D. Hanbury. A single seed taken from this fruit and incinerated in a platinum capsule is sufficient to yield a green residue, the colour of which becomes much more intense if the seed is burnt in a loop of thin platinum wire and then fused in the oxidizing part of the flame with a little sodium carbonate. For this purpose a small spirit lamp is better than a gas light, the flame of which causes a current of air which would blow away the small amount of ash. The burning of the seed on the platinum wire succeeds much better with the flame of spirit of wine; the heat is quite sufficient to fix the ash in the loop of the wire. It is then moistened with a little water in order to attach a particle of dried carbonate of sodium. Sometimes the carbonate fused with the ash is but little coloured at first, but assumes an intense green hue if it is moistened and again kept in fusion for some time in the oxidizing flame. In the interior reducing part of the flame the manganate is destroyed, and the bead becomes almost colourless, and *vice versâ*. The coloration becomes more distinct by addition of nitrate or chlorate of potassium; borax is not preferable to the carbonate.

The thin paper-like pericarp of *Amomum Melegueta* affords not more than 7·7 per cent. of ash; this is, however, much more than the percentage yielded by the seeds, and the ash of the former is evidently richer in manganese. The smallest fragment of the pericarp yielding a scarcely visible quantity of ash will produce an intensely green bead with carbonate of sodium.

Elettaria Cardamomum, Maton, the mother-plant of the Malabar Cardamom, as contained in my herbarium, from Canara, fully confirmed the above statements. Every part of it, the thinnest rootlets, the stalks, the leaves, the pericarp as well as the seeds, furnished a green bead.

The fruits of *Elettaria Cardamomum*, Var. *β. major*, the *Ceylon Cardamom* of trade are likewise rich in manganese, especially their pericarp. All the drugs derived from zingiberaceous plants which I had the opportunity of examining, were proved to contain manganese, viz., the rhizomes of *Cassumunar* (yellow Zedoary), *Curcuma*, *Galanga*, *Zedoaria*, *Zingiber*. The same remark applies to the smallest fragments of the leaves of *Amomum Cardamomum*, L., grown in Java, *Curcuma longa*, L., from Java, *Curcuma leucorrhiza*, Roxb., from Mangalore, *Zingiber officinale*, Roscoe, from Java. Among *Cannaceæ* I have examined the leaves of *Maranta indica*, Tussac, cultivated in Java, which afforded an exquisite green bead. Yet in *Maranta arundinacea*, L., grown in the Botanic Garden of Bern, I failed to ascertain the presence of the metal under notice.

These experiments speak sufficiently in favour of the suggestion, that manganese is widely and constantly distributed throughout the said natural order, although it would be desirable to have further confirmation with regard to other *Zingiberaceæ*, which I had not at hand. This I hope will be performed by some other chemist.

I was desirous to make a quantitative estimation of manganese in Ceylon Cardamoms, which according to their behaviour on platinum wire are likely to be the richest in that metal. As to the incineration of the drug, the usual attention is requisite to avoid loss, which can easily result by the sudden evaporation and inflammation of the volatile oil. A low red-heat is sufficient to burn away the organic matter. The cold ash must then be moistened with water, dried in the steam bath and again gently heated. By repeatedly performing this process without using a strong heat, the ash can be at last obtained free from carbon. A very high temperature would, on the contrary, melt the phosphates and thus protect the organic matter. The ash is finally to be moistened with carbonate of ammonium, which restores the full amount of carbonic acid to the carbonate of calcium. Thus,

I. 4·597 air-dried Ceylon Cardamoms yielded 0·743 ash = 16·16 per cent.; and

II. 11·027 air-dried Ceylon Cardamoms yielded 1·525 = 13·88 per cent., or, on an average, = 15·02 per cent.

The drug when exposed for 30 hours to the heat of boiling water loses 10·73 per cent. of moisture; the above number of 15·02, with reference to dried Cardamoms is consequently to be increased in the reverse proportion. The real percentage of ash then amounts to 16·8 (III.) The two estimations I. and II. are rather discrepant, but could scarcely be expected to agree very closely, inasmuch as the drug exhibits great variation in the comparative amount of pericarp and seeds, and the latter yield less ash.

The ash was subsequently moistened with dilute hydrochloric acid and, as soon as the carbonates were decomposed, warmed with the same yet concentrated acid. After the complete evolution of chlorine I added acetate of sodium, in order to replace the hydrochloric by acetic acid. The warmed liquid was now saturated with chlorine gas, and the peroxide of manganese thus separated was collected twelve hours later and weighed, after due calcination, in the form of mangano-manganic oxide or brown oxide, Mn_3O_4, intermediate between protoxide and peroxide. This was performed according to the usual rules of analysis; I ascertained moreover that the portion of the ash insoluble in hydrochloric acid contained no more manganese, and that, on the other hand, the brown oxide of manganese, which the ash had furnished, did not alter red litmus paper.

Of ash, 0·743 as obtained in the above experiment I., afforded 0·0082 manganoso-manganic oxide = 0·0059 of manganese. 100 parts of the ash consequently contain 0·79 of it; that is to say, the dried Cardamoms contain of that metal 0·16 per cent. In a further experiment I incinerated 25 grammes of the same Cardamoms, which would have corresponded to 22·31 of dried, and, according to number III., would have afforded 3·75 ash. I obtained now 0·0515 of the oxide Mn_3O_4 = 0·0468 of manganese. The ash consequently contained 1·28 per cent.; that is to say, the dried drug 0·209 per cent. of the metal. The portion of the ash, which had not been dissolved by hydrochloric acid, yielded still a slight green coloration on platinum wire; but I ascertained that no more peroxide of manganese was to be obtained from it by means of chlorine.

As in the case of the ash, the two experiments do not quite accord, owing, I am inclined to think, to the same reason.

Numerous instances are recorded in chemical literature of plants or their parts affording nearly as much or more manganese as I observed in these Cardamoms. Reichhardt* detected in the ash of cinchona barks from 0·10 to 4·1 per cent. of Mn_3O_4, corresponding to 0·07 to 2·8 of metal. The latter amount was furnished by flat Calisaya bark yielding not more than 1·22 per cent. of ash. This bark itself contained therefore only 0·03 per cent. of manganese.

Calluna vulgaris, Salisb., according to Thielau,† furnishes 3·3 per cent. of ash, from which he obtained 4·77 of

* 'Chemische Bestandtheile der Chinarinden.' Braunschweig, 1855, p. 77.

† Wittstein's 'Vierteljahresschrift für praktische Pharmacie,' iv. (1855) p. 525.

the intermediate oxide = 3·44 of manganese. The plant itself would therefore afford 0·11 per cent. of the metal.

Eriophorum vaginatum, L., yielded when dried 2·8 per cent. of ash, from which Willing* obtained 3·74 per cent. of oxide of manganese. Supposing it was the intermediate oxide, I calculate 2·7 per. cent of the metal; that is to say, 0·075 per cent. of the plant itself. Ramdohr's analysis of *Secale cornutum*† enables me to calculate that its ash contained 2·14 per cent. of metal or 0·06 per cent. with regard to the drug.

Yet the most striking accumulation of manganese ever observed in plants has been pointed out by Gorup-Besanez in *Trapa natans*, L.‡ If we calculate the analysis performed in his laboratory, we find that that plant, as collected in a tank near Nuremberg, contains no less than 1·61 to 1·68 of manganese; the hard pericarp of the fruit only 0·53 per cent. Wittstein's analysis of the ashes of several plants § may be reckoned to afford the following percentages of manganese as contained in the dried plants or their parts, viz., *Usnea barbata* Hoffm., grown on pines 0·05; leaves of *Betula alba*, L., 0·16, wood of the same tree only 0·018. In Wittstein's laboratory the seeds of the beech (Fagus) were proved to be rich in manganese; || the shells contain 0·13, the kernels 0·28 per cent. of it. This has been corroborated by qualitative estimation by Braun** and De Vry.††

Hops, according to Wheeler's researches,‡‡ furnish an illustration of the variability of the amount of manganese in one and the same drug. Among 12 sorts of hops of English, German, and Bohemian origin, he met with that metal only in the English specimen, which contained 0·09 per cent. of the metal. It is in accordance with these results, that I found the *lupulinic glands* (Lupulin) devoid of manganese.

Padina Pavonia, Lamour, is said §§ to contain the astonishing amount of 8 per cent. of manganese, a statement which certainly requires further investigation; the small specimens of that sea-weed in my herbarium yielded me no very sure traces of manganese, when examined on platinum wire. The same must be said with regard to *Padina*, collected for me at La Mortola, near Mentone, on the Mediterranean. In another fine specimen of the same seaweed, kindly sent by Mr. T. B. Groves from Weymouth, South of England, the presence of manganese was more evident. Yet on incineration of from 5 to 10 grammes of it, the amount of that metal proved to be so insignificant, that I altogether failed in estimating it quantitatively. I cannot, therefore, reckon *Padina Pavonia* among the plants rich in manganese.

The ash of another sea-weed, the officinal *Carrageen*, did not at all colour carbonate of sodium in the oxidizing flame.

Some other analyses of ashes, containing manganese, in which the quantities of this metal were estimated, are to be met with in a recent very exhaustive work—Wolff's 'Aschenanalysen,' etc., Berlin, 1871; 4to.

The above numbers will be found sufficient to illustrate my estimation of manganese in cardamoms. This metal has moreover been shown qualitatively to be present in numerous plants, although all these facts do not as yet enable us to trace clearly the part it plays in the vegetable kingdom.

I examined, nevertheless, some other parts of plants by means only of the qualitative test. As to *Cinchona* barks, I can fully confirm the statement that they contain a small amount of manganese, but I was unable to find it in the seeds of several species, or in the isolated liber-fibres, as for instance of *Cinchona boliviana*. *Secale cornutum* furnished a green bead with carbonate of sodium. *Trapa natans*, collected by myself in Switzerland (where it is a very rare plant) corroborated the above statements of Gorup-Besanez; a small fragment of it, which furnishes a microscopic residue of ash, is sufficient to demonstrate brilliantly on platinum wire the presence of manganese.

Pepper, both black and white, *hemp* fruits, *Lycopodium* (the officinal spores), the leaves of *Lobelia inflata* contain manifestly some manganese. *Lichen islandicus* is less evidently provided with it.* *Kamala* of unusual purity is not to be mentioned with certainty among the drugs containing manganese. I was not able to prove its presence in a specimen affording no more than 1.3 per cent. of ash. Commercial kamala is usually contaminated with a large amount of inorganic matter;† to such contamination may be attributed the circumstance that Leube found 0·14 per cent. of manganese in the ash of kamala which he analysed.‡ One of the small capitules or a fragment of the pedicel of *Wormseed* is sufficient to demonstrate the presence of that metal.

Manganese being so widely diffused throughout the vegetable kingdom, it is of some interest also to point out those plants or drugs in which it is wanting, or at least occurs only in quantities so extremely small that the test which I made use of fails in revealing it. The following are examples of this class furnishing no manganese, viz.: *Allspice* (*Fructus Pimentæ*), *Semen Colchici*, *S. Cydoniæ*, *S. Lini*, *S. Psyllii*, *S. Sesami* (both black and white), *S. Sinapis albæ*, and *S. Sinapis nigræ*, *S. Stramonii*. *Tinnivelly Senna* leaves as well as well as *Guaiacum wood* are also free from manganese. Lupulin has already been stated to be so likewise.

It would be desirable to have a full list of drugs stating where manganese is present or not. This investigation will, I hope, be performed by some zealous student of pharmacy; it would form at the same time a valuable contribution to the history of that metal. I need scarcely say, that great care must continually be taken for most perfectly cleaning the platinum before every experiment. This, however, is easily done by shaking off the fusing bead of sodium carbonate and repeating this process till no trace of green is to be observed—not only on the loop but on the entire piece of wire used.

Mr. EKIN (Bath): Is it not probable that the presence and quantity of manganese is much more determined by the strata on which the plants are grown, than by any peculiarity of the natural orders? Professor Church some two or three years ago examined the vegetation of the lias, which contains a quanity of manganese, and he found that the forest trees, the herbage, and, in fact, all the vegetation contained a very appreciable quantity of manganese also. There was not much variation. It seemed to be regulated more by vigour of growth than by natural orders, and this is rather at variance with the views of the author of the paper. He thinks that certain natural orders have greater affinities for taking up this metal than others.

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* Will's 'Jahresbericht der Chemie,' 1865, 636.

† 'Jahresbericht der Pharmacie' of Wiggers, 1857, 7.

‡ 'Annalen der Chemie und Pharmacie' of Liebig, etc., 118 (1861) 223.

§ 'Jahresbericht der Chemie,' 1862, 510.

|| In his 'Vierteljahresschrift,' xiii. (1864) 338.

** 'Zeitschrift für analytische Chemie' of Fresenius, vi. (1867) 73.

†† Pharm. Journ., Jan. 21, (1871), 53.

‡‡ 'Jahresbericht der Chemie' (1865), 636.

§§ In Meyer, 'Agriculturchemie' Heidelberg, (1870), 269.

* With this agrees the fact that in Wittstein's analysis of *Lichen islandicus*, in the 'Jahresbericht der Chemie' (1862), 510, manganese is *not* mentioned among the constituents of its ash.

† See my paper in PHARMACEUTICAL JOURNAL, ix. (1867), 280; the new kind of the drug there figured affords no manganese.

‡ Wittstein's 'Vierteljahresschrift' ix. (1860), 321; also in the Jahresbericht' of Wiggers (1860), 73.

Mr. Hanbury: The suggestion just made is well worthy of attention. The same idea occurred to me. I fully intended to provide Professor Flückiger with specimens of some of these plants grown in England. I will do so, in order that a comparative examination may be made. It seems exceedingly probable that the soil has something to do with the matter. On the other hand, we must observe this striking fact, that here we have cardamoms from Malabar, and grains of paradise from West Africa, and ginger from the West Indies, and they all seem to have picked up manganese somehow. Whether plants raised from seed and grown in an English hothouse would likewise yield the metal, is a point to be looked at.

Mr. Stoddart: I may call to the recollection of those who met me at Liverpool that I mentioned a circumstance corroborating Mr. Ekin's observations. At the top of a hill near Bristol I found the presence of strontium in all the plants by means of a spectroscope. That is far easier than any other method of detecting it. It is, however, an astonishing fact, that you find strontium in the plant when growing on the celestine beds of the new red marls, but not elsewhere.

Mr. T. B. Groves: I believe the same experiments were made on an extensive scale by Dr. Daubeny, of Oxford, but Dr. Flückiger does not appear to be aware of them. He cultivated a considerable quantity of garden, and watered the plants with various saline solutions, and observed whether the saline matter was taken up or not. The occurrence of manganese in plants does not seem to have much importance at the first blush, but perhaps it has something to do with the health of plants, and it has struck me that the occurrence of hop disease might be owing to a deficiency of manganese where the plant is cultivated.

Mr. Sutton: Dr. Daubeny's paper is a very valuable one. It was published in the Transactions of the Chemical Society. I think that if Mr. Hanbury would take the trouble to send Dr. Flückiger a copy of that journal, he would feel very much interested in it, because it bears a great deal upon the matter in question.

The President: I think the suggestions which have been made will prove very valuable every way. I confess that very much the same line of thought occurred to me whilst the paper was being read. Dr. Flückiger, however, does not commit himself to limiting manganese to a certain natural order. He speaks very guardedly throughout. There are certain water plants which he names in connection with the subject as containing manganese. My impression is that, of course, the manganese is derived from the ground, or it could not appear in the plants. But the question is whether certain plants will grow on ground where there is no manganese.

Note on Succus Scapi Taraxaci.

BY MR. HENRY BARTON, BRIGHTON.

Dissatisfied with the variable character of the usual preparations of dandelion, in 1862 I collected some flower stalks with the flower in full bloom, and expressed from them the juice. Gratified with the appearance, taste and effect, the next year the experiment was resumed, rejecting the flowers and crushing only the stalks. Our notes for 1863 may be thus condensed: — From 75 lb. 12 oz. flowering stalks as gathered, 12 lb. 6 oz. flower heads were picked off and rejected; and allowing about $1\frac{1}{2}$ lb. for drying and waste, from the remaining 62 lb. stalks by crushing and pressure were obtained 31 lb. 8 oz. of juice, to which we added 25 per cent. by measure of spirit, and stored in glass bottles; after some weeks it was filtered from the very small deposit, the resulting liquor remaining bright and retaining its characteristic taste.

From that time to this we have operated in much the same way, with the exception that on one occasion we added the spirit to the crushed pulp, and allowed it to remain 24 hours before submitting it to pressure; in the resulting liquor there was no appreciable difference from the former preparation either in odour, taste or colour. Our note for the present year gives similar results: from 237 lb. of the stalks were obtained 123 lb. 4 oz. of the juice, also from 63 lb. flower heads we pressed 24 lb. 3 oz.; this latter we consider inferior and have kept it separate.

The yield would be greater if the plant came in direct from the collectors' hands; as it is, they gather it one day and forward it by carrier the next.

The stalk juice is not so rich in solid constituents as is that from the root; but if I may be permitted to quote Professor Bentley, who, when speaking of the juice from the latter collected in the summer months, remarked that "its value as a medicine most certainly did not depend solely upon the amount of solid constituents it contained, but principally, if not entirely, upon the presence of a bitter principle, which had been termed taraxacine. One of the best evidences therefore of the value of taraxacum and its fitness for medicinal use would be its taste, etc." If then we may be allowed to admit taste as one of the evidences of value, it will certainly be favourable to stalk juice, and judging from the frequent remarks of our friends in the medical profession and others who have taken it, I have reason to believe that, if not the best, it is certainly one of the best, most uniform and readily obtainable preparations of taraxacum, and one that can be kept for almost an indefinite period without changing.

I will only now remark that if required in quantity, there would be little difficulty in meeting the demand; we once gave *carte blanche* to our collectors, the children of a parish some miles hence, and they sent in in three days 1258 lb. How much they would have sent it is difficult to say, as we were compelled from an accident to our press to countermand the order. At first we were at a loss as to the best means of effectively breaking up the stalk, the pestle and mortar process being ineffectual and tedious, but upon trial found a Kent's mincer, set in the direction for cutting coarse, answer admirably, feeding our press as readily and rapidly as could be desired; indeed so well does it bruise and divide succulent roots, leaves, stems, etc., that I can recommend our friends to give it a trial under similar circumstances.

Mr. Deane: I have been in the habit for many years of preparing the juice of the flowers of taraxacum, and it has proved a very useful preparation, and very uniform in character. I have generally succeeded in obtaining the flowers overnight, and working them the next morning, crushing them through rollers. I think Mr. Squire many years ago first drew attention to a preparation of the kind. I think some particulars about it will be found in one of the early volumes of the Transactions of the Pharmaceutical Society. Whether he continues to make it at the present time I do not know. It is tolerably certain that it is not so bitter as the preparation from the root, but it is more uniform. It is by no means made out, however, whether the active principle of taraxacum depends on the bitterness or not.

Mr. Giles: Taraxacum is an article in the Materia Medica which has interested me very much, and certainly we do find a very considerable want of uniformity in the succus taraxaci, which I think arises from the very large latitude given in the Pharmacopœia for collecting it. It says October to March. That covers too large a period. Mr. Deane, with that accuracy of observation which always characterizes every remark he makes, has referred to the greater uniformity of the flowers. The reason appears to me to be that the time is more limited. My experience is that if you take the root in the month of January, you get a much better product, totally different in appearance. The extract which you obtain is much less in quantity. It is almost black, extremely sapid, and very bitter. My observation is that the time for taking the root, in order to get the best medicinal effect, is the month of January.

Mr. Ekin: Mr. Giles's explanation can hardly be the true one, if we remember that dandelion flowers from early spring to late autumn. You have quite as large a range in the flower as in the root.

Mr. Williams: The flower would not vary as much as the root.

Mr. Barton: We have found that the admixture of the flower takes away from the bitterness.

Mr. Ekin: No doubt there would be a succession of flowers during the flowering season, which would be of the same age in point of development at the time of gathering.

Mr. Smith (Edinburgh): In our experience in the cultivation of taraxacum we found a very decided result, owing to the manuring of the ground. Probably the reason for the great discrepancy that occurs in the quality of the ordinary root depends on where it is obtained from and how it is cultivated and attended to. On one occasion we got a most remarkable result. The bitter principle was intense like aloes, and the root was collected immediately after the flowering. The weather happened to be particularly calm, and the whole field was several inches deep with the most lovely snow-white carpet which could be conceived. Our neighbours were so annoyed by the continual escape of the seed that we gave up the cultivation of it. A deal depends on the manuring of the ground, and I believe that if the plant were cultivated, instead of being plucked wild, its character would be much more under our control.

Mr. Umney: A large supply of taraxacum root for the London market is obtained from Cambridgeshire. It is collected wild about the month of November. To obtain it in the month of January would be almost an impossibility, at any rate, on the large scale, for the ground would then be too hard to be turned up on account of frost. I am of opinion that the latter part of the autumn is by far the best time for the expression of the juice. Having expressed juice in the early spring, and compared its flavour, depth of colour, and density, with the autumnal juice, I have always given the preference to the latter, the spring juice always appearing to me to contain more water and less flavour than that of the autumn. I should like to ask Mr. Barton whether he has compared the relative amount of extractive by evaporating the juice.

Mr. Barton said that the density was decidedly less in the flower stalk.

Mr. Carteighe: I should like to ask Mr. Umney what pharmaceutical principle is involved in the conclusion at which he has arrived,—that the density acts in any way as an indication of the quality of taraxacum juice. It is a new theory to me. I was under the impression that juice made from spring taraxacum was far better than that of the autumnal plant. That is my own experience. I have made it several times at different periods of the winter, spring and autumn. I think with Professor Bentley, that the spring juice is the better. The principle is that the value of taraxacum is due to its bitter principle. If Mr. Umney knows of any other quality which modifies that, I shall be glad to hear of it.

Mr. Umney: As we know of no definite principle that can be isolated, we must rely upon the taste. Colour, flavour, and density I have always looked upon as indicating quality. The specific gravity is less in April than in December, and I also think that the flavour of the juice expressed in November is far superior to that which is expressed in April, notwithstanding what Professor Bentley says on the subject. We have no means of estimating the active principle in taraxacum; I presume, therefore, that taste is the only test upon which we can rely.

Mr. Barton: In consequence of the difficulty of obtaining the root in the spring, I always found it better to use the flower stalks.

Pill Coating.

BY T. HAFFENDEN.

Many expedients have been tried and suggested for coating pills. The first requisite, of course, is a perfectly round, dry, hard pill, that will not run, and then to secure a coating, tasteless, elegant in appearance, insoluble for a moment or two in the mouth, and yet sufficiently soluble to allow the active ingredients of the pill to commence operations as soon as it reaches its post of duty.

Gilding and silvering are very common and useful modes of disguise, the great objection is that if kept any time, they are so liable to tarnish, besides, there is a strong and, I must own, well-founded objection by many to a pill which inwardly or outwardly has any metallic ingredient in its composition.

There is a mode of coating recommended by some, viz., sticking the pill on the point of a needle, dipping in a solution of gelatine or isinglass, and sticking the other end of a needle into a pad, for the pill to drain and dry. I have never tried this process myself; even if successful, which is possible, it involved too much time and finessing for ordinary purposes.

I frequently use myself the solution composed of

Balsam of Tolu	1 part.
Sulphuric Ether	4 parts.
M.	

and am very successful in getting a tasteless varnish or coating, which disguises the taste perfectly, but, I find sometimes the dark natural colour of the pill as seen through the varnish, is objected to; this, to some extent I have obviated by rolling the pills before the varnish is dry in powdered French chalk. I find after a few times, to acquire the necessary manipulative dexterity, I can get a good-looking covering on "the pill." One note here: the tolu used for the solution, and which seems to answer best, is that which has been used in preparing syrup of tolu, so that I use what I formerly threw away, and the methylated ether answers very well for the purpose, reducing the cost of materials to a mere fraction.

Many chemists used to get their pills coated with sugar in the same way as sugar plums, by wholesale confectioners; I believe confectioners now decline to do it; at all events the old and respectable firm with which I do business, though most obliging on all other points, totally decline helping me here.

Another method I have fairly succeeded with, has been to mix powdered tragacanth, precipitated chalk, and powdered French chalk together, damp the surface of the pills, get them nicely-coated with the powders, transfer them to a hair sieve, and agitate them over the steam of boiling water; I find the steam sets the gum tragacanth, and forms a nice coating which fulfils my requisites of pearly appearance, tastelessness, sufficient insolubility, and is besides not brittle, liable to chip off. It requires to be done with great care, otherwise in drying the coating cracks away and is unserviceable. I have turned out a nice sample of pills coated in this way after being previously varnished and made waterproof with the tolu solution. I have tried unsuccessfully to introduce plaster of Paris into the composition of the coating, but, owing to its greediness and great fondness for water, have not been successful.

I am now turning my attention to the use of yolk of egg, to brush the pills over with, and then roll them in

French chalk, or powdered starch and French chalk mixed. I also fancy something may be done with glue made liquid, after the French fashion, with nitric acid, and some combination of powders.

Of course, the powders used could, with cochineal, saffron, etc., be variously coloured if wished, according to the taste of patient or dispenser.

The Writer added that since preparing the paper he had spoken to a medical friend who objected to tragacanth, on the ground that it would be insoluble in the stomach. His own opinion was that, even if that body were insoluble, the coating of the pill would crack in the stomach and allow the pill to act.

The President remarked that coated pills were much more in vogue on the other side of the Atlantic than here. He would ask the two American gentlemen what they had to say on the subject of the paper.

Professor Wayne: Sugar-coated pills in the last few years have become quite an institution of America. In fact, no drug shop is without them. We not only coat them when made from prescriptions, but a whole list is kept constantly at hand ready coated, and we buy them from the wholesale manufacturers. We have found very little objection to these pills, because of the improved process by which we manufacture them, and the low temperature that is used in the sugar-coating. They are perfectly soluble, and answer all the purposes of pills. In extemporaneous sugar-coating our method is to make the pill as dry and hard as possible, coat it with a solution of tolu, and then cover it with a powder containing equal parts of milk-sugar and ordinary sugar, and dry it. It is perfectly protected by the tolu, and has a complete coating of sugar. It has not the pearly appearance which a machine-made pill has, but it answers every purpose; the coating serving to disguise the pill and make it pleasant to take. We have a small apparatus for extemporaneous coating of pills. It has a revolving cylinder and a spirit lamp. The pills are rotated in the machine, and in a very short time a perfect coating is produced. But by far the larger portion of the sugar-coated pills are manufactured by the manufacturing pharmacists, and sold at the dispensaries, and prescribed by our physicians.

Mr. Andrews: As a pill-taker, unfortunately, as well as a pill-maker, I should very much prefer a thin coating either of silver or of gold to *Creta præcipitata*, or French chalk, or plaster of Paris. With respect to the American plan, that appears to me perfectly simple and easy to carry out, and entirely unobjectionable, but the practice of buying pills from wholesale houses, I think, would never suit the English pharmaceutist.

The President: When I was in Philadelphia a year ago I was allowed, by the courtesy of Mr. Wiegand, to see the whole manufacture of sugar-coated pills by the large firm of Burke and Trinshow. I think it was quite by an extension of courtesy that I was allowed to see it. But although I had the very strongest objection to buying pills from wholesale manufacturers on a large scale, I certainly cannot bear too high a testimony to the excessive care in that establishment, and I would as soon take a pill out of their place as one I made myself. The enormous scale on which this thing is done in America surprised me more than anything else in connection with American pharmacy.

Professor Markoe: I only want to say a word with regard to the positive objection in America to the introduction of anything of a mineral or inorganic character in the pill coatings. If any manufacturing pharmacist were once detected in that practice, and it were exposed, it would be pretty sure to kill the sale of his preparations. I may mention that I have seen a sugar-coated sulphate of quinine pill broken after two years, and the interior of the pill-mass has been quite soft. The coating used in that case was inspissated honey.

Mr. Atkins: There could be no more appropriate place for the discussion of pill-coating than Brighton, where it is successfully carried out. There is no great difficulty, I imagine, in coating pills in large quantities. If you have to make a large quantity at a time, processes are pretty well known and practised for the purpose. What we want to ascertain is a good method of extemporizing a coating or rapidly coating pills. I believe that pharmacists will say that the tendency is growing for coating; and if any one present is able to contribute to us any method by which we can rapidly and successfully coat a box of pills, he will confer a very great boon. That I think is a yet undiscovered boon.

Mr. Bottle (Dover) asked why their Transatlantic friends used milk as well as cane sugar.

Professor Wayne said that he had found by experience that the mixture of two gave a much more uniform coating than simply cane sugar.

The Tinctures and Wines of the British Pharmacopœia.

BY W. W. STODDART AND R. L. TUCKER.

The solutions which we call by the doubtful appellation of "tinctures" form no insignificant item in the stock of a pharmaceutist. They have repeatedly been the subject of comment, and an apology is probably necessary for bringing them forward in the present paper. Why are they introduced into our Materia Medica? Is it because they are used by the physician as mere flavouring or preservative ingredients in their prescriptions? Or is it because they are really valuable and true solutions of the active principles of plants, and having specific powers as medicinal agents? We think the latter to be the case, and have tried to find out the most exhaustive method of preparation, and for the elimination of a product similar in all respects to that of the recognized Pharmacopœia.

The following notes are the results of an extensive series of analyses and experiments made for the attainment of this object.

Some prefer the old process of maceration, others the more recent one of percolation, while the compilers of the present Pharmacopœia generally recommend a quasi combination of both.

At our first meeting at Bath, a very interesting paper was read by Mr. Savage on some of the tinctures of the last edition of the Pharmacopœia, and a table of results appended. His plan of examination seemed good in many respects, and we have taken it as our guide in compiling a complete epitome of the tinctures and wines, each of which has, with few exceptions, been prepared in three ways for the purpose of comparison, viz.:—

1. By the maceration (marked in the table M).
2. By the Pharmacopœia formula (marked P).
3. By the same, as modified by the authors (marked S).

They have all been made with the greatest and most scrupulous care, and the sp. grav. of the spirit or wine ascertained and adjusted before being used.

There are 65 tinctures and 10 wines ordered in the Pharmacopœia; of these, 10 are simple solutions, 24 are prepared by maceration, and 40 by a combination of maceration, and so-called percolation. Our table gives the results of an examination of all, except 26, which have no relation to the methods in question, and is arranged in columns in the following manner:—

1. The method of preparation employed.
2. The weight per ounce of ingredients ordered.
3. The sp. grav. of solvent.
4. Ths sp. grav. of the resulting tincture.
5. The total contents, per ounce, of the tincture.
6. The percentage of ingredients dissolved.

Preparation by maceration.—This is the oldest process, and consists in bruising or coarsely powdering certain roots, barks, seeds, etc., and placing them in spirit or other menstruum for a specified time. After the time for maceration has elapsed, the fluid is strained off, and the remainder submitted to the action of a powerful press. Filtration completes the process.

Many persons still strongly advocate maceration, because it gives tolerably uniform results which they cannot so easily obtain by other means. The objections are the length of time required, the great waste from evaporation, and from the marc left in the press being still rich in active principles. It is in our opinion the last method that ought to be adopted by the careful and economically inclined pharmacist for the perfect extraction of the soluble matters of any herb or plant. There have been many suggestions for improving the process and saving the time, such, for instance, as that recommended by Dr. Burton, where the ingredients were suspended in the upper part of the solvent. The spirit, as it becomes saturated, and therefore of greater density, falls to the bottom of the vessel, its place being taken by more spirit, to be in its turn saturated and deposited. By this means exhaustion is attained with considerable rapidity, and saving more than half the time.

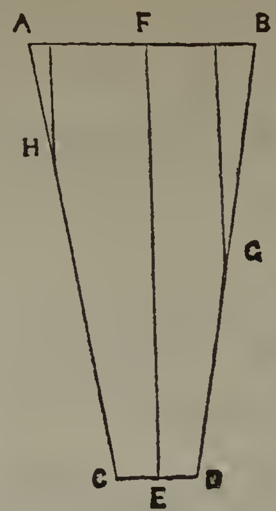
Preparation by percolation.—This method is comparatively a recent one, and was introduced some years ago, and strongly recommended by our friend Mr. Deane. When properly conducted, there is no doubt that percolation is of all methods the most perfect, and accompanied by the least waste. The resulting tincture is ready for use, quite bright, and independent of the press and filtering paper.

Probably why percolation is not more generally in use is on account of the difficulty attendant on "packing." A satisfactory percolation can only be performed by an absolutely perfect and uniform arrangement of the ingredients, and which is often an impossibility. It is imperative that the spirit should pass through equally and horizontally, or else one portion would permeate much faster than another. Each layer of the solvent as it passes downwards should be *displaced* by a fresh one, but a *mixture* of the two should not be allowed, which would entirely alter the *modus operandi* of the whole process.

Tincture making is generally placed in the hands of the apprentice or junior assistant, and of course a want of experience only makes matters still worse. The consequence is, that the proprietor of the establishment is startled at the thin bodied laudanum, the washy tincture of gentian, or the tasteless Vin. Ipecac.

It is surprising how constantly the meaning of the word percolation is misunderstood. It is so in the Pharmacopœia itself; for instance, in the directions for making Tinct. Chiratæ, Capsici, Colchici, Conii, Gentianæ, etc., what is there by inference termed percolation is not percolation but simply washing, and a large waste of spirit unnecessarily entailed. To obviate this waste is the object of our experiments, and of the process which we now recommend, the adoption of which an experience of twenty years will fully justify. There are two essentials for success in the operation, namely, the *proper form of percolator;* and secondly (strange as it may seem), *no direct packing.*

The form of percolator.—These are sold of every possible variety, according to the fancy of the manufacturer, but all are referable to two kinds, cylindrical and conical. Repeated trials have proved that the perfect cylinder is the only one on which dependence can be placed. A little reflection will at once point out the error of recommending the conical form. The well-known laws of hydrodynamics show that the pressure of a column of fluid on the bottom of a containing vessel is invariably equal to the weight pressing on the area of the base. It will, therefore, be evident that a percolator, having the form of an inverted cone, must have an unequal pressure from the contained fluid, and, as a consequence, the materials being exposed to an unequal pressure, must be unequally exhausted. The fluid will pass most rapidly through those parts where the force from behind is the greatest.



The diagram represents the form of percolator, ABCD, prepared by Mr. Deane (PHARM. JOURN. 5.533) having the sides inclined to the base line at an angle of 82°. If the vertical height be 24 inches, a column of water at EF would exert a pressure on the base CD, equal to 12·384 ounces for every square inch. But at the point G the pressure would be only 6·192 ounces, and at H only 3·096 ounces, or one-fourth of the whole.

Lateral pressure also causes a diagonal current in the direction of the central column, and exercises a considerable mixing force, which is of the greatest consequence when water is employed to displace spirit. Instead of true displacement, a combination of the two fluids will take place, and very much heighten the sp. grav. of the tincture.

Professor Redwood alluded to this fact when he said, "The conical form is most used, because the liquid aggregates towards the middle of the column, so that near the bottom more liquid runs than at the side * * * *spirit not to be driven out with water because it mixes.*"

Our experiments, as detailed in the accompanying table prove, we think, that the Professor's warning may be rendered unnecessary. We also differ from the opinion of Dr. Burton (PHARM. JOURN. 5, 1845,) when he affirmed that percolation is more expensive, more difficult, and less generally applicable than maceration. Our investigations and general practice prove just the contrary, and show that, with the exception of Tinct. Limonis (when fresh peel is ordered), percolation is by far the best and most economical method of preparing the tinctures and wines.

The most satisfactory work was done when the percolator had a diameter about one-fourth the length, and when the ingredients occupied one-fourth the interior.

Spontaneous packing.—As we before mentioned, any one who has worked much in the tincture department must be aware of the almost total impossibility of so regularly placing the ingredients with the requisite uniformity. The method which we venture to recommend is to allow the ingredients *to pack themselves,* and we think that so great a simplicity and completeness are attained that the veriest tyro may be entrusted with the operation without the risk of failure. Our mode of procedure is to powder the ingredients and pass them through a sieve having from 20 to 30 apertures to the inch, and put into the *whole of the spirit* and macerate for 48 hours, with occasional agitation. At the expiration of the time, the supernatant spirit is poured off, the dregs stirred up and poured into the cylindrical percolator, and allowed to drop until the liquid passes away clear and bright. It is then placed in the receiver, and all the spirit gradually poured on and allowed to percolate in the usual way. When all has passed through, an equivalent proportion of water is carefully poured on the residue to displace the spirit absorbed. If properly conducted, the water will not mix with the spirit, but by its gravitating force, will drive it forward. The process thus proceeds with great uniformity, and the materials are perfectly exhausted. No waste is incurred, and the tincture is made with a rapidity equal to the method of Dr. Burton, identical with that of the Pharmacopœia, and without the necessity of using the extra quantity of spirit or the aid of pressure. We give two examples to explain more clearly our made of proceedure, one where there is an excess of the material to the spirit, and another where the quantity of spirit is greatly in excess of the materials. To exemplify the first we would instance Tinct. Zingib. fort.

Four pounds of ginger are stirred up with one gallon of rectified spirit and left for 48 hours. The supernatant spirit is put aside, and the deposit poured into the percolator. As soon as the tincture passes through bright, which it does in the course of three or four minutes, the percolator is placed in the stand, and allowed to stay till all the spirit has been poured on. In this case 88 ounces will have passed through, while 72 will have been absorbed by the ginger. A considerable quantity of water is then gently poured on the top of the ginger, and allowed to displace the spirit till the gallon of tincture is obtained. If only a few drops more are allowed to go through, the resin will be deposited, showing that the water has made its appearance.

For the second instance let us take Tinct. Colchici sem. Two and a half pounds of the powdered seeds are mixed with two gallons of proof spirit and allowed to macerate for 48 hours. The supernatant liquid is then poured off, and the dregs placed in the percolator as before described, and the spirit displaced by water. With this quantity 32 ounces will have been absorbed by the seeds.

It will thus be seen that we dispense with the use of the press or the extra quantity of spirit by allowing the ingredients to settle spontaneously, or, in other words, to *pack themselves.*

To show you that such is the case, Mr. Tucker and I have made nearly all the tinctures and wines of the Pharmacopœia, and drawn up the following table of results. The only ones omitted are the following 26, because they have no relation to the point at issue.

Tinct. Aloes	Tinct. Kino
,, Assafœtida	,, Limonis
,, Benz. Co.	,, Myrrhæ
,, Camph. Co.	,, Opii Am.
,, Cannab. Ind.	,, Quiniæ
,, Cantharid.	,, Tolut.
,, Castorei	Vin. Aloes
,, Chlorof. Co.	,, Antim.
,, Cocci	,, Aurant.
,, Ferri Acet.	,, Ferri
,, Ferri perchlor.	,, Ferri Citrat.
,, Guaiaci Am.	,, Opii
,, Iodi	,, Quiniæ.

All the experiments were conducted in the following manner:—The sp. grav. were taken by the ordinary bottle, or by Regnault's modification, or by Mohr's hydrostatic balance. The evaporation was first conducted in a Griffin's hot-air bath at a temperature which never exceeded 212° F. till a soft extract was obtained. The capsule was then removed and placed on an air-pump over sulphuric acid, and dried *in vacuo* till no further loss was sustained, and instantly weighed by an Ortling balance. This method was thought preferable to that employed by Mr. Savage on a sand bath, or that recommended by Dr. Burton, which was at the temperature of 230° in an American oven. For, in many instances, it was found that partial decomposition was produced before complete desiccation.

To measure the tincture for evaporation a cylindrical narrow measure was first used, but the measurement was not found to be sufficiently accurate for comparison where the difference was small. A narrow glass tube graduated into $\frac{1}{50}$ cubic inch was substituted, and found to give a satisfactory and uniform result.

Before commencing, the sp. grav. of the proof and rectified spirits were carefully adjusted to 920° and 838°. The ingredients were weighed and sifted. The proper quantity for half a pint of each tincture was taken and placed in a stoppered bottle with the proof, rectified or ammoniated spirit, as the case may be. One lot was allowed to macerate for seven days and the other for 48 hours, preparatory to percolation. When the tinctures were finished the sp. grav. were taken, and a fluid ounce evaporated.

No.	Name.	Method.	Grs. per oz. of ingred. used.	Sp. grav. of solvent.	Sp. grav. of Tinct.	Total contents per oz. in grains.	Per cent. of ingred. dissolved.
1	Tinct. Aconiti	M	54·68	·838	·8480	6·30	11·5
2	,, ,,	P	54·68	·838	·8619	7·22	13·2
3	,, ,,	S	54·68	·838	·8620	7·26	13·2
4	,, Arnicæ	M	21·87	·838	·8160	3·80	17·3
5	,, ,,	P	21·87	·838	·8557	4·61	21·0
6	,, ,,	S	21·87	·838	·8560	4·84	22·1
7	,, Aurantii	M	43·75	·920	·9380	14·50	33·1
8	,, ,,	S	43·75	·920	·9410	17·00	38·8
9	,, Belladonnæ	M	21·87	·920	·9300	6·62	30·2
10	,, ,,	P	21·87	·920	·9285	6 29	28·7
11	,, ,,	S	21·87	·920	·9290	5·65	25·8
12	,, Buchu	M	54·68	·920	·9320	10·39	19·0
13	,, ,,	P	54·68	·920	·9323	10·50	19·2
14	,, ,,	S	54·68	·920	·9340	10·53	19·2
15	,, Calumbæ	M	54·68	·920	·9320	7·08	12·9
16	,, ,,	P	54·68	·920	·9389	8·10	14·8
17	,, ,,	S	54·68	·920	·9390	8·13	14·8
18	,, Capsici	M	16·40	·838	·8428	6·31	38·4
19	,, ,,	P	16·40	·838	·8429	6·32	38·5
20	,, ,,	S	16·40	·838	·8431	6·56	40·0
21	,, Card. Co.	M	68·62	·920	·9552	30·40	44·3
22	,, ,,	P	68·62	·920	·9550	29·11	42 4
23	,, ,,	S	68·62	·920	·9530	28·54	41·6
24	,, Cascarillæ	M	54·68	·920	·9277	8·33	15·2
25	,, ,,	P	54·68	·920	·9298	10·75	19·6
26	,, ,,	S	54·68	·920	·9305	10·87	19·9
27	,, Catechu	M	76·56	·920	·9649	43·52	56·8
28	,, ,,	S	76·56	·920	·9700	43·98	61·3
29	,, Chiratæ	M	54·68	·920	·9274	4·84	8·8
30	,, ,,	P	54·68	·920	·9278	5·83	10·6
31	,, ,,	S	54·68	·920	·9280	5.99	10·9
32	,, Cinch. Co.	M	81·00	·920	·9402	20 99	25·9
33	,, ,,	P	81·00	·920	·9414	21·19	26·1
34	,, ,,	S	81·00	·920	·9423	21.20	26·1
35	,, Cinch. flav.	M	87·50	·920	·9383	16·13	18·2
36	,, ,,	P	87·50	·920	·9387	16·19	18·5
37	,, ,,	S	87·50	·920	·9441	16·18	18 2
38	,, Cinnam.	M	54·68	·920	·9306	8·93	16·6
39	,, ,,	P	54·68	·920	·9307	8·99	16·4
40	,, ,,	S	54·68	·920	·9308	8·96	16·4
41	,, Colch. Sem.	M	54·68	·920	·9263	5 11	9·3
42	,, ,,	P	54·68	·920	·9284	5·34	9·7
43	,, ,,	S	54·68	·920	·9305	5·36	9·8
44	,, Conii	M	54·68	·920	·9260	5 63	10·3
45	,, ,,	P	54·68	·920	·9280	6·33	11.0
46	,, ,,	S	54·68	·920	·9285	6·45	11·8
47	,, Croci	M	21·87	·920	·9259	10·99	50·2
48	,, ,,	P	21·87	·920	·9281	15·08	68·9
49	,, ,,	S	21·87	·920	·9312	18·47	84·4
50	,, Cubebæ	M	54·68	·838	·8148	10·10	18·5
51	,, ,,	P	54·68	·838	·8451	10·54	19·2
52	,, ,,	S	54·68	·838	·8460	10·65	19·4
53	,, Digitalis	M	54·68	·920	·9375	8·98	16·4
54	,, ,,	P	54·68	·920	·9372	8·42	15·4
55	,, ,,	S	54·68	·920	·9389	8·36	15·2
56	,, Ergotæ	M	109·37	·920	·9367	16·44	15·0
57	,, ,,	P	109·37	·920	·9366	16·27	14·9
58	,, ,,	S	109·37	·920	·9366	16·89	15·4
59	,, Gallæ	M	54·68	·920	·9658	41·74	76·3
60	,, ,,	P	54·68	·920	·9632	36·13	66·0
61	,, ,,	S	54·68	·920	·9605	35·93	65·6
62	,, Gent. Co.	M	60·15	·920	·9430	23·70	39·4
63	,, ,,	P	60·15	·920	·9436	25·79	42·8
64	,, ,,	S	60·15	·920	·9438	25·85	42·9
65	,, Hyoscy.	M	54·68	·920	·9290	15·30	27·9
66	,, ,,	P	54·68	·920	·9320	24·61	45·0
67	,, ,,	S	54·68	·920	·9323	24·97	45·6
68	,, Jalapæ	M	54·68	·920	·9323	18·20	33·2
69	,, ,,	P	54·68	·920	·9324	18·21	33·3
70	,, ,,	S	54·68	·920	·9382	18·24	33·3
71	,, Kramer.	M	54·68	·920	·9340	17·56	32·1
72	,, ,,	P	54·68	·920	·9371	17·88	32·6
73	,, ,,	S	54·68	·920	·9393	17·96	32·8
74	,, Lavand. Co.	M	15·00	·838	·8395	6·57	43·8
75	,, ,,	S	15·00	·838	·8415	6 38	42·5
76	,, Lobeliæ	M	54·68	·920	·9286	12·16	22·2
77	,, ,,	P	54·68	·920	·9325	13·31	24·3
78	,, ,,	S	54·68	·920	·9333	13·40	24·5
79	,, Lobel. Æth.	M	54·68	·809	·8270	7 06	12·9
80	,, ,,	S	54·68	·809	·8278	8·43	15·4
81	,, Lupuli	M	54·68	·920	·9320	12·94	23·6
82	,, ,,	P	54·68	·920	·9320	13·71	25·0
83	,, ,,	S	54·68	·920	·9295	13·72	25·0
84	,, Nuc. Vom.	M	43·75	·838	·8390	6·00	13·7
85	,, ,,	P	43·75	·838	·8391	6·45	14·7
86	,, ,,	S	43·75	·838	·8452	6·49	14·8
87	,, Opii	M	32·81	·920	·9323	20·36	62·0
88	,, ,,	S	32·81	·920	·9325	20·90	63·6
89	,, Pyrethri	M	87·50	·838	·8391	4·60	5·2

No.	Name.	Method.	Grs. per oz. of ingred. used.	Sp. grav. of solvent.	Sp. grav. of Tinct.	Total contents per oz. in grains.	Per cent. of ingred. dissolved.
90	Tinct. Pyrethri	P	87·50	·838	·8416	4·77	5·4
91	,, ,,	S	87·50	·838	·8420	4·78	5·4
92	,, Quassiæ	M	16·40	·920	·9276	1·06	6·5
93	,, ,,	S	16·40	·920	·9277	1·07	6·5
94	,, Rhei	M	60·15	·920	·9390	26·33	43·7
95	,, ,,	P	60·15	·920	·9392	28·86	47·9
96	,, ,,	S	60·15	·920	·9386	29·01	48·2
97	,, Sabinæ	M	54·68	·920	·9890	12·94	23·6
98	,, ,,	P	54·68	·920	·9891	12·81	23·4
99	,, ,,	S	54·68	·920	·9896	12·87	23·5
100	,, Scillæ	M	54·68	·920	·9516	43·02	78·6
101	,, ,,	P	54·68	·920	·9571	48·72	89·1
102	,, ,,	S	54·68	·920	·9680	48·80	89·2
103	,, Senegæ	M	54·68	·920	·9351	18·05	33·0
104	,, ,,	P	54·68	·920	·9353	18·28	33·3
105	,, ,,	S	54·68	·920	·9356	18·26	33·3
106	,, Sennæ	M	120·31	·920	·9616	41·47	34·4
107	,, ,,	P	120·31	·920	·9603	40·41	33·5
108	,, ,,	S	120·31	·920	·9670	40·65	33·7
109	,, Serpent.	M	54·68	·920	·9233	6·00	10·9
110	,, ,,	P	54·68	·920	·9239	6·57	12·0
111	,, ,,	S	54·68	·920	·9241	6·57	12·0
112	,, Stramonii	M	54·68	·920	·9317	2·86	5·0
113	,, ,,	P	54·68	·920	·9318	2·89	5·1
114	,, ,,	S	54·68	·920	·9318	2·89	5·1
115	,, Sambul	M	54·68	·920	·9246	16·25	29·7
116	,, ,,	P	54·68	·920	·9248	16·48	30·1
117	,, ,,	S	54·68	·920	·9243	15·70	28·7
118	,, Valerian	M	54·68	·920	·9205	5·1	9·3
119	,, ,,	P	54·68	·920	·9215	6·1	11·1
120	,, ,,	S	54·68	·920	·9250	6·3	11·5
121	,, Valer. Co.	M	54·68	·870	·9000	5·03	9·1
122	,, ,,	S	54·68	·870	·9064	6·16	11·2
123	,, Verat. Virid.	M	87·50	·838	·8524	11·56	13·3
124	,, ,,	P	87·50	·838	·8527	12·72	14·5
125	,, ,,	S	87·50	·838	·8624	13·9	15·8
126	,, Zingiber.	M	54·68	·838	·8425	2·17	3·9
127	,, ,,	P	54·68	·838	·8426	2·18	3·9
128	,, ,,	S	54·68	·838	·8428	2·21	4·0
129	,, Zingib. fort.	P	218·75	·838	·8530	9·09	4·1
130	,, ,,	S	218·75	·838	·8533	9·14	4·1
131	Vin. Colchici	M	87·50	·988	1·0033	*38·04	24·1
132	,, ,,	S	87·50	·988	1·0050	39·10	25·3
133	,, Ipecac.	M	21·87	·988	·9946	26·16	42·1
134	,, ,,	S	21·87	·988	·9970	26·95	45·7
135	,, Rhei	M	35·81	·988	1·0176	38.62	60·5
136	,, ,,	S	35·81	·988	1·0212	41·65	68·9
137	,, Xericum			·988		16·95	

Mr. Haselden: I have listened with attention and great satisfaction to this paper. I admire very much Mr. Stoddart's patience and ingenuity in carrying out this matter. At the same time it is gratifying to me to hear what he has said, because I have myself come to the same conclusion that the cylindrical is the best form for percolators. You will perhaps remember that in 1864, soon after the appearance of the first British Pharmacopœia, I exhibited at Bloomsbury Square an apparatus which I had had made in order to carry out the Pharmacopœia process of maceration and percolation; and this percolator and macerator was cylindrical. The only objection made to it at the time was that it was rather large (holding four gallons) and that it was expensive. The percolator has rests inside it for fixing a diaphragm about one sixth of its length from the bottom. When the ingredients are large in quantity I use the diaphragm and allow the liquor to pass through, having liquid above and below the ingredients. When I do not think proper to use the diaphragm there, the quantity being small, I have a perforated plate, which covers over the opening of the percolator, which opening is connected with a tap, so that I can turn off or on at will. In using this vessel there is no necessity for another vessel in which to macerate the ingredients with the spirit first of all, and certainly there is no waste in transferring from one vessel to another. I put the ingredients in as Mr. Stoddart directs, and pour upon them the quantity of spirit. I allow them to macerate until all the material is well acted on by the spirit. I then well stir it up, and allow it to settle and pack itself down just as Mr. Stoddart has described. After a certain number of hours (say 24) I turn on the tap very gently and allow the percolation to commence. In that way I always get satisfactory preparations. Towards the end of the process (perhaps this may be superfluous) before I displace the spirit that remains, I take the precaution to press the ingredients to pack them down more. My cylinder is large enough to admit a couple of 28 lb. weights. I cover the ingredients with a metal plate, place one weight on the top of it. After a certain time I increase the pressure by putting another weight; and when I find that I can get no more droppings by means of these weights I remove them, and place over the top a thin piece of blotting-paper which prevents certainly any immediate mixture of water and spirit; and upon that I pour the water. I have seldom failed, I believe, to get a satisfactory preparation. There is another precaution which I take, when pressure and not displacement finishes the process, and which I mentioned on a former occasion. It was published in the Pharmaceutical Journal; but things are forgotten, and, though I am sorry to intrude myself upon you, I find that it is only by doing so again and again that it is remembered that the same thing has been told previously. The other precaution which I take in order to get all I possibly can out of the ingredients, and with as little waste as possible, is this: the Pharmacopœia permits and directs you to add sufficient of the menstruum after pressing to make up the quantity originally ordered. Instead of doing that, after the work is finished I pass the proper quantity through before pressing. I can tell pretty well from notes and experience how much will be lost in preparing one or two gallons, or even a quart. Thus, if there is anything left in the marc I have an extra chance of getting it out if I add at once the supposed loss. I think that is a little improvement. There are several tinctures in the Pharmacopœia which require particular manipulation. I am not going into all the particulars to-day. I may mention tincture of senna, for instance, with raisins in it; and compound tincture of cardamoms. Tincture of orange-peel also. This requires a little management to get not only a satisfactory preparation, but one which is not wasteful; because in the ordinary way the orange-peel absorbs a great quantity of the menstruum, and there is a difficulty in getting it out. However, I have a paper in hand upon tincture of orange-peel, and embracing the question whether it is prepared better from fresh peel or dried.

Mr. Savage: The percolator mentioned by Mr. Haselden has its objections. It is a metal percolator, and metal has an effect upon the tinctures, sometimes turning them much darker. I suggested some time ago a percolator whereby you might attain all the objects that you desired, and most effectually in any small quantity. It was one of Loysell's percolators by which ordinary coffee is made. It is a decided improvement compared with anything we have. A tube runs down the centre, and about two inches from the bottom is a double diaphragm. Betwixt the diaphragms you put your ingredients. A funnel is screwed on the top. The menstruum passes through the ingredients, and then repasses again, so that the substance is always surrounded with the menstruum. Thus you get a capital result with very little trouble. With respect to the observations of Mr. Stoddart, there is one thing which cannot be too strongly impressed on my brother pharmacists; that is, with reference to the measures. You will find that in dispensing and ordinary selling in small quantities, by having the two

* These determinations include the total contents per ounce of the wine.

dram measures cylindrical, you will save a great deal in the course of the year.

Mr. Giles: Mr. Stoddart has referred to the preparation of the tincture of ginger. I have been troubled with the puffing which takes place in the marc when you place on the water. I have always been obliged to put on a certain amount of water which displaces the spirit, and then it forms a muck, and this I have to take off with a spoon, then putting on more spirit.

Professor Markoe: The remarks made by the last speaker express the American idea. That is the practice we have been following a long time. Percolation alone is practised in the United States. We consider that maceration is a thing of the past, and that percolation is the process for every drug. Of course with tincture of tolu and resin guaiacum, and so forth, maceration is used, but for everything else percolation. We insist in every case on having a perfectly uniform powder, be it coarse or fine. We take the position that the mixture of a fine powder with ligneous particles is entirely wrong. We consider that to turn back a portion of the tincture into the percolator is exceedingly bad practice, and we make it a practice that the first drops shall be as clear as the last. We always carry the percolation to exhaustion. We employ fine powders sifted through a sieve of 20 meshes to the inch, and never use the English method of saturating the drug with the menstruum. Suppose we are working with a pound of the drug, we moisten that in the hand with about one-fourth of the menstruum. This will give a damp powder that will slightly cohere, but will never become pasty. A pasty mass will never properly pack; cylindrical percolators we think the best, but there are many cases in which the conical percolation is used because of certain advantages. For instance, in making fluid extract of gentian which is liable to swell, it would be totally impossible to percolate through a cylinder. If we use a conical percolator, as the substance swells, the slanting sides of the funnel allow it to relieve itself, and it is not a difficult matter to percolate gentian with a powder as fine as 50 or 60 meshes to the inch. Percolation has been carried in the United States to a degree of refinement that is scarcely known in Great Britain, for the reason that the most popular class of preparations are those known as the fluid extracts; these liquids being made of such a strength that each minim shall represent the soluble active principle of one grain of the drug, and one wine ounce shall represent one troy ounce of the drug. As many drugs are injured by heat, our aim is to avoid subsequent evaporation. We consider it poor work on the part of a pharmacist if, taking 16 ounces, we are not able to practically exhaust it by the time we have got three wine pints of the menstruum. We use the finest powders we can get. The tendency has been to use a menstruum as strongly alcoholic as possible, and to push through whatever remains of the drug. Merely to make up the measure with water, displacing all the contained menstruum is very easily done. When the percolation is done, you just scrape off the pulpy mass. The moment the water is added, it swells up into a mucilaginous mass, and after a little time the percolation stops. It is the practice of several large manufacturers who work on a large scale to go on percolating and exhausting with alcohol, trusting to the use of pressing to press out as much of the menstruum as possible, and keeping it to be used next time the preparation is made. Then, in order to recover what alcohol remains after pressure, the mass is thrown into a large steam-still, mixed with plenty of water, and the alcohol recovered that way.

Professor Wayne: I have very large percolations to make, and it is very necessary to obtain all the alcohol that has been used in percolation. By the use of water you obtain very readily a mucilaginous mass which it is very difficult to percolate, and which gives you an immense amount of trouble. My method is to use an alcoholic menstruum until my substance is completely exhausted. I afterwards distil the magma, using the alcohol in the next percolation of the same substance. I find by that means great economy of time. It requires a very long time if water is used; and long before the point has arrived the root becomes mucilaginous, and water will no longer pass through it; or in warm weather fermentation will set up and acetic acid be formed.

Mr. Umney: Mr. Stoddart remarked in his paper that the contact of the water when put upon the marc to displace the alcohol was merely skin deep. This is contrary to my experience. Let it be required for instance to recover alcohol of 56 over proof (·838) from a marc by displacement with water. It will be found upon examining the products after rectification that the strength will range from 56 to 40 or 20 over proof, to considerably under proof (·920), therefore, I imagine, to say that the mixing is *only skin deep* is incorrect.

Mr. Stoddart: In replying to what has been said, I can only say that facts are stubborn things, and the tinctures have been made twice over this way, therefore it can be done. With regard to Mr. Haselden's tincture of senna, tincture of cardamoms, and tincture of orange-peel, they are all three substances which do not easily powder. The raisins were, of course, the difficulty, but they were smashed up in a mortar; and you will find there is sufficent of the dry ingredients to suck up the menstruum, and you can actually sift them through a coarse sieve about twenty meshes to the inch. If you repeat these experiments, do not use any diaphragm whatever. I would wish that if anybody in the kingdom intends to repeat my experiments he should use nothing but a tube, and tie over a bit of muslin at the bottom. As to what Mr. Giles has said about the ginger, all I can say is that I get the ginger into a measure, put on the spirit, and stir it up with a spatula, and then put it on the muslin and wait till the ginger has settled, I then have a clear liquid.

Mr. Giles: Don't you find that water put on the powder forms a mucilaginous magma?

Mr. Stoddart: I am coming to that. You first of all stir up the ginger with the spatula and then pour it into the percolator. Let the spirit run through, and leave the top dry. Then you put on exactly the quantity of water that is deficient, and leave it and go to sleep if you like. It does not disturb the top at all; but there will be a dark brown ring, which is the skin-deep mixture which I mentioned. Tincture of myrrh is one of the 26, which are simple solutions. We made it by percolation. As to Professor Markoe, he must forgive me if I disagree with him altogether. He says, first of all moisten the powder, and if there is a swelling of the magma, use a conical percolator. Now, if you let it loose into a conical percolator, you undo my experiment. It has been said that it is impossible to make tincture of gentian in the way I have described. Well, I have done it. I will give you a very easy experiment which any one may try. Get some ground coffee and stir it up with water till it comes into a "muck," as Mr. Giles calls it. It must be just so liquid that the muck, when put down into the percolator, will run of its own accord. Then if you put a pint of water you will have your extract of coffee in magnificent style, and if you are economical, put another pint of water on the top, and you will get a liquid of about a third of the strength of the first.

The Bell and Hills' Fund.

The President then said that the question of the appropriation of Mr. Hills' last gift to the Conference had occupied the attention of the Executive Committee at a meeting held that morning, and they had instructed him to place before the Conference their view. The Executive Committee recommend to the annual meeting that the following be laid down as the general financial plan for the appropriation of the generous donation of Mr. Thomas Hyde Hills, viz., "That it be added to the existing 'Bell and Hills' Fund,' and that the discretionary power of granting a sum of £10 for books to any local association in towns where the Conference has met be continued. Further, that the principal sum of £200 be retained until the Executive Committee decide that one bond of £50 be sold out, and that such scale of the stock be not repeated until an interval of three years from the last sale. The Executive Committee for the current year to decide upon the appropriation of such income from principal and interest, by granting sums in aid of original research, or for the cultivation of pharmaceutical science."

Mr. T. H. Hills: Mr. President, with your permission I beg to say that it will afford me much pleasure to be allowed to move the resolution recommended by the Executive Committee. I gave the money without conditions more than it should be used for pharmaceutical education; to give money with conditions takes away more than half the value of the gift, and I feel that which the Committee now recommend is for the purpose I intended. I, therefore, have great pleasure in moving the resolution.

Mr. Deane: Gentlemen, I think there is little necessity for me to add many words on this occasion. We all of us know and feel the great generosity and warm-heartedness of Mr. Hills, and his zeal in the cause of pharmacy and the well-being of this association. Whatever I might say would be only a repetition of that which is in your own minds; and as we have a great deal of business on hand, I would simply beg to second the resolution so nobly put forward by our friend Mr. Hills.

The following resolution was then put to the meeting and carried:—

"That the recommendation of the Executive Committee relative to Mr. Hills' donation of £200, having been submitted to that gentleman and approved by him, be adopted by this meeting,"

The meeting then adjourned until two o'clock.

Parliamentary and Law Proceedings.

Poisoning by Laudanum.

An inquest was held at Sunderland on Monday, September 2, to inquire into the death of a Dutch gentleman, named Heemskirk, who had died after having been found insensible in bed, with a bottle that had contained laudanum by his side. Evidence was given that the deceased had suffered severely from "tic," and had been in the habit of rubbing his face with laudanum to ease the pain.

William Henry Barker, assistant to Mr W. B. Harrison, chemist, of 6, Bridge Street, said that on Thursday afternoon, between two and three o'clock, Mr. Heemskirk came into the shop and asked for some pure laudanum to apply to the face as a liniment for "tic." On witness inquiring how much he would require, deceased asked him to show him some bottles. He showed him a one fluid ounce bottle, but deceased said as he wanted to use it often, he would require a larger bottle. He then showed him the two ounce bottle produced, and he said it would do. Witness went to get a blue glass bottle, in which they generally put poison, when he said he would prefer the plain bottle, and witness labelled it poison and put on the name of the seller. He said he wanted to take the bottle home, so that it might not get into the hands of the servants. Witness told him repeatedly it was poison, and he said he knew that—he had been in the habit of taking it—(witness intimated that he understood him to mean that he had had it before for the purpose of using externally). He asked him (witness) what dose to take to induce sleep, and witness told him he would not recommend that it be taken internally at all. He recommended something simpler, and told him it was not safe for any person to take laudanum unless they were in the habit of doing so. He, however, told deceased that twenty drops was the medium dose, and on no account to take more; and he said he had had it through his hands before. He told him that a larger dose ought not to be taken without the advice of a medical gentleman. The two ounce bottle produced was full. He had known the deceased for several years, and for the last two years as a customer. He had not bought laudanum before to witness's knowledge; the other assistant was away. He bought things for "tic," and nervine, which witness believed contained laudanum, although he did not say he was suffering from "tic." On Thursday, there was nothing exceptional in his manner. Witness looked upon him as an intelligent, steady, and respectable gentleman, and would have felt confidence in giving him a larger quantity; although he would not sell it to one person in a hundred who asked for it incidentally, nor to any person whom they did not know.

A Juryman: I think your confidence will be shaken for the future?

Witness: Well, yes.

A Juryman thought that there needed some alteration of the law.

The Coroner remarked that persons would then endeavour to purchase it in smaller quantities at different shops.

Mr. Dixon detailed the efforts made to restore Mr. Heemskirk to consciousness, and said that death had been caused by an overdose of laudanum, which he thought deceased had swallowed during temporary unconsciousness caused by excruciating pain.

The jury returned a verdict to the effect that deceased died from an overdose of laudanum, obtained on the statement that it was to be used as a liniment for "tic," and that the laudanum was administered by his own hand, but that there was no evidence to show the state of his mind at the time of administration.—*Sunderland Times.*

Suicide by a Vermin Killer.

At Sheffield, an inquest has been held by the Deputy Coroner, Mr. Wightman, respecting the death of Mary Walker. Evidence was given tending to show that the deceased had committed suicide by taking some vermin killer, from motives of jealousy.

Mary Ellen Bishop, 13 years of age, deposed that she bought the vermin killer for the deceased, who said it was to kill mice. When she gave it to her she was sitting in a chair, crying.

George Corry, assistant to Dr. Robinson, had attended deceased on the day named. She died in about five minutes after he was first called in. From the symptoms he judged that she had been poisoned with strychnine.

Mr. Spurr, chemist and druggist, said that his assistant had sold the powder to the girl Bishop. Vermin killers are not placed under the restrictions of Part 1 of Schedule A of the Poisons Act.

The Coroner thought that they ought to be, for it was a mere farce to pass an Act of Parliament to prevent the sale of strychnine and then allow it to be bought in the form of a vermin powder. He thought it would be better if it were mixed with a strong emetic. It was a well-known fact that rats and mice could not be made sick, and if a human being took any with a felonious intent, sickness would supervene, and the evil would be obviated. In summing up the Coroner said that if the jury thought fit to append anything to their verdict with reference to the sale of poisons he would forward it to the proper authorities.

Mr. Spurr said if it were thought well to take into consideration the question of adding vermin killers to the list of poisons to be registered when sold, another side of the question would have to be looked at. It would be rather a serious tax upon the time of druggists when there was a pressure of business, to have to leave off three or four times, perhaps, on a busy morning or evening, to register the sale of a 2*d*. or 3*d*. packet, each registration, with inquiries, explanations, and entry, taking up some ten to fifteen minutes. Still, if it were thought wise and prudent to add these articles to part 1 of schedule A., the trade, he thought, would not object; but it appeared to him reasonable and just that a small registration fee should be paid for every entry, as a compensation for the trouble.

The Coroner said no amount of trouble should be allowed to stand in the way when a human life was at stake.

Mr. Spurr further said that it was not Battle's Vermin Killer with which deceased had been poisoned, but a preparation by another firm.

The Coroner was sorry to hear that any one else was in the business, as he was firmly of opinion that Battle's preparation had been the means of causing the death of more persons than any other poison. He thought that if greater precautions were used in the sale of the article, the deaths from poisoning would be less frequent.

After some further conversation the jury returned a verdict that deceased had committed suicide whilst labouring under a fit of temporary insanity.

Obituary.

JOHN CARGILL BROUGH.

At Esher, on Sept. 7, 1872, this man of the large heart and intense human sympathy passed away, aged 38.

If it be true that

"He prayeth well that loveth well"

John Cargill fulfilled to the letter the divine command, "pray without ceasing."

The end was not unexpected: for years he was a reed shaken by the wind, a lamp flickering in its socket—one Saturday morning at the break of day, the reed was broken, and the light expired. *Then* he entered into—life.

It is very difficult to say anything about him or about any brave and gentle spirit when he is gone—*Good things* appear so meagre in cold print; whimsical fancies; the infinite pleasantry of a passing hour, alike with the unstudied pathos of the moment, bear no repeating.

Mr. Brough, (if his friends will pardon the use of any term but Jack) was not known as a writer to the readers of this Journal; before his strength began to fail he was the Editor of the Chemist and Druggist—He was essentially a London literary man—circumstances led him into the domain of Pharmacy—but from his boyhood his fingers were smeared with printer's ink and the press claimed him for its servant. Why he was not legally qualified as a Pharmacist is explained in one of his most mournful and most exquisite notes. His was a hand to hand fight with Time the result of constant physical weakness—the res angustæ domi pressed heavily upon him and we are acting on the dearest wish of his heart in quoting "There are two friends, whom to know, is in itself an honour, who have spent themselves in turning my sick couch into a bed of roses."

Mr. Brough was born at Pontypool in Monmouthshire; his father was a brewer and suffered severely in the chartist riots the events of which will be found narrated in a work called "Hidden Fire." We need hardly state that he was a younger brother of the Brothers Brough, well known to literature and to the stage. He was first we believe employed on the Illustrated London News, and subsequently was connected with the Morning Star. He passed through strange apprenticeship, Type being usually the master, and thus he was thrown in contact with all sorts of people and intimately knew so many who have made their mark and become distinguished. This period must be passed over though it supplied him with an inexhaustible fund of anecdote—he never lost his interest in the geography of Fleet Street and the Strand or as he himself expressed it "I hope I may never be so respectable as not to be able to show a fellow creature the way to Covent Garden."

The first undertaking that brought him into notice was the Editorship of the Journal already mentioned, the prosperity of which he strove his utmost to secure. He was also the Editor of the Ironmonger writing the technical details of machinery; Sub-editor of Nature which he soon had to relinquish—Editor of a scientific periodical called the Laboratory one of the ablest that has ever been issued and patronized by our most celebrated contributors, English and Foreign—yet commercially it was a failure and lasted only six months. He was elected as the first Editor of the Year Book of Pharmacy—great hopes were entertained that his remarkable knowledge of his subject and skill in abstract and arrangement would have produced an authoritative compendium—these hopes were never destined to be realized—as always sickness gave its inexorable veto and forbade the attempt.

There is a little book of his which may strongly be recommended to the young—it is called Fairy Tales of Science—the style is throughout delightful, while the chapter devoted to an Atom is particularly good—he prepared for the press the last edition but one of Cooley's Encyclopædia of Practical Receipts: he undertook various literary work, reported lectures, wrote articles and spoke the truth when he signed himself a *Journalist.*

There had been a long and bad quarrel in Pharmacy some time since, the particulars of which need not be recalled. The Society, supposed to favour science and education—on the one hand, and outsiders supposed to exalt trade interests on the other—there were two Journals—the official and the opposition. One thing is certain that both parties knew very little of each other. Mr. Brough with a tact beyond praise endeavoured to effect a reconciliation or rather a mutual understanding, which amounted to the same thing—"I am convinced" (he writes) "that the proposed extension of the Pharmacy Act meets all the requirements of the trade and I have been working day and night to bring about a settlement of the question." [Feb. 16, 1867]. Again—"You may be quite sure that I shall not sneer at the Pharmaceutical Society for I am convinced that the reform of British Pharmacy can only be worked out by that body." Never surely was there a better peacemaker—his amiability assumed the shape of genius, and he is fairly entitled to be chronicled amongst us if only for his devoted and successful endeavours when his aid was most urgently required.

Let him not pass however without a word respecting his marvellous social influence. No other adjective will do. It was a gain for one's entire after-life to have enjoyed his companionship—he was so utterly unselfish—"so purposeless in his friendships" he loved his neighbour better than himself—How many of us can recollect the broader atmosphere we breathed when in his society—how we learnt with him to make large allowance; how instinctively we began to covet the excellent gift of charity—nor is it too much to say that his childlike and guileless character, bright with habitual cheerfulness, rippling over with quaint humour, softened and spiritualized by the peace of God, has left behind it an effect for which hundreds of us rejoice.

Less we cannot, more we dare not say. We may turn for an instant to the lighter shades of character—hoping that some who may read this, need not be told that Mr. Brough not only was wonderfully well versed in the lore of books but that he had a special gift in letter writing—his pen talked—that is the explanation of the secret: there was simply a mechanical difference between his notes and his conversation. Both were the revival of Charles Lamb, with too often a pathetic tinge of Hood. He was best in amusement when he had no definite subject, and positively nothing to say. The ability displayed in his serious communications was rare, and in the power of hinting compliment, he has scarcely been surpassed. One of his cleverest public efforts was the introduction at the meeting of the British Association in 1869 to a jeu d'esprit called "Exeter Change"—the appearance of which stimulated not a little the curiosity as well as the admiration of the leading scientific men to some of whom it proved his first introduction. That brochure contained besides the "Ode after Tennyson" which was unique—nothing was in sprightlier taste than his verse and pencil sketches which tempted the Fellows of the Chemical from their severer studies—nor must it be forgotten that the one title of honour of which Mr. Brough was justly proud was that of F.C.S.

Quitting the editorial chair and general literature in 1870, he became Librarian of the London Institution, a post for which by nature, training and all his antecedents he was specially qualified. Some may not be aware of the continuance of that noble library, nor pleasurably acquainted with the courtesy of its officers; nor yet know by experience the large resources it has to offer in the way of reference. Here Jack, (he was never recognized by any other name) was in full glory. Surrounded by books which found themselves in an unusual position close to the Bank, and beaming placidly upon his visitors. The old personal fascination followed him to his City home. He wore it like a charm. Soon he gathered round him distinguished helpers — conversaziones and excellent sets of lectures were commenced and the spacious rooms were filled with listeners and readers. A mysterious Providence summoned him from the very midst of his labours. The decree makes us wonder, but we are silent—his work was done faithfully and to the uttermost—with scarcely a vestige of what is termed health he literally took up his bed and walked—and as we stood round his grave at Norwood, thinking of his orphan children, there was this strong consolation, that we knew assuredly that *his* name was written in the Lamb's own book; and we rejoiced that his bright example had led others to share that perfect peace which was his blessedness in the life that now is, waiting only for its full accomplishment in that which is to come.

J. I.

Correspondence.

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

Pharmaceutical Examinations.

Sir,—It is much to be regretted that more time was not available for discussing the subject of Pharmaceutical Education at the recent meeting of the Conference at Brighton, for though it is sufficiently notorious that many incompetent men do manage to pass the Minor examination, yet, until the reading of Dr. Attfield's paper, few persons would have imagined that the vigilance of our examiners was so constantly and systematically evaded.

Men advertise "that an ignoramus may be converted into a chemist and druggist in a month," or, as I would rather say, into a resemblance sufficiently specious to deceive the examiners, and the Professor says, "what is very terrible, these crammers keep their word in most cases;" if this be true—if it be only partially true—the evil is of the greatest magnitude, and it is impossible to resist the conviction that we must make an alteration in our present system of examination.

The great evil of the present mode is, that some of the examiners have been on the Board for many years, their style of examination is well known, and, unless I am misinformed, the very questions they are likely to ask are, in many cases, anticipated and prepared for; Dr. Attfield in his paper corroborates this, for he says, "The successful legitimate candidate knows his subjects, the successful illegitimate candidate *knows the questions that will be put to him.*"

The remedy is not difficult nor far to seek; make the examination longer in the practical portion, and *have a frequent and total change of examiners,*—or, better still, have two or three examiners in each subject, and decide by ballot a few days previous to examination who shall take the various subjects, thus would cramming be almost entirely done away with, but, as a still further precaution, each candidate should be compelled to produce a certificate of having served an apprenticeship of at least three years' duration.

A *compulsory* attendance upon any particular course of lectures, though strongly recommended by some, is, I think, objectionable, nor is it necessary, for some of the best pharmacists I have ever known have acquired their knowledge (while working for their support) by diligent study during the hours not engaged in active business; no obstacle should be placed in the way of such as these, we ought rather *laudare pleno ore.*

Frederick Andrews.

23, *Leinster Terrace, London,*
August 20th, 1872.

Sir,—In the majority of letters from your correspondents on the subject of study, there seems to be ignored the one thing needful—Time. In a recent issue of the Journal, your correspondent Mr. Ekin alludes to both the Major and Minor examinations as being easy, and I am far from refuting his opinion; for with plenty of time, and opportunities for study, I think any average-witted fellow could pass both at the age of 21. Recently a gentleman gave us an account of the way in which he prepared for the Minor, and how he passed. But he said nothing about the length of time he was able to devote to study during the day. Perhaps he had a good deal, for he was in a village, where, I am afraid, he would not be dispensing the whole of the day. Of course, I am speaking of those departments of study that we cannot pick up behind the counter. We may obtain a fair knowledge of dispening and materia medica during "shop-hours;" but as for chemistry, botany, and so forth, they must be acquired at other times, if the shop be opened at 7 A.M. and close at 8 or 9 P.M., leaving at the very most eleven hours out of the twenty-four of which eight must be devoted to rest, and certainly part of the remaining three hours to health and recreation. I do not complain of the difficulty of the examination; all I ask is more time.

Syrupus.

August 6th, 1872.

Mrs. Stockman and Family.—The following sums have been thankfully received in aid of the above family:—Mr. F. McCulloch, per Mr. J. Wavell, Local Secretary, Ryde, £1. 1*s.*; Mr. W. Matthews (Rouse and Co.), £1. 1*s.*; A Friend, 5*s.*; Chemist Assistant, 1*s.*; Emily Lloyd, 5*s.*, ; Mr. R. O. Rippon, £1,; Mr. W. R. Harvey, 2*s.* 6*d.*, Mr. and Mrs. B. Humpage, 10*s*, 6*d.*; Mr. Noad, 2*s.* 6*d.*; Mr. M. Mitchell, 10*s.*; W. J. T., 10*s*. Collected by Mr. J. C. Pooley, Local Secretary, Bath: Mr. Barnett, 10*s.*; Mr. Ekin, 10*s.*; Mr. Tyler, 10*s.*; Messrs. Commans and Wilson, 10*s.*; Mr. J. C. Pooley, 10*s.*—in all, 50*s*. Further contributions are much needed, and will be received with many thanks by G. Perfect, Havelock Pork, Southsea, and Charles Mumby, Pharmaceutical Chemist, Gosport, Trustees.

"Justice."—We do not think the subject worth pursuing any further. The titles referred to had their origin in a compromise, the effects of which are becoming less every year.

A. Barron.—Apply at the office of the Registrar of the University of London, Burlington Gardens.

"Inquirer."—Dr. Cobbold's Cantor Lectures on "Our Food-Producing Ruminants and the Parasites that Reside in Them," was published in the 'Journal of the Society of Arts' for July 7, 1871, and following numbers.

"Ignorance," "An Old Chymist," and *J. C.* are referred to the rule as to anonymous communications.

Communications, Letters, etc., have been received from Mr. G. Cathcart, Mr. Jenkinson, Mr. A. Barron, Professor Redwood, Mr. Macdowell, "Inquirer," "A Major in Business," "Spofforth," "Medical Dispenser," "Local Secretary in an Eastern County."

MONOBROMATED CAMPHOR.

BY JOHN M. MAISCH.

(*Concluded from page 202.*)

To recapitulate the results of these experiments, before giving the process which, in my experience, is best adapted to obtain monobromated camphor on a more extensive scale for medicinal purposes, it may be stated that the process is divided into three distinct operations: 1, the combination of bromine with camphor (bibromide of camphor), which takes place at the ordinary or slightly elevated temperature, particularly in the presence of a trace of alcohol; 2, the formation of the substitution compound (monobromated camphor), which may be effected at a temperature of 100° C. (212° F.), or in a much shorter time at 132° C. (270° F.); and 3, the utilization of the oily residue, the greatest part of which is converted into the substitution compound at 260° C. (500° F.). The product of the second part is at once white, requiring, if decomposition has been avoided, no filtration, but simply recrystallization. The use of the cheap petroleum benzine and naphtha, in preference to alcohol and ether, will also commend itself for the sake of economy. The yield is probably larger than by Perkin's process, and the entire absence of all danger by the bursting of apparatus recommends this method as more practical than that of Swarts. Although more time is required for finishing the process completely, the different reactions will not require much supervision, except the careful attention to the temperatures.

The combining weight of camphor $C_{20}H_{16}O_2$ is 152; that of 2Br=160; equal weights of the two substances, therefore, give a slight excess of camphor. I have found it advisable to use about one-twelfth more of camphor, the excess of which remains in the mother-liquor, and very likely serves to prevent the formation of bibromated camphor ($C_{20}H_{14}Br_2O_2$), if the oily residue previous to its final treatment has liberated bromine on exposure to the light. A greater increase of camphor is unnecessary, since even in the proportion of two to one bromine, the formation of the oily compound and the liberation of bromine on subsequent exposure is not prevented, while the difficulty of obtaining the substitution compound free from camphor is considerably increased.

In regard to the quantity that may be conveniently worked up at a time, the manipulation described below renders it possible to use 12 oz. of bromine in a retort of the capacity of a quart, in which even 14 oz. have been operated upon by me at once.

Regarding the necessary apparatus, I have found the following most serviceable, and well adapted for the purpose.

A quart retort is placed in such a position that, the neck being sufficiently raised, any liquid condensing therein may readily flow back into the retort. To the neck is joined a glass tube, eighteen inches to two feet in length, bent downwards at the further end, and by means of india-rubber and glass tubing connected with a bottle of about 8 oz. or more capacity; the glass tube is cut off immediately beneath the cork, while another glass tube, running nearly to the bottom of the bottle, is bent twice at right angles, and dips with the other end into an open bottle containing about 8 oz. of water and an alkali for the absorption of the hydrobromic acid. The intervenient bottle, which is empty, serves merely as a receptacle for the bromide solution, which is drawn over on the cooling of the contents of the retort, and pressed back again into the last bottle on the reapplication of heat; the liquid is thereby prevented from running into the retort, but the bottle may be replaced by a Welter's safety-tube inserted into the tubulure. Since, theoretically, one half of the bromine employed is converted into hydrobromic acid, its saving is a matter of some importance; it may be collected in water, or combined with any salifiable base or its carbonate. I have found the employment of white marble very convenient; the resulting solution of bromide of calcium is nearly pure; traces of iron present are removed by hydrosulphate of ammonia, after which the solution will, on evaporation, yield the pure salt.

The retort is charged with 13 oz. of camphor broken into pieces of convenient size, with which the neck is completely filled, while the balance is given into the retort. For this quantity, 12 oz. of bromine are used, which is introduced in four or five portions in quantities ranging from 2 to 4 oz. at a time, the larger quantity being used in the beginning, the smaller afterwards. If a funnel tube is used for this purpose, and the last drops of the bromine are washed down with a small quantity of alcohol (about ½ drachm), the reaction usually commences in from 15 to 20 minutes, or it may be brought on by the careful application of heat, which should be at once withdrawn as soon as gas bubbles commence to rise in the retort; the reaction will then proceed without any further attention, the heat increases, some bromine and bromine compounds volatilize, the latter being mostly condensed in the upper part of the retort, while the former condenses in the neck, forming with the camphor an oily liquid which returns to the retort. The next addition of the bromine should not be made until the contents of the retort have cooled down almost or quite to the ordinary temperature: and this precaution should be particularly observed, if, perhaps, in consequence of too violent reaction, all the camphor has run into the retort. The contents of the latter will usually solidify when cooling, after such a reaction: but sometimes they remain quite fluid, and congeal on the subsequent addition of the requisite bromine. If the bromine is added in too large quantities, the heat will become so high, and the reaction so violent, that a large quantity of bromine may distil over uncondensed; if added in fractions, with the precautions stated, the temperature rises generally to from 60° to 65° C. (140° to 150° F.), with at first slow, but gradually brisk extrication of hydrobromic acid gas. It follows from the latter phenomenon, that the mass must contain some monobromated camphor, or perhaps combinations of it with hydrobromic acid and bromine.

Up to this stage the tubulure of the retort may be kept closed with the glass stopper; now a thermometer is inserted, and the retort slowly heated; a rapid, but regular evolution of hydrobromic acid gas takes place as the temperature increases; the golden yellow needles, mostly condensed in the neck, fuse and run back, and when the temperature has gradually reached about 120° C. (241° F.), the liquid boils somewhat and the evolution of gas slackens. From and above 90° C. (194° F.), the deep red colour of the liquid becomes much lighter, and if the heat is raised to about 132° C. (270° F.), the colour will not deepen. At a somewhat higher temperature, particularly when nearing 150° C. (302° F.), the liquid soon becomes darker and finally black.

When the temperature has reached 132° C.—which should require not less than three hours—the fire is withdrawn and the retort allowed to cool to about 50° or 55° C. (120° to 130° F.); the contents are dissolved in 12 oz. of petroleum benzine, and the solution is poured into a beaker glass containing some warm water and pieces of marble to neutralize the free acid still present. While cooling, the benzine solution is occasionally stirred to disturb the crystallization. On the following morning, the liquid matter is poured off, the benzine mother-liquor separated from the aqueous solution of bromide of calcium, and the crystals drained upon a funnel, the neck of which is loosely stopped with some cotton. Petroleum naphtha or gasoline is poured upon them until they change but little in colour when exposed to the direct sunlight. When dry the crystals will weigh about twelve ounces; for complete purification they require to be recrystallized from alcohol or petroleum benzine.

More crystals may be obtained by evaporating the benzine mother-liquor to one-half and washing them first with the naphtha solution and then with some fresh naphtha. The mother-liquor, not yielding sufficiently pure crystals, is evaporated, heated in a retort to 260° C. (500° F.), when it boils again, evolving hydrobromic acid. When the evolution of the latter slackens, the black mass, after cooling sufficiently, is taken up with benzine, the solution treated, as before, with warm water and an alkali (marble) and set aside to crystallize; the black crystals are redissolved in alcohol or benzine, the solution filtered and crystallized. The crystals require to be washed with petroleum naphtha, and on recrystallization are obtained pure. The remaining mother-liquors which on concentration do not yield any crystals, are evaporated, and the oily matter reserved for a subsequent operation.

Monobromated camphor crystallizes from alcohol in thin white or colourless prisms or needles; from petroleum benzine, it may be obtained in long, flat prisms, which are perfectly transparent and hard, and assume the appearance of shining scales when crystallizing rapidly from a very concentrated solution. It is entirely insoluble in water, but readily and freely soluble in alcohol, ether, and in less than its own weight of hot petroleum benzine, from which solution the greater portion crystallizes on cooling. It is permanent in the air and is not affected by the direct sunlight. Boiled with water it evaporates very slowly, condensing in the neck of the retort in fine white interlaced needles. Its odour is somewhat camphoraceous, not very strong, but persistent, and reminding of Borneo camphor; the taste likewise reminds of camphor, and is terebinthinate and scarcely bitter. It fuses at about 67° C. (170° F.), and boils with partial decomposition at 274° C. (525° F.) According to Swarts, it forms with hydrochloric and hydrobromic acids, oily compounds, crystallizing after having been warmed for some time, in soft scales. This is very probably the oil-like matter remaining in the first mother-liquor, and requiring for its decomposition a temperature of 260° C. (500° F.) But even then the decomposition is not complete, and Perkin found that the product obtained by his process at 274° C., required to be freed from oil by pressing between bibulous paper. Long continued application of heat (260° C.), and treatment with potassa may perhaps effect it. Its decomposition by the action of light and air may probably be expressed thus: $C_{20}H_{15}BrO_2$, $HBr = 2\,Br + C_{20}H_{16}O_2$.

When boiled with a solution of nitrate of silver in nitric acid, monobromated camphor is decomposed and bromide of silver precipitated. From this he amount of bromine was calculated, and the following results obtained:—

	Theory.		Found. I.	II.	III.
20 C	120	51.95	—	—	—
15 H	15	6.49	—	—	—
Br	80	34.63	34.59	34.57	34.64
2 O	16	6.93	—	—	—
	231	100.00			

No. I. was monobromated camphor crystallized from petroleum benzine; II., crystallized from alcohol, and, III., obtained by heating the oily compou of the first mother-liquor to 260° C. and crystalliz nd from petroleum benzine.

ON A METHOD OF DETERMINING THE EXPLOSIVE POWER OF GASEOUS COMBINATIONS.

BY JAMES DEWAR.

In a paper recently read before the Royal Society of Edinburgh, the author describes an apparatus by means of which the explosive power of gaseous combinations can easily be determined, and from this, by Bunsen's process, the temperature may readily be calculated. The essential feature of the apparatus is the registration of the "compression volume" of a given initial volume of air, on which the gaseous explosive mixture has been allowed to act. As the duration of the pressure is all but instantaneous, the well-known formula

$$\frac{P_2}{P_1} = \left(\frac{V_1}{V_2}\right)^{1\cdot 4}$$

may be employed to ascertain the final pressure, more especially as the sudden rebound prevents any great loss of heat. In order to test the apparatus many experiments were made with mixtures of hydrogen and oxygen, and the mean result arrived at was a condensation to one-fifth the original volume of air (the initial volume being measured at 30 in. bar), when pure electrolytic gas was employed. This is equivalent to a pressure of 9·5 atmospheres, and therefore agrees with Bunsen's previous determination. The author hopes to be able to execute a series of determinations under varying conditions of temperature and pressure.

ORGANIC CHEMISTRY AND THERAPEUTICS. *

BY A. W. HOFMANN.

(Continued from p. 206.)

Not only has the direct employment of glycerine resulted in advantage to therapeutics, but also the investigation of its metamorphoses, a study which has been followed with great zeal by chemists. It has long been known that the remarkable irritant properties of pow-

* Lecture delivered at the Medical Chirurgical Institute of Berlin.

dered mustard are due to a volatile oil obtained in distilling black mustard with water. But it fell to Will to determine the nature of this oil. He showed that the essence of mustard contained, combined with sulphur and cyanogen, an organic radical known under the name of allyl, and already met with in other substances; for instance, in essence of garlic, where it is combined with sulphur under the form of sulphide of allyl. While studying the action of iodide of phosphorus upon glycerine, Berthelot observed the formation of a substance in which this radical was united with iodine to form iodide of allyl; this quickly gave rise to the idea of the synthesis of the essence of mustard by the reaction of a metallic sulphocyanide upon the iodide of allyl. In fact, by distilling the iodide of allyl with sulphocyanide of potassium, essence of mustard was produced possessing all the properties characteristic of that obtained from the plant, and a large proportion of commercial essence of mustard is made in this manner.

In connection with this subject I would briefly mention another synthesis which has some interest, although but a slight one for therapeutists. In the organism of the *Cochlearia Armoracia* is produced an oil which the pharmacist utilizes to a certain extent in the spirit of horseradish. This oil has been ascertained in recent researches to have a constitution analogous to that of essence of mustard. It is sulphocyanide of butyl, a compound which it is easy to prepare artificially.

In the presence of these conquests, are we not right in expecting that the more important medicaments, which at present can only be extracted from the plants, will soon be prepared synthetically by chemists, and that even if they are not produced directly from the elements, at least it will be possible to obtain them by the modification of other substances, so that they will be procurable more easily and in larger quantity than by the present methods? However this may be, the foregoing examples are sufficient to indicate in how many cases the study of the changes undergone by organic bodies has been the origin of new, simple and less costly methods for the preparation of substances of which the curative properties have been demonstrated by experience. It would have been singular if, in traversing these tortuous paths in the domain of chemistry, the searcher had not also encountered some new compounds of which it sufficed to study the properties and recognize in them valuable therapeutic agents.

It is not necessary to seek far for examples of the progress of therapeutics in this sense due to the development of organic chemistry. The products of dry distillation vary not only with the nature of the substance distilled, but also with the temperature used in the operation. The decomposition is thus very varied, especially when the substances employed are complex mixtures of different compounds. Among the numerous products so obtained from wood, creasote, discovered by Reichenbach in the products of distillation of beechwood must be mentioned first. That chemist did not fail to appreciate its strongly antiseptic properties, as is indicated by the name he assigned to it. The antiputrescent action of creasote was so indubitable that, from the time of its discovery, it has been the object of an active manufacture; nevertheless, it has not been much employed in medicine, it being used principally for the the sake of its antiseptic properties. By the side of creasote was soon placed carbolic acid, an analogous body discovered by Runge in coal-tar. Possessing the same properties as creasote, carbolic acid has the advantage of being crystalline and presenting more definite chemical properties; it is easily prepared in a pure state and its purity assured, especially when, as is frequently the case, the well-crystallized sulphocarbolates derived from this acid are used. Besides the price of carbolic acid is relatively moderate, being chiefly obtained as an accessory product in other industries, such as the manufacture of coal gas and that of coke. But it is not only for the sake of the gas and the coke that the distillation of coal is now carried on; tar, the mixture of solid and liquid products so obtained, has already become an important article of commerce, supplying the materials for an entire group of industries. Tar yields benzine, the primary matter in the manufacture of the aniline colours; anthracene, by the aid of which is produced artificially the colouring principle of madder; and, lastly, a nearly inexhaustible quantity of carbolic acid, which, besides its hygienic applications, serves as the primary matter for the making of a magnificent red colour—coralline. We cannot here deal with the coloured derivatives of this acid, but its disinfecting properties are well worthy the attention of medical men. Its name cannot be pronounced here without recalling the important services rendered by it during the late war. If the frightful calamities which, under the form of epidemics of every kind, ordinarily succeed to the horrors of the fight, during this campaign made less victims than in preceding wars, doubtless this fortunate result is due to various causes; but impartial observers agree that among these causes must be reckoned the use of disinfectants, and chiefly carbolic acid.

In order that by the side of products so important, those possessing less striking properties may not be forgotten, I will here say a few words concerning collodion. The methods of investigation of a science are necessarily modified by the object pursued at a certain period. While chemists were devoted to the study of products of decomposition of organic bodies, nitric acid with its oxidizing properties was naturally one of their favourite agents. But nitric acid not only acts as an oxidizer, in many cases its nitrogen enters into the molecule of the products of decomposition, and bodies were so produced that were termed nitrated compounds. Then commenced an epoch which might be called the period of the treatment by nitric acid; chemists treated by this reagent everything that fell into their hands, obtaining thus a number of combinations, for some of which an application was quickly found. In so treating benzine, Mitscherlich obtained nitrobenzine, the first and also the most important of the nitrated compounds, which, for a long time, has, under the name of essence of mirbane, supplied a want of the perfumers, and more lately has formed the groundwork of the aniline colours industry. By the action of nitric acid upon phenol, Laurent obtained the yellow colouring matter known as picric acid. Again, by the aid of nitric acid, Pelouse obtained nitrated starch, or xyloidin, the explosive properties of which are utilized in pyrotechny. Schönbein in his turn treated cotton in the same manner, and discovered pyroxylin, or gun-cotton, for a long time a rival to gunpowder. But this powerful agent of destruction has also a more peaceful application; dissolved in ether, under the form of collodion, it becomes at the same time the indispensable auxiliary of the photographer, and the faithful aid of the surgeon; instead of causing wounds it heals them.

In analogous circumstances, but in another department of organic chemistry, was produced a substance more important still to surgery, and therefore to medicine in general. As an agent of decomposition, chlorine is no less energetic than nitric acid, and the time came when chlorine in its turn secured the preference of chemists. In the important researches upon the nature of alcohol during the last thirty years, chlorine has played a most important part. Under the action of this element, with its affinity for hydrogen, Liebig saw alcohol transformed into a series of remarkable products, differing from each other in the proportion of chlorine which they contained. Among these substances there was one that had escaped the researches of Soubeiran, and which Liebig first submitted to analysis. This was the body now known as chloroform. Among the same products of the chlorination of alcohol, the great chemist also met another substance, the name of which has for some years been in every mouth, chloral. Chemists could not at first agree as to the nature and composition of these two bodies, and then commenced the great controversy between Liebig and Dumas, which chemists of that day followed with so much anxiety, and we read with so much interest, not knowing which most to admire, the ardour that filled the two champions, or the admirable logic of their arguments. We cannot deal here with this controversy, in which the views of Dumas ultimately triumphed, but it is interesting to note what researches originated in these two bodies, to which was reserved so brilliant a future. The history of chloroform and chloral is a proof of the general axiom, that every fact seriously and disinterestedly studied, with the sole object of arriving at the truth, however far off the possibility of its practical employment may seem, will sooner or later find an useful application. For many long years chloroform was only an object for theoretic speculation; but when, thirty years since, the American Jackson discovered the anæsthetic properties of ether, the hour sounded for chloroform also. At the commencement of 1847, Flourens showed that the vapour of chloroform exercised upon animals an action analogous to that of ether; and at the end of the same year, that is to say fifteen years after its discovery, James Simpson, of Edinburgh, used chloroform for the first time as an anæsthetic. Nor was it a mere lucky chance that introduced this important agent into medicine. Simpson sought systematically for a substance possessing the anæsthetic properties of ether, but not exercising like it an injurious influence upon the system, and it was only after having carefully compared a long series of organic compounds that he decided in favour of chloroform. Since then, notwithstanding numerous attacks and many propositions to substitute it by other bodies, chloroform has victoriously held its place among the best auxiliaries of the surgeon and the accoucheur.

The history of the introduction of hydrate of chloral into therapeutics is, perhaps, even more interesting. Its discovery preceded that of chloroform; for it was in 1832, while studying chloral which he had just discovered, that Liebig for the first time met with chloroform. It is singular, that nearly forty years elapsed before the marvellous physiological properties of chloral were suspected. Although at the time of its discovery chloral attracted the attention of all chemists, and its discovery was of great importance in the solution of various questions, for a long period it was only the object of rare researches. And this was not without reason, for in a field that had been explored by Liebig there is generally but little probability of making a rich gleaning. Thus chloral fell into oblivion, being scarcely known from personal study to the younger generation of chemists; therefore, the astonishment was the greater when suddenly it reappeared upon the scene in a most unexpected manner. Again, it was not by chance that the physiological properties of chloral were discovered; if ever a discovery responded to that which was expected by its author, it was the marvellous action of chloral upon the organism discovered by Liebreich.

One of the most remarkable reactions of chloral is the transformation which it undergoes under the influence of alkalies. In 1832, Liebig demonstrated that in the presence of alkalies the molecule of chloral seizes the elements of water and breaks up into chloroform and formic acid. In 1868, Liebreich asked this question, "How does this reaction affect the system if, instead of taking place in the retort of the chemist, it occurs in the living organism?" The transformation of chloral into chloroform and formic acid takes place even under the influence of extremely dilute alkaline solutions. Chloral is soluble in water, and consequently easily absorbable by the organism; once absorbed, it comes into contact with the blood which has an alkaline reaction. So that here there was a question fairly put to Nature; and never does she refuse to reply to such questions.

We cannot here trace the progress of the employment of chloral, but it will give some idea of it to say that all the chloral prepared for the requirements of science from 1832 to 1868, scarcely amounted to one kilogram, while to-day the manufacturers of Berlin alone send one hundred kilogrammes into commerce daily. As to the manner in which chloral acts upon the economy, physiologists are not yet agreed, but no medical man of the present day doubts that in it he has always a practicable means of producing a more or less profound anæsthesia, and that therein organic chemistry has furnished to therapeutics one of its most valuable agents. But one need not be a physician to appreciate the value of this service; one need only experience its marvellous properties, or see them exercised upon others. Science, especially, has reason to rejoice concerning them, for during the severe illness which recently menaced the life of the great chemist who discovered chloral, he was able by its use to obtain beneficial and reparative sleep.

If I have dilated somewhat upon the introduction of chloroform and chloral into medicine, it is because this introduction was the commencement of a new phase in the relations between organic chemistry and therapeutics. As long as the researches of organic chemistry were confined to the domain of analysis, therapeutics was content to receive, with thankfulness, the fruits of those labours, and even when the study of the metamorphoses of organic bodies commenced, its *rôle* was scarcely changed. In the first case it accepted gladly indications as to the nature of the substances it used; in the second, it was happy to enrich itself with the discoveries due to the progress of chemistry. But the relations between the two sciences quickly changed: therapeutics was no longer content only to receive; already it stretched out a hand towards the treasures which incessant labour had acquired for organic chemistry. It was in the presence of a well-defined want that it examined these treasures, searching and trying, and finishing by placing its hand upon chloroform, which answered so well to its expectation. But as chemistry discovered fresh reactions, therapeutics made them the objects of remarkable speculation, and it was thus that the action of chloral was discovered. This is a method that ought incontestably to offer to therapeutics an immense field for development. He who examines this field, who knows with what ardour, perseverance, care and love, chemists have cultivated it; he who has seen this field, in the first decades of this century a waste, and now a verdant oasis, transformed by the cares of indefatigable workers into a flourishing garden; he who knows the fruits already produced by this garden, will have no doubt that therein is a rich harvest for therapeutics to gather; and as formerly the problem chemists had to resolve was to determine the composition of substances used as medicines, so it is now for the physician to examine the physiological properties of the numerous substances that have had their origin in systematic chemical research and to seek to profit by them. In such researches it is necessary that a choice should be based upon an intimate acquaintance with the substance; to ascertain the facilities existing for procuring it; and never to lose sight of the relations which exist between it and substances already tried. Often the study of a single compound will suffice to give an idea of the physiological action of all the bodies of a series; but always investigations conducted in this manner will exercise an important influence upon the development of therapeutics.

There is still another direction in which organic chemistry has rendered services to therapeutics. It is well known what singular modifications may occur in the physiological properties of a substance when it unites with one or more elements to form a more complex body. Thus, arsenicum, combined with oxygen or hydrogen, under the form of arsenious acid or of arseniuretted hydrogen, constitutes a deadly poison. If besides the oxygen and hydrogen, it unites with carbon to form such a compound as the oxide of cacodyle or the compounds of tetræthyl-arsenium, it loses its poisonous properties. It is not only the introduction of other elements which influences the physiological properties of a body, but they depend sometimes upon the manner in which these elements are combined. United with carbon, hydrogen, and oxygen, as tartarated antimony, antimony acts as an emetic; in another compound where it is united with the same elements, it has no longer such action. The group of cyanogen compounds present examples still more striking. Anhydrous prussic acid may be mixed with fifty times its weight of water, and even more, without losing its poisonous properties. Combined chemically with one or two molecules of water, as formic amide or formiate of ammonia, the molecule of prussic acid loses its poisonous properties. Again, add to the molecule of prussic acid a group formed of one atom of carbon and two atoms of hydrogen, that is to say, introduce the radical methyl, and according to the place occupied by that radical, according to the manner in which it is combined, we shall have two bodies of the same composition, but with different properties; one by its suffocating odour and poisonous properties recalling prussic acid; the other, with a strongly aromatic odour, but not having the slightest injurious effect upon the system. We thus have a method of modifying the physiological action of a substance by the addition of a certain number of atoms of carbon and hydrogen, by the introduction into its molecule of the radical methyl. How could such a discovery remain long unutilized? Already therapeutists have sought to profit by it, and with this object have been produced the extensive researches of Crum Brown and Fraser upon the changes which occur in the physiological properties of strychnine, brucine, thebaine, codeine, morphine and nicotine, when the radical methyl is introduced into these bases, and in the same direction, the labours of Jolyet and Cahours upon aniline and its methylic derivation.

The limit to which I am confined will not allow me to indicate all the results of these researches. But there are some indubitable facts to which I would call your attention. It has been found that the reflex cramps produced in a frog by the administration of morphine are reduced to a simple paralysis when the base has been methylated; and that the more or less sudden action of strychnine, brucine and thebaine are nearly extinguished in their methylic derivatives. The latter only present the action upon the extremities of the motor nerves, which characterizes the Indian arrow poison curarine. If the beginning of research discloses such modifications in the powerful properties of well-known substances, it cannot be doubted that in the future active researches will be prosecuted in this direction.

Perhaps it is reserved for us to see a revolution take place in therapeutics like that which has recently been accomplished in the dyeing industry. The modern dyer disdains, more and more, to produce the different shades by the mechanical mixture of many colouring matters; it is the same colouring principle which, according to colour desired, undergoes a definite chemical modification. This same methylic radical which we have seen deprive prussic acid of its dangerous properties can work in colouring matters an infinite variety of modifications. Let it be introduced into the molecule of rosaniline, the base to which we owe fuchsine, and this magnificent red is converted into a splendid violet. The introduction of two or three methylic radicals causes this red violet to pass into a blue violet and then into blue. Two more methylic groups and we obtain the magnificent green, which rejoices the heart of the fairer half of the human race. The modern dyer is not content with the methyl radical; there are other radicals, compounds of carbon and hydrogen, carbon and oxygen, and oxygen and nitrogen, which he utilizes with the most marvellous results. This remarkable revolution which, in dyeing, is now an accomplished fact, is, in therapeutics, scarcely in its first stage. But he who observes with an attentive eye and reflectingly the powerful influence that to-day chemistry impresses upon every science and industry with which it comes into contact, will not doubt that, however varied these sciences and industries may be, the changes brought about by this influence will all be in the same direction, and that just as now the dyer no more has recourse to mechanical mixtures, but to chemical compounds to attain his object, so the therapeutist will follow in the path traced out, and apply himself more and more to modify the physiological properties of his medicaments, no longer by means of mechanical mixtures in the phial of the pharmacist, but by the aid of chemical modifications of the molecule of the active principle itself.

IGNITION OF COTTON BY SATURATION WITH FATTY OILS.*

BY JOHN GALLETLY.

The following experiments have been made with the view of giving greater precision to our knowledge of the kindling of cotton or other open combustible materials which happen to have imbibed animal or vegetable fatty oils. Graham mentions† that "instances could be given of olive oils igniting upon sawdust, of greasy rags from butter, heaped together, taking fire within a period of twenty-four hours." The danger of fire from this cause is familiar to those manufacturers who coat any textile fabric with varnishes containing drying oils, and also to Turkey-red dyers from the olive oil employed in their process. Generally, it is stated in Watts's Dictionary that this combustion "may take place in intervals varying from a few hours to several weeks, when considerable masses of lamp-black, tow, linen, paper, cotton, calico, woollen stuffs, ships' cables, wood ashes, ochre, etc., are slightly soaked in oil and packed in such a manner that the air has moderate access to them." (Watts's Dict. ii. p. 880.) Nevertheless, there is great vagueness about the exact conditions in which actual ignition of the mass would take place, what size of a heap might be necessary, and the various powers of different oils to produce this result. Graham states, in the report already quoted, that the ignition of heaps of the materials under discussion "has been often observed to be greatly favoured by a slight warmth, such as the heat of the sun. This is a very important observation. I shall only, however, mention in the meantime that the first of my experiments was made at a temperature of about 170° Fahr., but I have some made at a heat a little over 130° or about the temperature a body acquires by lying perpendicular to the sun's rays; the former temperature might represent the heat attained in the neighbourhood of a steam pipe, or in front of an open fire. For completeness, I shall repeat in this paper, along with later results, some observations published a few weeks ago in the 'Oil Trade Journal.'

Boiled Linseed Oil with Chamber kept about 170° Fahr.—A handful of cotton waste, after being soaked in boiled linseed oil and removing the excess of this by wringing, was placed among dry waste in a box 17 in. long by 7 in. square in the ends. Through a hole in the cover of this box a thermometer was passed with its bulb resting amongst the oily cotton. Shortly after reaching the temperature of the warm chamber the mercury began to rise rapidly, viz., from 5° to 10° every few minutes, and in 75 minutes from the time

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* Read before the Chemical Section of the British Association, August 21st, 1872.

† Report on the Fire in the 'Amazon,' 'Journ. Chem. Soc.,' 2 v. p. 34.

the box was placed, in the chamber the heat indicated was 350° Fahr. At this point smoke issuing from the box revealed that the cotton was now in a state of active combustion, and on removing it to the free access of air, it burst into flame. In another similar experiment the temperature rose more slowly, but reached 280° Fahr. in 105 minutes, when, from the appearance of smoke, it was plain that the cotton was burning, and the whole mass was soon in a flame on being placed in a current of air. On a smaller scale I tried a quantity of the oiled cotton that just filled a common lucifer match-box; within an hour it was on fire, the temperature of the chamber being 166° Fahr.

Raw Linseed Oil, as generally supposed, does not so readily set fire to cotton as the boiled oil, but in two experiments where the size of the box employed was 6½ in. by 4½ in. square in the ends active combustion was going on in the one case in five and the other in four hours.

Rape Oil, put up as in first experiment on boiled linseed, resulted, in two trials, in the box and cotton being found in ashes within ten hours. The box being put up at night, the result was only observed in the morning. In one trial I did not get the cotton to ignite in six hours; the chamber in the cases of this oil and raw linseed was kept about 170° Fahr. With the five following oils, at a little over 132° Fahr., the quantity of waste used was loosely packed in a paper box holding about the sixteenth of a cubic foot.

Gallipoli Olive Oil.—The two trials made with this oil gave closely similar results; in one case rapid combustion was going on in a little more than five, and in the other within six, hours.

Castor Oil.—I found the oxidation of this oil to proceed so slowly that only on the second day I found the interior of the box to be a mass of charred cotton. Its sp. gr. (·963) is remarkably high, and its chemical nature very distinct from the other vegetable oils I have tried, which, no doubt, has some intimate connection with its slow oxidation.

I have tried three oils of animal origin with effects very distinct and instructive.

Lard Oil, an oil of an ordinary sp. gr., viz., ·916, produces rapid combustion in four hours.

Sperm Oil, which has a sp. gr. of only ·882, and is not a glyceride, showed its unusual chemical character by refusal to char the waste.

Seal Oil, which has a strong fish-oil odour, not unlike the sperm, but a sp. gr. of ·928, produced rapid ignition in one hundred minutes. Comparing raw linseed with lard and seal oils, it would appear that the statement is not altogether correct, that drying oils are more liable to spontaneous combustion than non-drying oils. I have also some reason to believe that the rate at which oxidation takes place does not chiefly depend on the presence of small quantities of oxyotized or other easily putrefiable matters, but rather on the particular olein. However, further inquiry on this point is necessary. I have made at least two experimenta with each oil, and have got remarkably uniform results. The ignition of the cotton can be calculated on for any oil, with about the same certainty as the point at which sulphur or other combustible material takes fire when heated in the air. So that the term spontaneous combustion may be objected to for the same reason that Gerhard objects to spontaneous decomposition produced by oxidation. The heavy oils from coal and shale, being chiefly the higher olefines, have a remarkable effect in preventing this oxidation, undoubtedly by giving a certain protection from the air. Mixtures of these oils with 20 per cent. rape gave no indication of heat whatever at 17° Fah.; and even seal oil, with own bulk of mineral oil added to it, did not, at 135°, reach a temperature sufficient to char the cotton. The author hopes that these remarks will lead to a more elaborate inquiry into this subject, both for scientific and practical purposes.

PRELIMINARY NOTE ON "GUARANINE."

BY JOHN WILLIAMS, F.C.S.

The fruit of the *Paulina Sorbilis* is made up into rolls by the Indians of Para, in South America, and is by them called "Guarana." Its infusion is used as a beverage, and within a few months has been introduced into medical practice, and recommended as a remedy for sick headache.

Dr. Stenhouse some years back examined guarana, and isolated the crystallizable principle, which he named guaranine, but considered it to be identical with caffeine or theine.

I considered it a matter of interest to prepare some of this substance, and first proceeded to do so by the process given by Stenhouse, but found it troublesome, and the result not so satisfactory as might be desired. This led me to adopt the following process, which I found in every way satisfactory.

Guarana reduced to a fine powder, is mixed with one-third of its weight of hydrate of lime, and moistened with water. After an hour or two it is placed in a drying closet, and completely dried at a moderate heat. This is exhausted with boiling benzole, filtered, and the benzole distilled off, when a small quantity of light-coloured oily matter is left. This is treated with boiling water, and the whole digested over the water-bath until all traces of benzole have been dissipated, then filtered through a wetted filter so as to keep back the oil; the aqueous portion evaporated to a small bulk, and set on one side for 24 hours, yields the guaranine white and pure, in fact requiring no further purification of any kind. I have tried the process upon tea, and it appears to answer, but have not yet finished my experiments in that direction. As far as appearance goes, guaranine appears to be identical with theine and caffeine, but the author suspects it will be found to be rather more soluble in water, and not quite so bitter in taste as the above-mentioned bodies.—*The Chemical News.*

THE BRIGHTON ASSOCIATION OF PHARMACY.

At an adjourned meeting of the chemists and druggists of Brighton, W. D. Savage in the Chair, held at the Town Hall, on Friday evening, September 13th, it was resolved that the balance from the Pharmaceutical Conference Fund of £25, held by Mr. Glaisyer, the Treasurer, be a reserve fund, to be applied (as contingencies may arise) for Pharmaceutical purposes.

Mr. Brew, as President, Mr. Schweitzer, as Secretary, and Messrs. Cornish, Gwatkin and Savage, members of the old Chemist and Druggists' Association, resigned their respective offices, having first assigned over the sum of £20 for the safe keeping of the Treasurer, Mr. T. A. Brew, and Mr. Thos. Glaisyer, and to be used in such way as they and the old Sub-Committee may from time to time determine.

It was then moved by Mr. Mathews (at Mr. Colby's), and seconded by Mr. W. H. Smith:—That a new Association be formed, to be called "The Brighton Association of Pharmacy," consisting of an Executive Committee of twelve (six principals and six assistants); and ballot for names having been taken, the following was the result:—Messrs. Brew, Colby, jun., Cornish, Ettles, Savage and Schweitzer, principals; and Messrs. Gwatkin, jun., Higham, Mathews, Pick, Purvis, and W. H. Smith, assistants, who on the motion of Mr. Barton, seconded by Mr. Higham, were elected the first Committee.

It was further resolved that Mr. W. D. Savage be President, and Mr. Mathews, Secretary.

The sum of £2. 2*s*. was voted by the old Committee to meet a few preliminary expenses. A vote of thanks to the Chairman concluded a very satisfactory meeting.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 21, 1872.

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

PHYSIC AFLOAT.

WE took occasion at the commencement of the current year, to comment upon ships' medicine chests, and the reputed quality of the drugs contained therein. There is, however, another aspect of the question, interesting alike to the doctor who is to prescribe, and to the druggist who has to furnish the physic required for the voyage. We will state a case, example being better than precept. A druggist, say at Shields, Sunderland or Newcastle, receives an order from a shipowner to furnish a medicine chest for a complement (including passengers and crew) of 500 persons. He may or may not be an adept at nautical work, but we may safely say with no slight to our readers, that not one man in fifty would be able to commence work with a clear perception of what was required. He may or may not be informed as to the destination of the vessel, and the probable duration of the passage. He will have, in all probability, no opportunity whatever of consulting the ship's doctor, inasmuch as that functionary, with a perverse but ever-recurring constancy, seldom turns up before the ship is just on the eve of getting under weigh. And so the druggist is cast adrift on his own resources. The 'Medical Guide' and 'Scale of medicines' authorized by the Board of Trade, give little or no assistance, as they apply only to ships' crews. We believe that a list of medicines and medical stores required in such a case may, after some official correspondence, be obtained from the Emigration Office, and the person concerned can of course, if he chooses, obtain and consult such of the Army regulations as relate to this subject in connection with the transport of troops to foreign stations. But all these means of gaining information are roundabout, incomplete and eminently unsatisfactory. Transport by water is now practised so often on a large scale, whether under the auspices of the Emigration Commissioners, or as a matter of private enterprise, that some sort of official list of medicines and medical stores ought to be issued and sanctioned for the information of druggists who are called upon to furnish medicine chests. A very eligible opportunity now occurs for the adoption of such a plan, as the Board of Trade have, by an Act that has just become law, taken over all the duties that formerly appertained to the Commissioners of Emigration, and so have, or should have, the materials for the compilation of these lists close at hand. They should, of course, be as simple as possible, and if distinct indications were given as to the proportion of drugs, etc., required in accordance with the duration of the voyage and the number of persons carried, the information would prove a most invaluable boon to many of our readers who now perforce flounder about, and have to glean the requisite knowledge in a "scrappy," and, therefore, incomplete manner.

THE report of Mr. HOWARD on the Jamaica-grown cinchona barks, which we published in a recent number, is so very satisfactory that it cannot fail to inspire the colonists with renewed energy in the cultivation of those species which appear to be the most productive of quinine. From St. Helena we have hitherto had good accounts as to the suitability of the climate and the prosperity of the plants under cultivation; but a recent number of the 'St. Helena Guardian' now before us contains grave charges of the neglect of these valuable plants for the growth of common vegetables. It is proved beyond doubt that cinchonas are easily cultivated in St. Helena, for we are told in the same paper that the plants already established "are in perfect good health, showing the most vigorous growth. Some are 8 feet 6 inches in height, and from 8 to 9 inches in circumference; about 600 vary from 5 to 6 feet, showing a most rapid growth." The question then is very reasonably asked why, when there is plenty of room for some thousand more plants at Diana's Peak, the cultivation is not proceded with?

WE read in a report from the British Consul at Aleppo that "a profitable trade" might be carried on in Storax from Mount Amanus, where the *Styrax officinale* grows abundantly, but none of this rare and precious gum is gathered. It is well known that the *Styrax officinale*, L., is the source of the original Storax of the ancients, and it has always been more or less scarce and valuable, and in recent times has quite disappeared from commerce. The question may well be asked, why is this, if the plant grows so abundantly that the Consul, who ought to know the capabilities of the country, sees the means from whence might spring "a profitable trade?"

THE practice of early closing appears to be steadily extending, and a recent instance of its adoption is reported by Mr. EVE, in the case of the Hampstead pharmacists, who have issued a circular requesting the co-operation of the public.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

Wednesday, August 14th, 1872.

(Second day.)

The Conference reassembled at two o'clock. The first paper read was on—

Kamala.

BY THOMAS B. GROVES.

The few remarks I have to make on this substance refer exclusively to the moot point whether it contains the crystallizable principle Rottlerine.

The botanical history of the drug, its pharmaceutical preparations, and its medicinal uses have already been so fully and conscientiously treated by Mr. D. Hanbury that I need do no more than direct inquirers to volume XVII. p. 405 of the Pharmaceutical Journal, where all the facts then known are amply set forth.

The chemistry of the drug had previously been investigated by Dr. Anderson, and reported on by him in an elaborate paper first published in the Edin. New Philos. Journ. (new series) 1, 300, wherein was announced the discovery of Rottlerine, a crystalline principle obtainable in yellow silky crystals by allowing an ethereal tincture of Kamala to evaporate slowly and spontaneously. This substance is by no means of an interesting nature. It is not believed to have much to do with the activity of Kamala as a vermifuge, and moreover its chemical relations are not noteworthy. It is indeed doubtful whether its formula has as yet been correctly ascertained. The experiments of Anderson were some four or five years subsequently repeated by G. Leube, jun., the results being published in several German publications devoted to pharmacy, and in the Pharm. Journ. vol. II., second series. He described several resins more or less closely allied in character and composition, and assigned to them formulæ more or less doubtful. The remarkable point of his work was that he altogether failed to obtain Anderson's crystalline principle Rottlerine. Since then various samples of Kamala have been examined by competent observers (by Mr. D. Hanbury more especially), and still with the same negative result. In consequence of this clashing of opinions, Dr. Attfield in 1867 obtained from Dr. Anderson some further details respecting the extraction of Rottlerine, and a probable explanation of the cause of Leube's failure. The latter chemist had evidently been supplied with an impure specimen of Kamala. It had yielded no less than 28 per cent. of ash, whereas the pure article should give less than four per cent.; and although the mineral constituents were unlikely to be found in the ethereal tincture, it was not unlikely that a specimen so largely adulterated would also contain foreign organic bodies that would prevent the crystallization of a substance so intractable as Rottlerine. It was also explained that the crystals obtained were small in quantity, variable in amount in different experiments, and recognizable as crystals only by means of the microscope.

It came to pass then, that, up to last year, Anderson's results had received no confirmation from other experimenters. In December, last year, however, Mr. D. Hanbury was good enough to send me a large quantity of a thick solution of Kamala in ether, in which were imbedded numerous feathery crystals of an orange colour and not a few whitish semi-crystalline granules. The chemical inactivity of the Kamala crystals rendering their extraction a question of solvents and filtration only; this demanded a greater amount of care and perseverance than the subject, in my opinion, merited. I proceeded thus. Having ascertained that the crystals were not re-dissolved when the ethereal solution was thinned with alcohol, it was in that way rendered sufficiently fluid for the mother-liquor to pass through paper, and then thrown on a filter contained in an air-tight arrangement. After a week or so the orange-coloured pasty mass was removed from the filter, and subjected first to simple draining on bibulous paper; next, to the same assisted by the pressure of weights. Evaporation of ether was as before carefully prevented. The mass so obtained was boiled with alcohol, and the operation several times repeated until the sparingly soluble residue retained but little colour. The spirit deposited on cooling a sufficient quantity of what I have termed Kamala wax to render the filtrate semi-solid. When completely cold it was again filtered, and the solid residue washed with cold spirit. This substance proved to be the same as that which had remained undissolved in the previous operation. They were, therefore, subsequently treated together, and after being several times dissolved in boiling spirit were allowed to deposit therefrom. Thus obtained, the substance presented the appearance of a yellow powder of no great intensity of colour, and in all probability would if pure be perfectly white. The intensity of the colour imparted by the Kamala dye would make such a purification exceedingly wasteful, and perhaps altogether impossible to effect.

The filtrate being a cold spirituous solution of what may be termed crude Rottlerine was next evaporated quickly to dryness, and the residue, dissolved in ether, was placed aside in a deep beaker loosely covered, to evaporate spontaneously. As it approached a syrupy consistence, I could perceive a layer of an orange colour slowly making its appearance at the bottom of the vessel. This layer I was not slow in recognizing as caused by a multitude of microscopic crystals, but owing probably to difference of circumstances, not feathery as before, but consisting chiefly of aggregated needles. At the proper moment this stratum was separated from the supernatant fluid, cautiously thinned with ether, and thrown on a filter supported in an air-tight funnel. To remove the syrupy mother-liquor it was lightly washed, and then subjected to draining on bibulous paper with and without pressure. It was, however, far too readily soluble to admit of being completely purified in that way.

Dried spontaneously by exposure on a glass plate to the air, it formed after some days (for it retained the ether tenaciously) a dry substance of orange colour, which, when powdered and examined microscopically, showed no appearance whatever of crystalline structure. Treated with solvents, it was evident that its solubility had much diminished, and moreover I was completely unsuccessful in my attempts, in many ways varied, to induce it to resume the crystalline form. I am, therefore, of opinion that when exposed to the air undefended by their mother-liquor, the crystals of Rottlerine undergo a change (probably by absorption of oxygen) that prevents one from regarding the amorphous product as the same thing as the well-defined body that was subjected to desiccation. This explains, I think, the fact that various experimenters have obtained results so discordant.

Rottlerine, as stated by Anderson, *does exist*, but being easily modified by exposure to air, a *new* as well as pure specimen of Kamala should be taken for its extraction.

In testing my own specimen of Kamala, which must have been four years old, I avoided the interference of the waxy substance by thoroughly washing out the colouring matter with *cold* spirit. That substance is then left on the filter out of harm's way. When the spirituous tincture thus obtained was evaporated to dryness, and the ether solution of the solid residue was set aside to concentrate itself by slow evaporation, not a symptom of crystallizing was observable, thus confirming the anticipations derived from my knowledge of the age of the specimen.

Mr. Hanbury: This substance was very circumstantially described by Professor Anderson, of Glasgow. He describes the occurrence of a mass of crystals filling an ethereal solution of Kamala when the latter is in a tolerably concentrated condition; and I may say that it has struck me as a very extraordinary circumstance that this fact which he observed many years ago has not been distinctly observed by any subsequent chemist. I myself have tried it repeatedly; examining strong ethereal solution of Kamala even in a condition in which it was almost like thin mucilage. I have examined it on a plate of glass, and in other ways, but I never could detect any crystalline structure whatever until on a recent occasion, when, to my great astonishment, some ethereal tincture which had been drying up in a bottle for some time exhibited a considerable abundance of crystals. But why other specimens of the drug failed to afford it, is by no means, in my opinion, satisfactorily explained by the fact of the Kamala used having been impure, because the impurity in this drug is merely earthy matter, and the presence of earthy matter would only diminish the amount of soluble matter which the drug might afford. One does not see at all why it should destroy or alter the chemical principle. It seems rather, from the explanation which Mr. Groves offers, that the age of the drug has something to do with it; but without close examination we are really hardly able to say whether that is the fact or not. I rather think that the Kamala which was the subject of his observations was some of a recent parcel that was collected in the north of India; and probably it was not more than a year old, if so much.

Florentine Orris.

BY HENRY GROVES.

Florence has not always borne its present distinction for the produce of orris root. Anciently that of Illyria was the most famous, and even Italians gave the preference to that of Dalmatia, which would almost lead one to suppose that some of the species at present cultivated may have been introduced in like manner as some of the numerous tulips which now adorn the cornfields around the City of Flowers, and which are supposed to have escaped from garden cultivation. The negative evidence of Micheli (A.D. 1720) would seem to support this view; he having simply mentioned the occurrence of *T. sylvestris*, whereas we have now some ten or twelve forms of that genus, four of which are exceedingly common. In any case the introduction of Iris must have been at a very early period, as Andrea Cesalpino, in 1583, mentions two of our present species — *Iris florentina* (Linn.) and *I. Germanica* (Linn.) as occurring in the neighbourhood of Florence; the former he describes as "Iris cujus flos ex toto candidus," and the latter as "Iris" simply. Later we find much confusion of nomenclature, and the synonym of "Iris florentina" has been given to both *I. germanica* and *I. pallida*, the former in Savi's 'Botanicon Etruscum,' and the latter in Santi's 'Viaggi,' both of which are of the present century. Santi, however, describes his plant as a variety of florentina. It was thus that it became usual to quote the Florentine iris as the source of all orris root, whereas it is now known that three species are capable of yielding the sweet-scented rhizome, and are called in common "Giaggiolo" or Ireos, the latter being considered the more refined term, and adopted by perfumers, whereas the former is always used by the country people. The employment of these words gave great offence to Antonius Musa Brasanolus as far back as 1545, for in his 'Examin. omn. simpl. Medicament,' published at Venice, he contended that they should be simply "Iris," and asserts that at Ferrara many druggists collected the rhizomes of a species of Gladiolus (?) instead of the true drug, and from this he argues that the word "Giaggiolo" was derived, it having a sound somewhat similar to Gladiolo. This author advised the use of Illyrian orris; which, although perhaps not a distinct species, owed its superiority to a suitable soil and climate, which caused it to flourish abundantly in that region. Illyria was visited by him in company with the Duke Alphonso, and especial attention was paid to the various irides. They were collected with flowers of various colours, some being white or variegated, others pale or yellow, purple or blue; in fact, so great was the variety, that it was customary to separate them, not by their flowers, but by their rhizomes, of which two kinds were noted in Illyria, one called Rhaphanitis (from its similitude to Rhaphanites), being considered the best, while the less esteemed bore the name of Rizotomos, and had a sub-rufous colour.

Although the three species of Iris already mentioned, are found in the orris growing districts of Tuscany, the *Iris florentina* (Linn.) is by far the most rare, and is very seldom found beyond the precincts of the country villas, where, in common with the two other species, it is used to ornament the wall and gardens. From this it will be seen that the Florentine orris root is almost entirely the produce of *Iris germanica* (Linn.) and *Iris pallida* (Lam.), these two species being at present about equally cultivated. In the neighbourhood of Genoa, the *Iris florentina* is much more frequent than at Florence, and it is planted, together with one of the other species, around the roots of the fig-trees, which are said to flourish better when thus surrounded, possibly on account of the moisture retained in the soil by the shelter of leaves. The cultivation of Iris as a commercial product has very much increased during the last sixty or seventy years, since the establishment of a manufacture of orris peas at Pontasieve in 1806, under the auspices of the Marquis Strozzi. This establishment is situate in the centre of the orris district, which is very extensive, and embraces many communes on the right and left banks of the Arno, perhaps the greatest yield being from the neighbourhood of Rignano and Pontasieve, although Grassina, Greve and Panzano on the left bank, and Compiobbi on the right contribute largely to the general sum. The rhizomes are frequently collected from the peasants by mezzani or middlemen, and sent to some centre, such as Pontasieve or Leghorn, from which latter port it is sent in large quantities to England and other countries. The rhizomes are picked over and sold either as "scelti" or selected, or as "in sorte," or sorts, and vary very much in price in different seasons. This year the prices are advanced. Besides the whole rhizomes, the Pontasieve manufactory sells pieces or "frantumi," and raspings or "raspature" for the use of perfumery, the prices of which are of course ruled by the price of the whole rhizome. There is also a considerable trade in powdered orris, which, under the name of "ireos," is much sought for by strangers. The pharmacy of S. Maria Novella, at Florence, sells enormous quantities of the powder either plain or scented, so that the combination of perfumery with drug vending is by no means as English as we suppose, for in Italy it is of very ancient date; the same may be said of the manufacture of liqueurs, of which industry the Grande Chartreuse of Grenoble offers a striking example, which has served as a model to many a similar establishment throughout Europe. All the species of Iris are very hardy, and are cultivated chiefly on the wall sides of the terraced stony hills so frequent in Tuscany, or on the otherwise waste ground separating plots of ground in hilly districts, sometimes also it establishes itself on the waste ground contiguous to cultivated land or even in thin woods. The irides are by no means confined to Tuscany, but as a branch of industry their cultivation is not well known beyond it. On an excursion to the lake Thrasimene, I noted a large extent of an iris, which, although out of flower, appeared to me to be *I. germanica*, on the east end of the Isola Maggiore; and on remonstrating with the people for not turning it to account, they informed me the rhizomes were once collected, but could not be sold for want of the proper trimming. The plants flower in April; the *I. florentina* (which is some days later than the other two species), the tall *Iris pallida* with its pallid blue, and the more lowly *I. germanica* with its deep azure flowers, conspicuously gladden the springtide. It is in August that the rhizomes are harvested. They are so superficially set in the soil as to require little labour in uprooting, and, as they are dug up, a sufficient quantity of offshoots are selected each with a small portion of rhizome attached—a mere fragment suffices. These are set aside in the cellar or other convenient damp place, and kept until the cooler and more rainy month of October sets in, when they are planted in the cleared places, and speedily take root. It requires, at the least, two years for the plants to form another crop of rhizomes sufficient for removal. As soon as the rhizomes are taken up, they are deprived of their outer integuments either by peeling or scraping, and the denuded wood is carefully laid out in the sun, great attention being used to avoid bruising, which discolours the product when dried. The odour of the drug developes itself as soon as the rhizomes are thoroughly dry, and it is said that it continues to improve up to a couple of years, but this does not prevent the country people from selling the crop at once. Although the iris crop is comparatively a side product, it is of sufficient importance to be shared by the landowner according to the Tuscan system, which provides that the owner of the soil shall find the plant, and the contadino, or labourer, his toil,—the profit to be divided equally between them. A group of these small farms or poderi is overlooked by a fattore, or bailiff, on behalf of the owner, all purchase of implements or cattle being managed by him; happy is the man on whom he smiles, so great is his influence on the farm.

The severe frosts of last winter, whereby perished many thousands of olive-trees, besides other fruit and ornamental plants, have given us a clue to the present distribution of the orris plants, for on a visit with Mr. D. Hanbury, to one of the few spots where the three enumerated species flourish without cultivation, we found *Iris florentina* so nipped by the frost that the upper buds were entirely rotten, and the plants themselves so backward and puny as to present a lamentable contrast with the *Iris pallida*, whose tall, flaunting inflorescence, unlike the other two species, was quite double the height of the leaves. I have remarked that this species is to be seen planted higher up on the mountain side than the *I. germanica*, and this would seem to give it the preference for hardiness. The white papyraceous bracts of the *I. pallida* are very conspicuous, and offer a distinctive character in comparison with the *I. germanica*, which has the bracts less developed and of a green colour. The bracts of the Florentine orris would seem to have a texture between those of the other two, but are not larger than those of *I. germanica*. It is very difficult, perhaps impossible, to distinguish the fresh rhizomes of the different species, although, as Mr. Hanbury pointed out to me, the lobes of Florentine orris root, seem more cylindrical than the other species; moreover, it appeared to me, that the rhizomes were less forked than with the other species. In conclusion, I may state my belief that in some future time *Iris pallida* will become more extensively cultivated, as being the most hardy of the three species, and the one best suited to resist the cooler air of the mountains, or the scorching heat of the lower clevations.

Mr. Hanbury: I may be allowed just to say that I had the pleasure last spring of visiting, partly in company with Mr. Groves and partly by myself, many spots in the neighbourhood of Florence where these plants were growing. I also observed the distribution of the plant, and noticed how it was restricted to the neighbourhood of Florence. On going southward, or on going towards Ancona, one was very soon out of the district of iris cultivation. In fact, it appears quite confined to a comparatively small area of which Florence may be taken as the centre. What Mr. Groves says about the species is borne out by my own observations. He says that these three species are distinct, and that *Iris florentina*, which we have been accustomed to regard as the chief source of commercial orris root, is that which affords least of it. In fact, orris root may be said to be derived more from *Iris pallida* and *Iris germanica* than from *Iris florentina*.

Mr. Haselden: I cannot add anything to the history of the *Iris florentina* or *Iris germanica*; but I may make a few practical observations upon the rhizome of the iris which is supplied to us in the course of business. The employment of the orris root, as we commonly call it, is chiefly in the form of powder for tooth powders. Also it is largely employed by chemists and perfumers for making tincture and used as an adjunct, or, as it were, a vehicle for, other perfumes. There is this peculiarity about orris root—that, like some other perfumes that I may mention, musk, ambergris, and vanilla, it is almost impossible to exhaust it of its odour. Orris root contains, as far as my experience goes—(I have not gone into the matter very minutely)—a resinous gum, a mucilaginous gum, a large amount of starch, and, authors say, an essential oil. I have tried, but without success, to obtain that essential oil. An oil has been introduced from Germany as the essential oil of orris root, and at a very large price, but I am inclined to think that it is not the pure essential oil. In order to obtain the essential oil of orris root, distillation with water is the process. The difficulty with it is that it contains so much mucilage and so much starch that it is necessary to keep it constantly stirred before it arrives at the boiling-point, at which point the oil would come over. Unless it is kept constantly stirred, before it comes to the boiling-point it is almost sure to stick to the bottom of the still and become spoilt, or else it boils over. By making a tincture of orris root a strong perfume is obtainable by the employment of rectified spirits; but when distilled in order to get a colourless tincture, a large amount of the perfume remains behind along with the resin. The odour of the distillate is very faint. Water extracts a large amount of the perfume; but it is useless except as a substitute for common water in distilling for the oil. Orris root is used very much by fashionable people, as a preservative or, rather, as a corrective masticatory; and the custom, with those who are particular about it, is to have the orris root soaked in water and cut into very fine pieces and then dried; they carry it in the pocket, and use it as they require it. But I find that it is possible to get the odour of the orris root if distilled with some essential oil. I obtain a combination of the oil with which it is distilled with a strong odour of the orris root at the same time. It appears that some essential oils have the power of not only dissolving, but of positively extracting, and carrying over in the process of distillation, the odour of the orris root. There is, of course, a waste of the original oil in the operation, but still for any one who is curious in the perfume of orris, it is really one of the best ways of obtaining it. Macerate the orris root well in water, first of all; then slice it, and in that way the starch which abounds is less troublesome. There is no oil I know of which answers the purpose better than that commonly known as oil of geranium, the article used to adulterate otto of roses. In that way, with care, you may get over the original oil of geranium very strongly impregnated with the flavour of the orris root. That is the only way in which I have been able to obtain anything like oil of orris root. There is this peculiarity about orris. Like musk, it never seems to lose its odour entirely.

Mr. Umney: I rise not to make any remarks upon Mr. Groves's paper, but merely to set at rest the doubt which Mr. Haselden seems to have of the existence of essential oil of orris root. Having distilled during the past eight years several tons of the root, I can assure him such a body is to be met with in commerce, very much resembling in appearance cacao butter. The proportion of essential oil obtained is about one part from one thousand of the root. Professor Attfield will remember that some years ago he saw several ounces of it.

Mr. Hanbury: Is that the substance that is described as orris camphor in Gmelin?

Mr. Umney: It may be. I may remark that it is a very expensive oil, more so, perhaps, than otto of rose.

Professor Wayne asked whether the essential oil contained all the odorous principle of the orris root.

Mr. Umney: The essential oil dissolved in spirit has a very powerful odour.

The President: The question is whether there is any oil left in the residue after distillation.

Mr. Umney: I should say not, as distillation would be continued until the root no longer yielded oil.

Professor Wayne: I thought the odorous principle of orris root depended upon the soft resin more than upon the essential oil. I think it will be found that the soft resin contains the odorous principle, and that the odour of the essential oil depends upon its containing some of the soft resin accidentally.

Professor Attfield: Although I have every intention of examining into this question I have not done so at present. From what I remember I think the substance shown to me by Mr. Umney was probably a mixture of definite chemical substances.

Note on Guaiacol.

BY JOHN WILLIAMS, F.C.S.

In a recent number of the Pharmaceutical Journal (No. 92, third series, page 788) attention was drawn to the statement that creasote consisted mainly of a body called "Guaiacol" and which was a product of the destructive distillation of gum guaiacum. As this appeared to be a fact of some interest I determined to prepare a little of the substance and compare its properties with those of the ordinary creasote of commerce.

The process of preparing it is as follows:—Gum guaiacum reduced to powder is exposed in a shallow iron pan to considerable heat, sufficient to cause the commencement of charring, and until every trace of water is driven off. We thus avoid the frothing, which otherwise renders the distillation of the gum a very difficult matter. When the mass has been thus heated for some time it is transferred to an iron retort, furnished with a long iron tube, to act as a condenser. The heat must be increased gradually to low redness, and continued as long as any tarry matter continues to distil. In this way a product is obtained amounting to about one-third the weight of the gum employed.

This tar is again placed in an iron retort and distilled, when it yields about one-third of its bulk of a light brown oily liquid. This brown oil is treated with a solution of caustic soda, which dissolves a part of the oil, but leaves a considerable quantity which must be separated and rejected. The alkaline solution of the oil is now placed in a retort and subjected to prolonged distillation, water being added from time to time, to make up for that which distils over. In this way a quantity of light oily matter passes over, having a very offensive smell, and floating on water. This is to be rejected, and when no more oil is observed to pass over, the alkaline solution in the retort is diluted, and a slight excess of sulphuric acid added, by which means a dark coloured heavy oil is separated. This is distilled, and the oily product again treated with caustic soda and distilled as before, by which means a further small quantity of the light oil is separated. This alkaline solution on exposure to air soon turns of a very dark brown, almost black colour, and when an acid is added after a few days a very dark purple coloured oil is deposited. This oil distilled gives a light yellowish oily liquid, which after several distillations yields a colourless heavy oily liquid, which is the pure or nearly pure guaiacol.

Guaiacol is an oily liquid, considerably heavier than water; it is quite white when first distilled, but soon assumes a pale straw colour. Its smell is characteristic of creasote, but not so disagreeable as some of the samples of that body found in commerce. The sample I have made begins to boil at 200° C, and soon rises to 210°, at which point eight-tenths distil over, and the remainder comes over at 215°. Pure creasote is stated in the books to boil at 210°. Guaiacol refracts light strongly, and has the taste as well as the general physical properties of creasote. It is soluble in glacial acetic acid, but insoluble in pure glycerine.

It appeared interesting to compare this body with creasote as found in commerce, more especially as some attention has lately been drawn to the fact, that creasote is sometimes sold consisting mainly of carbolic or crysylic acid, or other products of the distillation of *coal* instead of, as it ought to be, of *wood*.

In commerce we find two kinds of creasote, said to be derived from wood, one well known in England, manufactured by Messrs. Morson and Son,—which I shall call "English" creasote—is said to be made from Stockholm tar, and if so, is the product of pine-wood probably. The other, of German manufacture, is said to be the product of beech-wood. Of the common German coal-tar creasote, I have made no especial note, but have employed pure carbolic acid in all cases to represent the coal tar or phenylic product.

English creasote commences to boil at 100°, but almost immediately rises to 213°, at which about six per cent. passes over; the temperature then rising to 216°, at which about 34 per cent. passes over; then to 222°, when about 34 per cent. again distils, and then rises to 231°, when 16 per cent. is obtained, the remainder distilling at a still higher temperature. We thus find that this is a hydrated product, and that its boiling-point is considerably higher than the proper boiling-point of creasote as represented by Guaiacol.

German creasote commences to boil at 200°, gradually rising to 220°, 40 per cent. comes over under 203°, 34 per cent. at 210°, and 16 per cent. under 220°, thus boiling rather lower than it should for pure creasote, but apparently not containing much of the higher homologues.

Carbolic acid boils at 180°, and, when pure, its boiling-point is quite constant.

English creasote is insoluble in pure glycerine, as stated by Mr. Morson, in the Pharmaceutical Journal, No. 99, page 921.

German creasote is soluble in glycerine.

Carbolic acid dissolves in glycerine in all proportions.

As I have before stated, guaiacol is not soluble in glycerine; it therefore became of great interest to find out, if possible, why the German creasote should be soluble, and thus differ from the guaiacol and English creasote, more especially as I found that the addition of, say 50 per cent. of carbolic acid to either guaiacol or English creasote, causes them to become perfectly soluble in glycerine. It thus becomes very important that we should, if possible, devise a mode of detecting the presence of carbolic acid in pure creasote.

For this purpose recourse was had to Professor Flückiger's process as described in Pharmaceutical Journal, No. 103, page 1008. It consists in adding creasote (or carbolic acid) to a very small quantity of perchloride of iron in solution, then adding alcohol and afterwards diluting considerably with water. If carbolic acid alone is employed a beautiful blue colour is produced, but if creasote, a dingy brownish liquid is the result. Now this test distinguishes between pure creasote and pure carbolic acid perfectly, but when I attempted to use it as a means of detecting the presence of carbolic acid in creasote it quite failed, the brown creasote reaction quite masking the blue produced by the carbolic acid. I tried various proportions, and in no instance could I obtain a reaction I could depend upon, 50 per cent. and even 100 per cent. of carbolic acid mixed with English creasote or guaiacol being quite undistinguishable. Professor Flückiger distinctly states that his test enables us to detect the presence of carbolic acid in creasote, but I cannot agree with that statement; in my hands, at least, it does not answer.

In a recent number of the 'Chemical News' a test was given by means of bromine. When bromine water is added to an aqueous solution of carbolic acid, a white oil is speedily deposited, but when it is added to an aqueous solution of pure creasote or guaiacol, a brown oil is the result. This test, however, fails, as might be expected, to distinguish carbolic acid when mixed with creasote; in all cases a brown oil is deposited, which is useless for the purpose we have in view.

Strong solution of ammonia dissolves carbolic acid readily (the solution turning blue after a few hours' exposure to the air) while guaiacol and creasote (both English and German) are only partially soluble, or at any rate would require a very large quantity of ammonia to effect complete solution. I found German creasote to be much more soluble than either guaiacol or English creasote, namely, one-half dissolving without much difficulty, when treated with about six times its bulk of strong liquor ammonia.

The English creasote so treated did not lose above one fourth of its bulk.

The portion of creasote insoluble in the ammonia was separated; the ammoniacal solutions being diluted and neutralized with acid, also deposited the creasote which had been dissolved. These different samples were examined carefully.

The English, which had dissolved in ammonia when distilled, smelt better and more like guaiacol than the original sample of creasote before treatment; it also boiled nearer 210°, all distilling under 220°.

The portion which did not dissolve in ammonia when distilled, yielded a liquid which had a much more offensive smell and appeared to contain more of the impurities of the original creasote than the soluble portion; its boiling-point was, however, lower and almost identical with the first portion. Both samples were insoluble in glycerine. The German creasote, which did not dissolve in ammonia, retained its old boiling-point, but no longer dissolved in glycerine. The portion soluble in ammonia was carefully examined; its boiling-point was found to be almost the same as the normal creasote. Its smell was good; almost identical with guaiacol, but it was soluble in glycerine. Attempts made to detect the presence of carbolic acid quite failed.

Other means were then tried to procure evidence of the presence of carbolic acid in creasote.

It is stated in the paper first referred to (Ph. Jour. No. 92, p. 789), that while the phenol series yields with nitric acid trinitrophenol or picric acid, guaiacol or creasote yields only oxalic acid. If this were true, we might hope to detect the presence of picric acid, and thus prove that carbolic acid had been contained in the creasote.

To determine this point, the creasote to be examined was first dissolved in about twice its weight of glacial acetic acid, and then added to an equal bulk of strong nitric acid, sp. gr. 1500. (If the creasote to be examined is added direct to the nitric acid, the action is so violent and unmanageable that no definite result can be arrived at). The capsule containing the mixture must be placed on a sand bath, and evaporated almost to dryness. When pure carbolic acid has been used, the product is a bright yellow crystalline mass (pure picric acid), but in the case of guaiacol or creasote (both English and German), the product is a brown, sticky, semi-resinous mass. This product, treated with a little hot water, is transferred to a large test tube or small retort, and a gramme or so of ordinary bleaching powder added, and a gentle heat applied, the result being the production of chloropicrin if picric acid is present, which can be distinguished without doubt or difficulty by its most peculiar and repulsive smell, or can be separated by distillation if thought necessary; but if oxalic acid is the product of the reaction, no chloropicrin is produced, but simply a liberation of chlorine. I am sorry to say that in all my trials I obtained chloropicrin, and not a trace of chlorine, and all other attempts made to isolate oxalic acid from the product of the reaction of nitric acid upon guaiacol or creasote having quite failed I have come to the conclusion that the statement respecting the different products obtained from creasote and carbolic acid by oxidation is incorrect. Picric acid, or some isomer of that body, is the product of the reaction in all cases, irrespective of the source of the creasote (or carbolic acid) being from coal-tar or from wood.

Attempts were made to distinguish between carbolic acid and creasote by the production of sulpho-conjugated acids. But the acid produced by creasote appears to be too much like the sulpho-carbolic acid for anything like a distinguishing test to be founded upon that reaction.

I regret that the results of my experiments are of a negative rather than of a positive nature, but I trust, unsatisfactorily as they confessedly are, they may prove of service to any one who may wish to follow up the examination of the true nature of creasote.

There is, I think, no doubt that the English creasote is a genuine product of wood tar. It is, however, not a homogeneous body, but probably consists of several isomeric substances; while the fact of the German (beech-wood) creasote dissolving in glycerine led me to suspect the presence of carbolic acid, but all my attempts to demonstrate its presence have quite failed, and I can only conclude that beech-wood tar yields a creasote to a certain extent different to that yielded by either guaiacum or pine-wood tar. In some of its chemical properties German creasote much nearer approaches guaiacol than the English; its smell is almost identical, and its boiling-point very much nearer and more constant.

When English and German creasote are dissolved in strong caustic soda, and then diluted, the English becomes milky, and yields, when distilled, an appreciable quantity of light oil; the German, on the contrary, remains bright and yields no oil, which would tend to prove the German to be in some respects a purer article than the English.

The fact of the German creasote dissolving in glycerine ought to be explained, either by proving that beech-wood creasote really possesses this property, or has obtained it from some peculiarity in the mode of manufacture.

It would be very interesting to examine some of Reichenbach's original creasote, if an authentic sample could now be obtained; perhaps some member of the Conference may be able to assist in this matter.

To Mr. Myles Smith, our chemical assistant, I must express my best thanks for many of the suggestions, and nearly the whole of the experiments here detailed have been performed by him with great care and accuracy.

Mr. Morson: Our attention has naturally been called to the extensive sale of carbolic acid under the name of creasote; and we are very well satisfied to find that by the mixture of glycerine we have had some chance of detecting it. We have examined some specimens from German sources, and we have invariably found them to dissolve in glycerine, and we have also found that there is a peculiar coloration in all the creasote so prepared—a tendency to a red coloration, whilst in all pure creasote, or what we consider to be so, the tendency is to become brown. This is excessively remarkable; for some which is designated as pure white creasote, and which I obtained from an excellent source in Paris, though perfectly white became perfectly red in the course of about three months, and is perfectly and entirely soluble in glycerine, even in a diluted form. In an American journal some observations are made on the short notice written by my son on the subject; and they state that no doubt our experiments are made with diluted glycerine. Such, however, is not the case. They were made with Price's glycerine, which, I think, can hardly be called diluted glycerine. You have only to add a few drops of this substance to find out that carbolic acid in all its forms is perfectly soluble in glycerine, and that most readily. Creasote we have prepared for 40 years. We take the heavy oil of tar, and separate the light oils by frequent saponification with oil of vitriol, and ebullition. We distil it in a concentrated form. We do not distil it in glass, for it breaks the retorts very readily, until you get rid of the whole of the water, and requires a very high temperature for the process. We have constantly pursued one process, and never had difficulty. Of course, the introduction of carbolic acid has interfered with it. It is strange that Gerhardt was perfectly acquainted with it. He says, "Le substance qu'on vend dans le commerce sous le nom de créosote n'est souvent que l'acide phénique plus ou moins impure. Mais le véritable créosote, extrait de goudron de bois par M. Reichenbach, est un corps parfaitement distinct, et c'est à cette créosote que le vinaigre de bois, l'eau de goudron, la fumée de bois, doivent leurs propriétés antiseptiques." It is a curious thing that carbolic acid and creasote act very differently as preservatives of animal matter. There are instances in which that will be found to be the case. Creasote preserves in a very different way from carbolic acid. There is another fact which should not be lost sight of, and that is, that if you mix carbolic acid with creasote, the mixed body is perfectly soluble in glycerine, and even in comparatively diluted glycerine. When it contains half its weight of water, it will still dissolve carbolic acid. Consequently, the observations made in the American journal as to diluted glycerine do not in the slightest degree apply. Professor Flückiger speaks of anhydrous glycerine. That is a body I am not acquainted with; but I suspect—in fact, I know—that much that is described as beech-wood creasote is nothing but carbolic acid, and is not derived from wood. I make this observation because some of the so-called beech-wood creasote becomes red, and that is quite a characteristic of carbolic acid.

Mr. Stoddart: I should like to ask Mr. Morson a question which I have not been able to get solved. Some few years ago, a naturalist, who was going to Australia, went into a shop in London to get some creasote; and all the things that he put into the bottle and brought back from Australia were preserved admirably. You could dissect them, or do what you like with them, and they did not disintegrate. He then took them out, and put them into fresh creasote, and, to his utter astonishment, all the things disintegrated.

Mr. Morson: He got pure creasote first, and carbolic acid afterwards.

The President: The fact is, that pure creasote has a very different sort of antiseptic power from carbolic acid. That is very well known amongst zoologists and anatomists, who I find generally prefer pure creasote for preserving specimens of animal tissues.

Mr. Morson: When creasote is distilled with water and so perfectly saturated, this solution is very efficient in preserving objects of natural history.

Tincture of Perchloride of Iron.

BY MR. T. H. HUSTWICK.

So many complaints having been made as to the unsatisfactory character of this preparation, and so many alterations suggested in its formula, is proof enough that considerable revision is needed to make it an acceptable article to those who have to do with it.

Of the suggestions that have appeared in the Pharmaceutical Journal for improvements in the formula, one was an addition of a certain proportion of glycerine, another, a reduction of the quantity of spirit; the objection to the first of these is too patent to call for remark, and to the second, it is that the reduction is not carried far enough, for so long as alcohol is left so long will there be a liability to change.

Now the spirit being useless, either chemically or medicinally, for no medical man orders the tincture from any therapeutic value possessed by the spirit, but simply, as I believe, from pure force of habit; and it also having been pronounced by competent authority to be "useless, unnecessary and detrimental," I think we are justified in expunging the tincture from our Pharmacopœia and abolishing it in our practice.

Acting on this idea, for two years past I had completely abandoned the use of tincture, the liquor being invariably substituted in its place. Prescriptions wherein tincture was ordered, and which had been previously dispensed at other establishments, were prepared by me with the liquor, the substitution in no case giving rise to any difference either in taste, appearance, or any other particular, while, for retailing, it also has completely taken the place of the tincture.

I do not exactly like tampering with official formulæ, but would prefer, where they are unmistakably objectionable, if possible, to ignore them altogether.

As to the legality of such a substitution as this, though it cannot be held to be exactly and strictly correct, still I think an educated pharmacist who thoroughly understands what he is about, should not be tied down by a Medo-Persian law in such a case as this, where an elegant, stable, and inexpensive compound is made to displace one that is inelegant, unstable and costly; such a change causing no difference whenever used.

These are my own opinions strengthened by experience, and I should like to elicit an opinion from those who have had more experience than myself, and if anything said here to-day on this subject can induce our medical friends to prescribe a good article in the place of a bad one, I, for one, shall be abundantly satisfied.

Mr. Schacht: I think some of the difficulties which are supposed to surround this preparation are more fanciful than real, and can be very easily indeed surmounted. I think the changes that sometimes annoy us in the tincture are limited to one cause, and that is the absence of chlorine in the preparation in sufficient quantity, and that that arises very likely from the fact that the quantity of nitric acid ordered in the Pharmacopœia is beyond what is necessary, and consequently after the oxidation process is completed, during the evaporation which follows, a large proportion of chlorine is naturally driven off. I certainly take this liberty with the Pharmacopœia process, that instead of adding the whole quantity of nitric acid there ordered, and heating until there is the exhalation of red fumes, the acid-protochloride is heated and the nitric acid added gradually. The evolution of red fumes in that case occurs long before the nitric acid is all added. After that, I cease to add further nitric acid and the evaporation is then not attended with so much loss of the chlorine element. Since I adopted that plan some three years ago, I have never found any trouble arising from change in tincture made from liquor so prepared.

Mr. Giles: It appears that one gentleman who has spoken has taken a liberty with the Pharmacopœia, and I have taken another. I think it is very important that the formula should exist in a form in which it can be practised. I made the tincture according to the new Pharmacopœia one day, and I have never repeated it. I did not try to find out the why and the wherefore.

Mr. Umney: I was about to confess that I also have taken a liberty with the Pharmacopœia. The excess of nitric acid is about 25 per cent. over the theoretical quantity that should be required; and I have used about 5 per cent. in excess of that required by theory, and I have reduced to a minimum the chief complaint—that of sending out the tincture on a large scale with the smell of hyponitrous ether by the action of a large quantity of nitric acid on spirit of wine. When the smell is so prevalent, I have noticed the peculiar appearance described by Mr. Glaisyer. Perhaps it is that some of the salt is reduced into the ferrous state. It certainly has that peculiar colour which we notice in testing for nitrous acid.

Professor Attfield: Irrespective of the presence of nitric acid or nitrate of iron, there is an action between the perchloride of iron and the alcohol. That action commences as soon as the tincture is made, and goes on slowly, varying in rate according to the position occupied by your specimen in relation to light, until ultimately, after some years, in many cases, the whole of the ferric salt is reduced to ferrous chloride. And inasmuch as this always takes place, though the rate varies, I conceive that we should prefer to use, wherever we can legitimately do so, the aqueous solution of perchloride of iron, rather than the spirituous one; and as I have never heard, though I have made many inquiries amongst medical men, that the tincture is really supposed to be of any great therapeutic value over the liquor, we may hope that in time we may produce such an impression upon medical men that they will use the liquor.

Mr. Hanbury: But so long as there is a tincture ordered in the Pharmacopœia, I hold that we are bound in honesty to use it.

Mr. Sutton: I quite agree with Mr. Hanbury. Only last week I had brought back to me a bottle half full of tincture of perchloride of iron. It had become thick and disagreeable in appearance; and, in fact, the change had taken place by its standing six weeks. The customer said that she could not take it. I have no doubt that the real effect produced is similar to that of the reducing action of alcohol upon chromium salts, only in the case of iron it is very much slower.

Professor Attfield: The body produced is a chlorinated ethereal body. I am not quite sure which, but it is an ethereal body.

Mr. Groves: I believe there are two classes of action which take place. If the liquor contains too small a proportion of chlorine, a very speedy reaction occurs, and a sub-salt is thrown down. If the liquor contains an excess of acid which it ought to have in order to be permanent, then, after a lapse of greater time, an ethereal action occurs, and you get quite a different affair. In either case the result is unfortunate. I suppose every one here is in the habit of doing what I do, of keeping the *liquor ferri*, and mixing it when required.

Professor Markoe: The practice of the United States provides for a proportion of muriatic acid, added purposely with the intention of gradually developing or forming muriatic ether. We all take especial pains not to dispense the tincture of chloride of iron until it has acquired the distinct odour of muriatic ether. I have forgotten what is the percentage in excess of muriatic acid, but it is added purposely; and we have two preparations—the simply watery solution and the tincture—which are used distinctly by physicians.

Professor Attfield: I should say that the remarks which have fallen from Professor Markoe seem to suggest that an important agent introduced into pharmacy and the practice of medicine would be the old German tincture, which is, I believe, a solution in which the per-salt of iron has disappeared altogether. It is a light green liquid, which you may obtain quite easily by putting your bottle of tincture of perchloride of iron out in the sunlight for a few months. You will then get the maximum instead of the variable proportion, which, I suppose, would always be present according to the practice of pharmacy in America.

Mr. Reynolds: This preference for the ethereal flavoured tincture is not confined to America. I have standing instructions from one physician always to use such a tincture in preference to one that has not the flavour of ether. I suppose we must regard the reason to be not that the physician considers the ethereal flavour to have any special medicinal quality, but that it makes it a somewhat more elegant remedy. If it be not stable and permanent, it is quite desirable, of course, that we should have a tincture free from that objection.

Mr. Haselden: I have never, I believe, taken a liberty with the Pharmacopœia, but I have taken a liberty with my customers. When the present form of tincture of perchloride of iron was first introduced, it was quite impossible (at least I found it so) to make the preparation, or to buy a preparation that was suitable for those who before had been used to the tincture of perchloride of iron, or muriate of iron of the London Pharmacopœia. Well, having no new preparation which was satisfactory, what was to be done? I could only supply that which had been supplied before, and which was perfectly satisfactory to the patients and the medical men with whom I came in contact. Having found this old preparation approved of by both these parties, and not being able to get a good preparation from the new Pharmacopœia, I have continued to use, up to the present day, the old tincture of muriate of iron. That, I believe, is an efficient preparation. If made according to the London Pharmacopœia, a saturated solution is obtained, and the addition of the spirit really makes no difference either in appearance or effect. It has, as far as I know, always been a satisfactory preparation to my customers. We talk about an aqueous solution. I dare say the solution might be better adapted for some cases, but medical men sometimes order two drachms of tincture of perchloride of iron, or muriate of iron, and at the same time 14 drachms of tincture of cinnamon. If simple tincture of cinnamon and tincture of muriate of iron are mixed, a tolerably fair mixture is obtained; but if water were used, decomposition of the tincture of cinnamon would result. Therefore, before recommending very strongly an aqueous solution, I think the matter should be well thought over and well tested, and it should be tried whether that would be really a better product than the old preparation.

Researches on the Constituents of Aloes.

PART I.—BY WILLIAM A. TILDEN, D.SC. LOND., F.C.S.

On a former occasion I had the honour of presenting to the Conference the results of some experiments which I had made upon the constituents of aloes, and an investigation of the action of alkalies upon those substances, chiefly with regard to the changes which have been observed in several pharmaceutical preparations. The object of the present paper is to bring together all the facts that have been established with reference to the chemical composition and properties of the proximate constituents of aloes, including some new experiments which I have been assisted in carrying out by the able co-operation of Mr. Edward Rammell.

The various kinds of aloes met with in commerce are, of course, well known to consist of the inspissated juice obtained from a peculiar stratum of vessels in the leaves of different species of *Aloë*. It is said that the juice which exudes from a freshly cut leaf is comparatively pale in colour, but that it speedily becomes brown by exposure to the air. There can be little doubt that this change which commences thus early in the aloetic liquid advances much further before the inspissation is complete, whether that operation is performed with the aid of artificial or solar heat, or whether the evaporation proceeds spontaneously. In the peculiar semi-fluid, socotrine aloes, frequently met with in commerce, the alteration is less marked than in the other solid varieties, for this substance may be looked upon as consisting mainly of crystallized aloïn and the resinoïd matter; and these two substances may, I think, be regarded as the two primary constituents of all the varieties of aloes.

My own experiments have been conducted chiefly with the Barbadoes variety, because I have found that practically that is the best source from which to prepare in quantity the crystalline principle which I venture to call for the sake of distinction "Barbaloin." The process I employ for that purpose has been already described. (Year Book of Pharmacy, 1870).

The researches of Flückiger, which were communicated last year to the Conference, have shown that the crystalline substance met with in Natal aloes, and probably also that of the Zanzibar variety, is totally different from "Barbaloin," which occurs not only in Barbadoes but in Socotrine and Cape aloes. Though the composition of these crystalline bodies is not representable by the same formula, there can, however, be no doubt that they are analogous in constitution.

All the different varieties of aloes then may be represented as consisting of mixtures in various proportions of the following proximate constituents:—

1. Aloïn and products of its decomposition or change.
2. Resinoïd matter.
3. Accidental ingredients, *e. g.*, gum, albumen and salts, to which there will be no necessity to allude further.

Aloïn.—The barbaloin, isolated originally by Messrs. T. and H. Smith, and examined by Dr. Stenhouse, possesses the formula $C_{34}H_{36}O_{14}.H_2O$, but in the water-bath loses the molecule of water. It is characterized by its comparatively ready solubility in alcohol, from which it crystallizes in tufts of yellow prisms; by giving, when moistened with strong nitric acid, a transient red colour; by furnishing, with excess of bromine water, a yellow precipitate of brom-aloïn; and by giving, by prolonged digestion with nitric acid, a large quantity of chrysammic acid. I have recently found (Journ. Chem. Soc. [2] x. 204) that by acting upon barbaloin with chlorine in the presence of concentrated hydrochloric acid, a chloro-derivative may also be obtained, which crystallizes readily in tufts of beautiful prisms. It has the formula $C_{34}H_{30}Ce_6O_{14}.6H_2O$.

No attempt has been made so far as I am aware to explain the constitution of barbaloin. It seems to me, however, to possess all the characters of a complex phenol. Thus it gives with ferric chloride a dark olive coloration; it furnishes a sulpho-acid, the barium salt of which is soluble, though not crystallizable. It also gives the chloro- and bromo- substitution derivatives just alluded to, and when acted upon by nitric acid it yields two nitrated acids, viz., picric and chrysammic acids. The latter is evidently a derivative of anthraquinone, inasmuch as it is the sole product of the nitration of chrysophane from rhubarb, and from that body anthracene has been obtained. Hence barbaloïn most probably contains two groups each containing C_{14} and one C_6.

The action of acetyl chloride has not yet been tried, but so soon as the number of hydroxyl groups in barbaloïn is known it will be possible to write for it a constitutional formula.

The products of the alteration of barbaloïn existing in ordinary crude aloes comprise anhydrous, non-crystalline aloin and oxidation products. These have already been fully described in my former paper.

Nataloïn is obtained from Natal aloes, and was first discovered by Professor Flückiger, and described in his paper last year. I have found that when previously purified by crystallization from alcohol, it furnishes large and distinct crystals by deposition from water; and I am indebted to Mr. F. J. Hanbury, at present studying in the Laboratory of the Pharmaceutical Society, for valuable assistance in preparing beautiful specimens of this body. I have submitted nataloïn to combustion, and obtained numbers which lead to the formula $C_{25}H_{28}O_{11}$.

		Theory.		Experiments.
C_{25}	300	59·52	(I) 59·59	(II) 59·53
H_{28}	28	5·55	6·07	5·86
O_{11}	176	34·92	———	———

And this formula is supported by the composition of the acetyl derivative $C_{25}H_{22}(C_2H_3O)_6O_{11}$ which I have also succeeded in obtaining.

		Theory.	Experiments.
C_{37}	444	58·73	58·54
H_{40}	40	5.29	5·38
O_{17}	272	———	———

Nataloïn is characterised by its crystalline form, rectangular plates, by its comparatively limited solubility, and by giving with nitric acid a blood-red coloration which does not fade unless heat be applied; also by giving no definite bromo-derivative, and lastly by furnishing, under the influence of nitric acid, no chrysammic, but only picric in addition to oxalic acid.

It was formerly stated that aloes contained a glucoside. I can only say that my own experiments contradict this. This matter was referred to in my former paper. I have only now to add that the experiments there described of boiling pure aloïn with sulphuric acid and water, has been extended to Barbadoes and Cape aloes with the same negative result. Sugar could in no case be detected in the liquid by the fermentation test.

PART II.—BY WILLIAM A. TILDEN, D.SC. LOND., AND EDWARD RAMMELL (*Bell Scholar*).

Resin of Aloes—When almost any kind of aloes is exhausted by successive treatments with cold water, a curdy yellowish-brown substance remains as a residue, which is commonly known as resin of aloes. In preparing extract of aloes according to the directions of the Pharmacopœia, the same substance is deposited in a fused state as the solution is allowed to cool. It then has the aspect of a soft, dark-brown, elastic, sticky matter, which gradually hardens and becomes brittle in the course of time. It is obvious from its solubility in water that it is not a resin in the usual sense of the word, and it will be found in fact that, by repeating the action of hot water once or twice, a considerable portion of it may be taken up and rendered permanently soluble so as to resemble very closely the rest of the extract. We have made some experiments upon this substance, the material operated upon being the "resinoïd" from a very fine sample of Barbadoes aloes and a second specimen from Socotrine aloes, for which we are indebted to Mr. T. B. Groves, whose valuable experiments on aloes are well known.

The resin in both cases consisted of the matter which had been deposited in the course of preparing extractum aloes B. P., and which had further been subjected to a washing with warm water.

This resin was exhausted by repeated boiling with distilled water, acidified by a few drops of acetic acid; the solution was filtered through paper in a funnel surrounded by boiling water, and the filtrate which had a clear sherry-colour was then acidified more strongly by the addition of hydrochloric acid and set aside in a covered vessel. In a few hours the resin which had been deposited was collected, drained from the mother-liquor and washed with cold water. In this way we had effected the analysis of the original resin into two portions, one of which, A, was soluble in hot water; the other, B, insoluble. The latter was much darker in colour than the former. They were both further purified by dissolving in rectified spirit, filtering, and evaporating to dryness, a temperature of about 220° Fahr. being maintained until the substance ceased to lose weight.

We had conceived the idea that the so-called resin of aloes was a product of the condensation of the crystalline principle, generated by the abstraction of the elements of water from that substance.

This view was supported by the undoubted fact already alluded to, that by repeated washings a portion is rendered permanently soluble, and, on the other hand, that pure aloïn heated for a long time on the water-bath is partly resinified.

Experiments with the soluble resin A.

Three combustions were made in oxygen gas, the substance being weighed in a platinum boat which was introduced into the combustion tube behind a long column of granular oxide of copper.

1. From Barbadoes aloes—
   ·2968 of substance dried as in all the following experiments at 220° Fahr. left ·0003 ash, and gave ·670 CO_2 and ·1510 H_2O.
2. The same.
   ·3162 gave ·0005 of ash, and ·7115 CO_2 and ·154 H_2O.
3. Socotrine.
   ·3275 gave ·7260 CO_2 and ·1680 H_2O.

These data correspond respectively to the following percentages:—

	(1)	(2)	(3)
C	61·60	61·46	60·46
H	5·65	5·42	5·69

Considering the nature of the substance analysed, these numbers agree with each other satisfactorily.

A portion of the resin to which the analyses (1) and (2) refer was dissolved in rectified spirit, and the solution deluged at once with bromine water in excess, A precipitate formed which was collected, washed, and dried in *vacuo* over sulphuric acid. The bromine in it was determined by heating in a sealed tube with nitric acid and silver nitrate.

·3145 gave ·302 Ag. Br.

corresponding to

40·85 per cent. of Bromine.

Now, assuming this resin A to have the constitution which we believe we have a right to assign to it, its formula would be

$$C_{68} H_{70} O_{27}.$$

That is to say two molecules of aloïn *minus* a molecule of water.

$$2 (C_{34} H_{36} O_{14}) - H_2O = C_{68} H_{70} O_{27}$$

The percentages of carbon and hydrogen required by this formula are given below, together with the experimental numbers—

		Theory.	Experiment. 1	2	3
C_{68}	816	61·91	61·60	61·46	60·46
H_{70}	70	5·31	5·65	5·42	5·69
O_{27}	432	—	—	—	—

And the formula of the brominated body would be $C_{68} H_{58} Br_{12} O_{27}$.

	Theory.		Experiment.
C_{68}	816		
H_{58}	58		
Br_{12}	960	42·36	40·85
O_{27}	432		

From this comparison it will be seen that, so far as composition is concerned, our view is completely confirmed.

Further evidence which seems to be conclusive was obtained by heating a portion of the resin with water in a sealed tube to 300° F. for several hours; when cold the tube was opened, the solution filtered from the undissolved residue and evaporated to a syrup. It could not, however, be made to crystallize.

This was perhaps to have been expected, contaminated as it was with a considerable quantity of resinous impurity. But by adding bromine water to a part of the solution a yellow precipitate was obtained, which, when dissolved in alcohol and left to spontaneous evaporation, furnished crystalline tufts which were visible under the microscope.

By boiling a portion of the same substance for several hours with dilute hydrochloric acid in a flask from which the air was excluded, a larger portion was rendered permanently soluble. The solution was strongly bitter and gave a precipitate with bromine water.

We also found that when resin A was boiled with nitric acid, a large quantity of chrysammic acid was formed, together with picric and oxalic acids and carbonic anhydride. It yielded the same products, in fact, as are obtained from barbaloïn under the same circumstances.

We thought it likely that, conversely, crystallized barbaloïn would be readily converted into resin by the action of dehydrating agents, but we found that on heating it with chloride of zinc, or with concentrated hydrochloric acid in sealed tubes, till on gradually raising the temperature a change was visible in the contents of the tube, the condensation seems to proceed at one step too far, and the result is a black insoluble pulverulent matter which we have not yet examined further.

The previously recounted experiments appear, however, to establish the view that that portion of the resinoïd matter of aloes which is soluble in hot water is a kind of anhydride of aloïn standing in the same relation to the crystalline substance that ether does to alcohol, or, as recently shown, that tannic acid bears to gallic acid. In both cases a crystalline body is converted by condensation and the loss of the elements of water into an uncrystallizable body.

$$\underset{\text{Gallic Acid.}}{2 (C_7H_6O_5)} - H_2O = \underset{\text{Tannic Acid.}}{C_{14}H_{10}O_9}$$

$$\underset{\text{Barbaloïn.}}{2 (C_{34}H_{36}O_{14})} - H_2O = \underset{\text{Aloe Resin A.}}{C_{68}H_{70}O_{27}}$$

One practical conclusion that may be drawn from these experiments is, that in preparing extract of aloes, the quantity of product may be much augmented, probably without deterioration of its quality, by treating the deposited resin several times with water.

Experiments with the insoluble resin B.

This substance purified in the manner already described was analysed by combustion in oxygen gas as in the last case.

1. Barbadoes
   ·2980 gave ·6795 CO_2 and ·1520 H_2O.
2. Barbadoes
   ·3225 gave ·7410 CO_2 and ·1635 H_2O.
3. Socotrine
   ·3410 gave ·0015 ash, and ·7710 CO_2 and ·1670 H_2O.

Calculating from these data, the percentages of carbon and hydrogen are as follows:—

	1.	2.	3.
C.	62·18	60·27	61·94
H.	5·66	5·63	5·46

It will be seen in these analyses that the numbers obtained are not perfectly concordant, and this might in fact be almost expected from the indefinite and changeable character of the substance operated upon. Moreover, it is possible that we may not have been wholly successful in removing from it traces of foreign matters soluble in rectified spirit. Nevertheless, we incline to the belief that the composition of this substance is more nearly represented by the numbers obtained in the first and third analysis than by those of the second. And we regard it as not improbable that this insoluble part of the resin may result from the simultaneous oxidation and condensation of crystallizable barbaloïn. Suppose, for instance, two molecules of barbaloïn to lose a molecule of water, and at the same time four atoms of hydrogen:

$$2 (C_{34}H_{36}O_{14}) - H_2O - H_4 = C_{68}H_{66}O_{27}.$$

The formula to which such an hypothesis would lead would be

$$C_{68}H_{66}O_{27},$$

and would require percentages of carbon and hydrogen, which in the following table may be compared with those obtained experimentally:—

	Theory.		Experiment. 1.	2.	3.
C_{68}	816	62·10	62·18	60·27	61·94
H_{66}	66	5·02	5·66	5·63	5·46
O_{27}	432	—	—	—	—

We by no means consider this view established, as in the nature of the case it would be very difficult, if not impossible, to indicate by any analysis of a substance of this kind, a change so small as would be represented by the loss or gain of a few equivalents of hydrogen. But the few facts we have at our disposal seem to show certainly that the insoluble part of aloe-resin is not a product of simple condensation. Thus, when heated with water to a high temperature as described in the former case, a portion is rendered soluble, but it differs in appearance and character from the soluble substance into which resin A is converted by the same treatment. Moreover, when treated by nitric acid the amount of chrysammic acid produced is very much smaller than in the case of resin A.

It is somewhat interesting to observe that if the mean of the numbers obtained in our analyses of these two be compared with the mean of the numbers obtained by Stenhouse in the analysis of anhydrous barbaloïn, we find them approach each other so nearly as almost to coincide. The theoretical numbers calculated from the formulæ exhibit the same relation. It is, however, to be noticed that taking them in the order in which they stand, there is a gradual increase in the proportion of carbon. The reason of this has been already pointed out.

Experimental Numbers.

	Aloin, average Stenhouse.	Resin, A, soluble in hot water.	Resin, B, insoluble in hot water.
C	60·63	61·17	61·46
H	5·57	5·58	5·58

Theoretical Numbers.

Calculated from the formulæ.

	$C_{34}H_{36}O_{14}$	$C_{68}H_{70}O_{27}$	$C_{68}H_{66}O_{27}$
C	61·07	61·91	62·10
H	5·38	5·31	5·02

The President: I am sure, gentlemen, it must be a cause of great satisfaction to every one here that one of the Bell scholars should, in conjunction with Dr. Tilden, bring this valuable contribution to our pharmaceutical work. This increases my regret that the time does not permit us to do justice to work so excellent.

Mr. Smith: It might enhance the value of the paper just submitted that there should be an expression of the opinion of one who has worked up a very large quantity of aloes. The results which we have arrived at in the manufacturing thoroughly corroborate the character of the resin just referred to. We have not gone into the analysis as exactly as the gentleman who has read the paper, but our practical experience on a very large scale thoroughly corroborates his observations.

A Cheap Disinfectant.

BY E. C. C. STANFORD, F.C.S.

Some of the popular disinfectants have such an offensive odour of their own that an odourless substance will generally secure the preference for ordinary household purposes. We have several harmless, cheap, and odourless disinfectants amongst the alkaline and other chlorides. I have recently experimented on several of these to ascertain which is the most powerful, and, at the same time, the cheapest. That highly popular substance known as Chloralum was used also for the sake of comparison. The experiments lasted thirty days, and the times noted were those when mildew and offensive odour first appeared. The chlorides were each mixed in the proportion of 2 per cent. and 5 per cent. with urine. In the second experiments a mixture of equal parts of blood and water with the clot removed was used, and the chlorides added in the same proportions.

Mixtures with Urine, 2 per cent. Salts.

	First appearance of mildew.	First appearance of offensive odour.
Chloralum	4 days	6 days
Chloride Iron	none	none
„ Calcium	15	none
„ Sodium	4	8
„ Potassium	4	5
„ Ammonium	4	23

Mixtures with Urine, 5 per cent. Salts.

Chloralum	4 days	6 days
Chloride Iron	none	none
„ Calcium	25	none
„ Sodium	4	8
„ Potassium	12	none
„ Ammonium	none	7

Mixtures with Blood and Water, 2 per cent. Salts.

Chloralum	11	none
Chloride Iron	26	none
„ Calcium	18	none
„ Sodium	5	6
„ Potassium	5	6
„ Ammonium	none	12

Mixtures with Blood and Water, 5 per cent. Salts.

Chloralum	11	none
Chloride Iron	none	none
„ Calcium	18	none
„ Sodium	4	5
„ Potassium	4	5
„ Ammonium	none	13

It will be seen that the most powerful of all is the Chloride of Iron; the simplest and least powerful is the Chloride of Sodium. The cheapest, in proportion to its power, is the Chloride of Calcium. This substance is a waste product in all alkali works, and the quantity at present thrown away is enormous; I now propose it for general household use as a convenient, colourless, harmless, and cheap disinfectant. I propose to use it in the form of solution containing 25 per cent. of the solid salt, and acidified with 12 per cent. of Hydrochloric Acid. This increases its power and is a harmless addition. I found about the same proportion in liquid Chloralum. Compared with liquid Chloralum in deodorizing sewage it was found to be about four times the strength, and it can certainly be produced for half the price.

The sample of powdered Chloralum used in the urine and blood experiments was found to contain about 3 per cent. of Chloride of Iron, which accounts for part of its deodorizing property. I was first led to notice the disinfecting power of Chloride of Calcium by using it in urinals. There is always great difficulty in keeping urinals in houses free from offensive odour; this is entirely obviated by putting a lump of Chloride of Calcium in the urinal; it lasts a long time, as it dissolves very gradually, and keeps the urinal perfectly free from odour.

For general household purposes, however, the liquid form is more convenient, and I propose to give the combination I have described the name of Chloricalcium, which is shortly and sufficiently descriptive of its composition.

Mr. Schacht inquired whether the author considered it necessary that the article should be so strongly acid for commercial use as it was described to be. The reason he asked the question was, that in his endeavours to keep portions of his own house sweet and odourless, he had used materials which had tended to destroy the pipes. It appeared to him that the presence of a very large proportion of free muriatic acid in the disinfectant would make it rather difficult of application for closet purposes.

Mr. Groves expressed the same opinion.

Mr. Stanford, in reply, said: My experience is confined principally to the use of the soluble chloride of calcium. It may surprise many when I tell them that such an extremely deliquescent substance as chloride of calcium will stand for months when it is put in a large lump. The acid is added to this disinfectant because it is an advantage to have an acidified solution, as most of the odours contain ammonia or some volatile alkaline body. It is not in the least necessary, for chloride of calcium alone is a far better disinfectant than chloride of aluminium alone, and is by far the most powerful and the cheapest.

The President: You use the fused chloride of calcium of course?

Mr. Stanford: Yes.

Election of Officers.

On the motion of Mr. Giles, seconded by Mr. Allchin, the following officers were elected by ballot for the ensuing year—

President.

H. B. Brady, F.L.S., F.C.S., Newcastle-on-Tyne.

Vice-Presidents who have filled the office of President.

H. Deane, F.L.S., Clapham Common, S.
Professor Bentley, F.L.S., M.R.C.S., 17, Bloomsbury Square, W.C.
D. Hanbury, F.R.S., F.L.S., Clapham Common, London, S.W.
W. W. Stoddart, F.C.S., F.G.S., Bristol.

Vice-Presidents.

T. H. Hills, F.C.S., London.
J. Williams, F.C.S., London.
R. Reynolds, F.C.S., Leeds.
F. M. Rimmington, Bradford.

Treasurer.

G. F. Schacht, Clifton, Bristol.

General Secretaries.

Professor Attfield, Ph.D., F.C.S., 17, Bloomsbury Square, W.C.
F. Baden Benger, 1, Market Place, Manchester.

Assistant Secretary.

John Moss, F.C.S.

Local Secretary.

R. Parkinson, Ph.D., Bradford.

Editor of the Year Book.

C. H. Wood, F.C.S.

Editor of the Transactions.

Professor Attfield.

Other Members of the Executive Committee, 1872-3.

M. Carteighe, F.C.S., London.
T. B. Groves, F.C.S., Weymouth.
F. Sutton, F.C.S., Norwich.
C. Ekin, F.C.S., Bath.
T. Greenish, F.C.S., London.
W. D. Savage, Brighton.
C. Umney, F.C.S., London.
F. C. Clayton, Birmingham.
M. Rogerson, Bradford.

Auditors.

Mr. Collins proposed, and Mr. Husband, of Exeter, seconded a motion appointing Mr. Brew, of Brighton and Mr. Hick, of Bradford, as auditors.

Carried unanimously.

Mr. Morson moved—"That the cordial thanks of this assembly and the non-resident members be given to Mr. Savage, Mr. T. Glaisyer, and the other members of the Local Committee for their most successful efforts in organizing the present meeting." He said that the non-resident members of the Association would be unanimous in returning their thanks to the members of the committee who had provided for them so handsomely and treated them so well.

Mr. Bamford: The uniform kindness that I have met with at Brighton has led me to accept the duty of seconding this vote, which I do with great pleasure. I am sure that you all feel it to be well merited, and I can say no words which would present that view more clearly to you.

Professor Attfield: I should like just to support the resolution. In previous years I have had to state to the Conference how greatly I have been helped in my office of secretary by the local committee, more especially by the permanent officers of the local committee, in the town where we have met. I can say nothing of the kind this year, simply because the local committee have had the whole of the arrangements, and I have had nothing whatever to do with them. To the local committee is due the whole credit.

The motion was carried unanimously.

Mr. Savage, in reply, said that these members of the local committee, whose names had not been mentioned in the resolution had taken an active part in the arrangements.

Mr. Ince: Gentlemen, I have very great pleasure in moving a vote of thanks to the Town Council of Brighton and the Pavilion Committee for the use of this room. I am sure I need say nothing further about this, because it is a resolution which commends itself to you all. I do not recollect that we have ever been under equal circumstances as far as accommodation is concerned, though, I believe, at Bath we were under similar circumstances as to architectural beauty.

The resolution was seconded by Mr. Schacht, and carried unanimously.

Mr. Savage said that as there was no member of the Town Council present, he might state that the Pavilion Committee had most readily, upon his application, placed one of the best rooms of the building at the disposal of the Conference, both for the meetings and the supper.

Mr. Betty moved that the thanks of the Association be presented to Mr. H. B. Brady for acting as President at the present gathering. He said that he felt unable to do justice to the urbanity of manner and the talent which had been displayed by the President in the discharge of his onerous duties.

Mr. Greenish seconded the motion.

Mr. Hanbury, in supporting it, said that he was sure that the chair could not have been filled in a more able manner than on the present occasion.

Carried by acclamation.

The President: Gentlemen, for some weeks past this meeting has been upon my mind like a night-mare. If ever there was a decision of this Association which I felt disposed to question, it was that of the meeting at Edinburgh, when the election of officers was under consideration. I felt my inability to do what the president of this large Conference ought to do, and during the course of its proceedings the same thing has been constantly in my mind. So far from feeling that the meed of praise which my friend Mr. Betty has awarded me is my due, I tell you honestly that I was prepared to apologize for the apparently arbitrary way in which I have been compelled on one or two occasions, especially to-day, to conduct the business of the meeting. In many ways it is a painful thing to find good papers before you, and gentlemen present capable of thoroughly discussing them, and then to have to give a mere *résumé* of the paper, and forego the discussion altogether in consequence of the want of time. If I have seemed in any way discourteous in this respect, I assure you that it has been only with a view to geting through the business in something like reasonable time. For those personal expressions which you have used I can only thank those who have utterred them and those who appear to have endorsed them. It seems to be your pleasure that I should continue another year in this office; I should have been glad to have been excused from the duty, not on account of any indisposition to serve the Conference, which I have loved from the beginning, but from the feeling that you have so many amongst you who are so much better able to undertake the somewhat onerous duties which fall to the lot of yonr president.

The proceedings then terminated.

ERRATUM.—In the President's remarks on Pill Coating at p. 213 in last week's Journal, *read* Bullock and Crenshaw *for* Burke and Trinshow.

Parliamentary and Law Proceedings.

A Fatal Mistake.

An inquest was held on Thursday evening at the Cambridge Hotel, Woolwich, on the body of an infant named Mary Dixon, who was accidentally poisoned.

Rose Dixon, widow of James Dixon, tailor, of 3, Mary Ann Cottages, Frances Street, said that deceased was her daughter and her age was seven weeks. She was bringing her up by hand, as she had to take a situation in service, but had not yet transferred her to the care of any one else. She only arrived from Ireland on Sunday week, and the journey made the child ill and feverish. She therefore sent for a James's powder, as a cooling medicine, and the messenger returned saying that the druggist had none, but had given another little powder, which she was to give the baby. She administered it on Monday afternoon, and on the middle of the next day the child was very ill. Five minutes after she had given the powder she saw printed on the inside of the powder "Stedman's teething powder," and Mrs. Styles went directly to the druggist, who advised her to give the child plenty of warm water to make it vomit, and also gave her a dose of medicine for it, and told her to keep it awake. She did so, although it was very drowsy, and next morning the child seemed better, but got worse during the day. She saw the druggist several times with the child, and paid him 2*s.* 6*d.* for a visit and his services to the child. When she found on Tuesday that the druggist was not a doctor, she taxed him with being not qualified, and he referred her to Dr. Hughes, who came on Wednesday. She did not tell him what the child had taken, thinking that the druggist had informed him, and the same night the child died. The druggist charged her nothing for the medicine he gave the child.

Margaret Styles, the wife of an artilleryman living in the same house, said the last witness was acquainted with her in Ireland, and came to her at Woolwich. Witness had often been to the druggist, Mr. Shipman, in Frances Street, for her child, and on Monday went for a James's powder for Mrs. Dixon and a Stedman's powder for her own child. He said he had not a James's powder, but gave her one which he said was of a cooling nature. Her own baby was nine months old, and she told the druggist its age. She had always used Stedman's powder, because she had been told that it kept away little fits. He gave her the powders in separate packages, and told her to be sure not to make any mistake by exchanging them. They were both in the same coloured paper, and there was no label or writing outside either. After the baby had taken the one powder they saw "Stedman's powder" printed on the inside wrapper, the outside paper being white.

Mr. Geo. Virgo Shipman, chemist and druggist, of 2, Frances Street, said he was registered by the Pharmaceutical Society. He served the last witness with the two powders, pointing out the printed label on the Stedman's powder and cautioning her to be most careful not to make a mistake. The baby's powder was not labelled at all, and both were in outer wrappers of white paper, but he had told the woman expressly that the one with the printed label on was for the elder child.

The Coroner said it would have been better to label both the powders. And there was another serious question affecting Mr. Shipman. How came he, being a non-qualified practitioner, to attend the child and treat the case.

Mr. Shipman said he went in a friendly way.

The Coroner said the law was now very stringent on the subject. A druggist might give advice as a friend, but he must not undertake the management of a case.

Mr. Shipman said in that case if he saw a fellow-creature bleeding to death, he supposed he must not stop the bleeding.

The Coroner: Every case must be judged by itself, and in that case it would be inhuman to refuse any help in your power; but here you have been attending upon a patient for two days like a qualified doctor, treating the case yourself and charging a fee; and not until the child was dying did you recommend any other assistance.

Dr. Hughes said he attended the child on Wednesday afternoon between two and three o'clock, under an order from the parish. Nothing was said about the urgency of the case either when he was sent for or when he got to the house. He saw that the child was dying from severe narcosis—as he supposed from opium; but the women said it was only diarrhœa. He was not told anything about the mistake which had occurred, and asked where they got their medicine. They told him Mr. Shipman's, and he went there, where he learned for the first time what had happened. The case was hopeless, and the child died the same night. He had since made a *post-mortem* examination, and found the child very badly nourished—in fact, he might say starved. It had been brought up on a feeding-bottle—the greatest curse for babies that ever existed. ("Hear, hear," from the jury). He did not think the child would have survived the dose even if it received the best attention, for its life was on the flicker, and the least thing was enough to put it out. Stedman's teething powders were composed of calomel, opium, sugar and starch. No child under a year old ought to take opium, except under very extraordinary circumstances. Stedman's teething powders were altogether a different thing from Steedman's soothing powders, which were an old-established and harmless medicine.

Mr. W. F. Smith, of 280, Walworth Road, said he appeared for the proprietor of Steedman's Soothing Powders, a tried preparation of fifty years' standing, prepared by Mr. Steedman, of Walworth. The powder given to the child was not one of these, but a different preparation called Stedman's Teething Powder—the two being entirely different.

Mrs. Styles, re-called, said she asked for Stedman's Teething Powder, and got it.

The Coroner pointed out that the Stedman's Teething Powder administered to deceased was only printed on one side, and Mrs. Styles might have opened it from the plain side without turning it over. The child having been brought up by hand, was very weakly, and very little would kill it, especially after a sea voyage. He believed that Mr. Shipman duly cautioned Mrs. Styles; but he thought he did wrong in charging 2*s.* 6*d.* for attending the child, the Act being strict in that respect. He also thought it would have been better to have got a doctor the moment the mistake was discovered. It would also have been better to have put one powder in blue paper and the other in white.

The jury considered the administration to have been accidental, and returned a verdict to that effect.

Correspondence.

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

Examination Fees.

Sir,—I have read the communication from Mr. Vizer, which appeared in the Journal for August 31st, under the above title; and, while ready to acknowledge that Mr. Vizer evidently wishes to advance the best interests of the Society, I am, nevertheless, of opinion that some of the recommendations put forth in that letter are founded on fallacies. I will, therefore, examine a few of his statements by the test of published official documents, as I am confident that if I succeed in showing them to be incorrect or imperfect, no one would be more ready than Mr. Vizer to acknowledge the service.

Passing over matters of opinion, which it is not my object to discuss; it is sufficient to remark that Mr. Vizer says he desires now "to see a radical change brought about in the examination fees," the object being to induce persons to join the Society who at present hold themselves aloof. In developing his argument, he says, "unfortunately the advantages of membership, as viewed by outsiders, are so few that a very small proportion only of those who aspire to the higher grade of pharmaceutical chemist deem it necessary or desirable to join themselves to the Society as members; the result being that our strength as a Society is yearly decreasing, whilst the numerical, and therefore political, strength of outsiders is largely increasing." To this I take exexception, first, as to pharmaceutical chemists; and, on reference to the Registrar's Reports, as to members, associates and apprentices for the years 1870 and 1871, it will appear that there is here a series of mistakes. We learn from these reports that in 1870* only 63 persons passed the Major examination, but that 84 persons were elected to membership as pharmaceutical chemists for the first time, besides 13 who were restored, giving a clear increase on the year, after deducting deaths, secessions, etc., of 19. In 1871† the number passing the Major was 50, while the number elected to membership as pharmaceutical chemists for the first time was 63, and 6 were restored. So that in these two years there were 166 pharmaceutical chemists elected to membership, against 113 persons who passed the Major examination. Nor must it be forgotten that of this 113 some probably are connected with the Society as Major Associates, and are not reckoned in the 166.

Next, as to whether it be true that "our strength as a Society is yearly decreasing, whilst the numerical, and therefore political strength of outsiders is largely increasing." In 1870 the number of persons who passed the Minor examination, and therefore the total number by which the numerical strength of outsiders could have been increased, was 199; a number insufficient to fill the vacancies in the Register caused by death, even if none had joined the Society. On the other hand, the clear increase in the numerical strength of the Society was,—pharmaceutical chemist members, 19; chemist and druggist members, 179; associates in business, 60;‡ associates not in business, 170; total, 428.

In 1871, again, 234 passed the Minor, but the net increase to the strength of the Society—excluding apprentices as before—was 269. So that while the additions to the entire body of chemists and druggists during the two years were only 433, insufficient to maintain a *statu quo*, the numerical strength of the Society was increased by no less than 697, that of the outsiders being at least equally decreased.

If we take the statistics another way, the result is no more favourable to Mr. Vizer. In 1870 there was a net increase of associates of the Society amounting to 230. Deduct from these 150, as representing those who had only passed the Modified examination, and we still have not only all the vacancies filled, including those among Modified men elected associates, but a clear increase of 80 men with the Minor qualification, showing that a large proportion of the 199 who in that year passed the Minor compulsorily also joined the Society voluntarily. Again, in 1871 the net increase, after deducting 141 Modified men, was 46.

I will not discuss here the probability of Mr. Vizer's theory, that men not induced to seek the title of "pharmaceutical chemist" by the possible benefits attached to it, would be overcome by the offer that they should be excused paying subscriptions, especially if that privilege were purchased by an increase of seven guineas in fees and loss of the Journal. This, and the anticipated financial benefit to the Society, are fair matters of opinion that could be discussed at another time; and I pass on to the next statement put forward as one of the facts upon which Mr. Vizer's theory is founded. He says that "the Journal account has always formed a sore point in the annual statement, showing a considerable loss to the Society." I am aware that there is an impression to this effect in the minds of a few persons, but there is not the least foundation for it. In fact, there have been years when the Journal has been a source of revenue to the Society. If Mr. Vizer will refer to the annual balance sheets, he will find in proof of this, that in 1865 the cost of furnishing free copies to members, which had been decreasing for some years, was extinguished, mainly through the exertions of Mr. Mackay, and there was an actual surplus of £50. 10*s.* 8*d.* In 1866 this surplus was increased to £218. 5*s.* 5*d.*; in 1867 to £296. 14*s.* 7*d.*; in 1868 to £332. 4*s.* 7*d.* In 1869, by the great increase in the number of members, after the passing of the Pharmacy Act 1868, and the issue of an index to twelve volumes, which cost £99 13*s.* 6*d.*, there was a charge incurred of £31. 18*s.* 8*d.* In 1870, when the present weekly series commenced, the balance sheet showed a large sum against the Journal; but apart from the inevitable expense and loss attendant upon such a change, that was due principally to the fact that a large sum on the advertisement account did not become payable from the publishers until after the close of the year.

In the balance sheet for 1871 there is a sum of £164. 9*s.* 7*d.* charged against the Journal, and I expect to see this sum reduced to a nominal amount if the Council will, as in former times, leave the management as far as possible to those who, taking a real interest in the Journal, understand it best. But I maintain it to be wrong altogether to regard that deficit as a loss, for it represents the actual cost of some 6000 Journals weekly, including about £500 a year for *postage*, and if the Journal account were credited with a proportion, say only half, of the publishing price for each copy supplied free, as, I believe, is done in the case of the American 'Journal of Pharmacy' by the Philadelphia Society, the apparent deficit in the balance sheet would be transformed into an apparent gain of more than two thousand pounds. In the face of these facts, and considering that the proceeds of the Journal are actually sufficient to pay for 6000 copies weekly and more than two-thirds of the postage, while the Society's announcements are thus made *gratis*, and the Society's interests promoted without expense, it cannot fairly be said that the Journal account shows "a considerable loss to the Society."

As to the benefits which Mr. Vizer thinks would result from making a charge for the supply of the Journal, his statements before being discussed would require to be supported by detailed explanations as to the way in which the abandonment of the free issue of the Journal would be advantageous to the readers or to the Society as proprietors. Speaking generally on this point, my conviction, is that even if the balance against the Society were very much larger than £164 per annum, the members would not sacrifice so powerful an engine for the defence of our interests, as a weekly journal must necessarily be.

Michael Carteighe.

172, *New Bond Street.*

* Pharm. Journ. [3] I. 892. † *Ib.* II. 649.

‡ Doubtless Mr. Vizer is aware that a person who has passed the Minor examination is eligible to join the Society as an associate, and to exercise, when in business on his own account, all the privileges appertaining to membership, except that he cannot hold office as a councillor or examiner.

Dr. John Muter, Ph.D., F.C.S., writes to declare that in the school under his direction no such process as that described by Professor Attfield is in operation. Dr. Muter also expresses his approval of the Society's examiners.

Communications, Letters, etc., have been received from several correspondents, but owing to want of space we are compelled to defer the replies until next week.

PHARMACEUTICAL EDUCATION AND EXAMINATION.

BY PROFESSOR REDWOOD.

I am unwilling to allow the discussion of the subject introduced by Dr. Attfield at a meeting of the British Pharmaceutical Conference to pass without offering some remarks which I had no opportunity of making at the meeting. I consider the subject one of the deepest interest and importance to the Pharmaceutical Society—one, in fact, which more perhaps than any other affects the prosperity of the Society, and the interests of British pharmacy. The Pharmaceutical Society occupies a position with reference to the education and examination of those who are legally authorized to carry on the business of chemist and druggist, which, while it constitutes its highest function, invests it with considerable power and influence, and imposes upon it great responsibility. The complaints which have been so frequently, and not unjustly, expressed from time to time during the last thirty or forty years, of the low state of pharmacy in this country, of imperfect qualification among those engaged in its practice, of increased competition, small returns, and diminished profits, may find a practical remedy for the evils complained of in the judicious exercise of the influence and control which the Society can exert over the future members of the trade. But with the powers conferred upon the Society there are corresponding responsibilities. The primary object of legislation is the good of the public, not merely of a section of it, excepting as this may result indirectly or without detriment to the mass. Happily the interests of the pharmaceutical body, as a section of the public, and of the public at large, have points of coincidence enough to render the furtherance of one consistent with that of the other, and this is especially the case with reference to questions of pharmaceutical education.

The new features introduced into the discussion at Brighton, in connection with those on which the opinions of pharmacists had been previously asked by the Council, give to the subject-matter a wide and comprehensive range, which appears to be favourable to the successful and judicious disposal of the various propositions that have been made.

The whole subject may be comprised within the scope of the following questions :—

1. What is the nature of the education required for the qualification of those to whom the practice of pharmacy is entrusted ?

2. By whom and in what way should the education we require be provided ?

3. What is the best method of testing the qualifications of those to whom certificates giving the right to practice pharmacy are granted ?

The first question appears to demand something more than the mere consideration of means by which a qualification for the practice of pharmacy may be supplied. It would be easy to suggest a curriculum of education that would furnish the knowledge required for such qualification, but there are circumstances surrounding the question that must be taken into account—conditions that have to be fulfilled, and obligations that are due to those directly affected and to those indirectly affected by the law. In fact, we must consider the requirements of the law, the obligations moral as well as legal of the existing race of students, and the interests of the public.

The requirements of the law are pretty clearly defined in the Pharmacy Acts and the bye-laws of the Pharmaceutical Society. There are two compulsory examinations to be prepared for and passed —the Preliminary and the Minor—the Major examination being optional. I entirely agree with those who urge the importance of the former of these, and of its being passed at the commencement of pharmaceutical pupilage. No part of the ordeal to which students are subjected is more calculated than this to exert a beneficial influence on the future condition of the pharmaceutical body. It may be used as a lever by which to raise the status of the chemist and druggist without inflicting hardships or entailing disappointments, which are otherwise liable to occur. The amount of scholastic knowledge indicated by this examination should be a sufficient guarantee of ability, both mental and financial, to pursue the subsequent studies with effect. The law does not indicate at what period of pupilage this examination should be passed, excepting that it shall precede the Minor examination, but probably a bye-law making the fee proportionate with the time that has elapsed after the commencement of technical studies might accomplish the desired object.

The Minor examination indicates the nature of the knowledge required by law for the chemists' and druggists' certificate. It is not a high qualification, but it is a thoroughly practical one. It was not originally intended as the qualification of a man engaged in business on his own account, and the Pharmaceutical Society is not responsible for its having been made so. This was an act of the Legislature, and on several occasions a strong feeling has been manifested in Parliament that the qualification for this certificate should not be raised above that of the Minor examination. It would, I conceive, be inconsistent with the duty of the executive body to deviate from the spirit of the law while this remains as it is.

The subjects involved in the Minor examination and the extent of knowledge implied by the description of it given in the bye-laws, appear to me to be such as a young man of average ability, with the scholastic acquirements indicated by the Preliminary examination, ought to be able to acquire in a three or four years pupilage with a competent master, and attendance during part of the time at lectures or classes for systematic instruction. Even without lecture attendance, if the pupil be properly guided in his studies, he may, as many do, successfully prepare for this ordeal. I hope, however, as increased advantages are offered, and brighter prospects presented to those who pass, that a greatly increased proportion of our students will be induced to aim at a higher distinction than that of barely fulfilling the requirements of the law. It should be the aim and desire of all to go beyond this, and many do so, but many also, I am sorry to say, from want of zeal, ambition, prospective advantage or means, do just as much as the law requires and no more.

There are obligations of an ethical nature by which students should be induced to consider, not merely the requirements of the law, but the interests of the profession to which they belong, and, could they discern it, their own interests also, which are involved in the efficient performance of their professional duties. These obligations cannot be too strongly insisted upon; but it must at the same time be admitted that there are circumstances affecting many of the present race of students which claim for them a special indulgence. Many of these have been induced to enter upon the study of pharmacy with little school knowledge, and unprepared for the necessity of incurring further expense than that of their appenticeship to enable them to pursue the business of a chemist and druggist as their future livelihood. They have found themselves suddenly placed in a critical position not previously contemplated, with examinations to pass for which they were unprepared, and the preparation for which involves expenses they can ill afford. Is it matter of surprise that many of these should seek to bring themselves within the requirements of the law by the easiest process? The moral obligations of this class can hardly be measured by the standard we may hope to see applied to those who shall succeed them.

Then with regard to the interests of the public; these seem to demand that there should be to some extent a gradation of qualifications among chemists and druggists. The conditions are so different under which the business has to be conducted in different places, that it would be unreasonable to expect the same qualification in all those who are engaged in it. There are many country towns and villages the inhabitants of which are supplied with the medicines they require by men who rarely, if ever, see a prescription, and to whom a knowledge of analytical chemistry would certainly be unremunerative if not useless, but who, like Lord Elcho's dealer in mousetraps, may be profitably applying a kind and amount of knowledge such as their position requires, and which is not inconsistent with that position. It is from this view of the subject, no doubt, that the objection has arisen which has been urged against fixing a higher standard than that which is comprised in the statutory qualification of a chemist and druggist.

The law defines the minimum qualification, and it certainly is not very exacting. It leaves much to voluntary effort, to the influence of public opinion and combined action, by which so much has already been effected.

It might have been expected that our educational arrangements would require some modification to meet the altered circumstances resulting from recent legislation. That the means which, during the last thirty years, have been employed, under an exclusively voluntary system, for promoting and providing pharmaceutical education, should prove insufficient, and should be considered unsuited in charactrer as well as extent, for the accomplishment of what is now required, does not necessarily imply that those means were inappropriately or unwisely devised at the time when they were called into operation. That they have been incomplete, and in some respects insufficient, has resulted from conditions under which they were established; but they have nevertheless been productive of much good which could hardly have been effected in any other way.

It cannot be denied that existing arrangements, as applied to the whole body of chemists and druggists, are defective, and very insufficient for the accomplishment of what could be desired, or indeed, of what the law demands. This may be admitted without detracting from the credit due to those who have provided and those who are using such means as the course of events has called into requisition. Whatever has been done, and is now doing, in the way of systematic education, is so much in advance of what was done thirty years ago. During that period we have made steady progress, and I cannot admit that there has been within the interval anything like a retrograde movement. Yet, looking to the future, it is obvious that much remains to be done.

It appears to me that the circumstances affecting the future are so far different from those of the past, that it will be necessary to entirely remodel our educational arrangements. I look to the application of the Preliminary-examination-lever, together with the *esprit de corps* which our association in Bloomsbury Square is calculated to promote and maintain, for the means of establishing a system of education, both central and provincial, more adequate to the wants of the student-class, more conducive to the advancement of the interests of pharmacy, and more consistent with the principles upon which such a provision ought to be founded, than any now existing in this country.

A sound pharmaceutical education should be both practical and systematic. Much of the former can only be acquired at the retail and dispensing counter of a pharmaceutical establishment. The latter is best acquired through lecture instruction and systematic laboratory work. The education should commence with apprenticeship or pupilage with a pharmaceutical chemist or chemist and druggist, capable of imparting a general knowledge of the mode of conducting business, and the special knowledge of medicines, their preparation and the art of dispensing them. During this period of pupilage opportunities will be afforded of studying chemistry, botany and materia medica from books, and probably in some instances, to a greater or less extent from attendance at lectures. But the instruction thus acquired is often fragmentary and incomplete. A few lectures on chemistry or botany may tend to create a taste for scientific study, and may communicate valuable matter for which lecture illustration is necessary; but the student will find it difficult by mere reading, with occasional attendance at short courses of lectures, to acquire a sound and general knowledge of subjects so comprehensive as those of chemistry and botany. Hence the importance of having schools with extended and well illustrated courses of lectures, in which the subjects in a connected, systematic and sufficiently complete form, are explained and illustrated, the matter being as far as possible made applicable to the particular uses to which the students intend to apply it.

In establishing such schools there are two objects, the fulfilment of which should be especially aimed at. One is, that in every case provision should be made for complete and thorough instruction in all departments of knowledge required for the highest qualification in pharmacy; and the other is, that the schools should be self-supporting.

All the objections that are urged against the sort of superficial teaching called cramming, may with equal justice be applied to any attempt at teaching chemistry and the allied branches of physics, botany and materia medica, as these should be studied by qualified and accomplished pharmacists in short courses of lectures with imperfect means of illustration. It must not be understood, however, that I object to such lectures, which are often the only ones available; neither do I object to the use by students at a certain period of their studies, of short condensed treatises, sometimes called cram books; nor, under certain circumstances, to the services rendered by qualified tutors in guiding the pupil in the path he should pursue, and testing his knowledge as he proceeds. It is not the use of these means that is justly subject to condemnation, but the abuse of them; and what I think should be particularly guarded against is that such teaching should be represented and considered as anything more than partial aids to the furtherance of a more comprehensive and complete system. I would not honour with the name of a school, for our purpose, any establishment that was not provided with the means of giving complete and thorough instruction to pharmaceutical students. Let such schools be established wherever they can be maintained, or rather, I should say, wherever they can maintain themselves, in an active and efficient state. I see no reason why they should not be self-supporting and very good reasons why they should not be mere sucklings of the Pharmaceutical Society.

Then, it may be asked, is the Pharmaceutical Society to be exonerated from all charge and responsibility with regard to pharmaceutical education? I should be the last to make such a proposition. But this brings me to the consideration of the question,

By whom and in what way should the education we require be provided?

With reference to this question it is important to notice that the contemplated education is not merely for the apprentices and pupils of members of the Pharmaceutical Society, but for all future practitioners in pharmacy, including the pupils of those, three-fourths of whom are unconnected with the Society. Neither is the education referred to the whole, but only a part, of that which is required for the qualification of a chemist and druggist. It is the part supplementary to that which for a money consideration is stipulated for in the apprenticeship or pupilage, which should, if it does not, always form the commencement of a complete pharmaceutical education. To the extent to which the knowledge obtained during apprenticeship is deficient, that which is supplied by class or school teaching must be capable of filling up what is wanted to complete the statutory qualification. One part of this education is as necessary as the other. The whole as indicated by the test examination is the guarantee of proficiency given to the public in return for exclusive privileges.

It is no longer a question as to whether scientific knowledge is requisite or not. The time has been when it was not so, when all the druggist thought it necessary for him to do was to satisfy an imperfectly informed public that he knew enough to enable him to supply them with what they wanted in his line of business. But that time is passed. Enlightened and disinterested members of the trade, desirous of elevating the position of their calling, and at the same time of furthering the interests of medicine and the safety and welfare of the public, initiated a new era in which a more complete education was provided. Hitherto the Pharmaceutical Society, with whom the proposition originated, has been almost exclusively chargeable for the establishment and maintenance of the supplementary education thus offered. It was a new and untried experiment in this country, the predicted advantages of which were disbelieved in by many, nay, by most, even of those immediately and directly interested in it. This education has been supplied at a merely nominal charge to those who have partaken of its benefits, the Society defraying the principal part of the expenses from its own resources. The circumstances under which this system was first introduced rendered this mode of offering it at a discount the only one by which it was thought that a full and fair trial of it could be ensured. It has now been tried and approved. That which at the commencement was a speculative and not a popular system, is so far sanctioned and demanded by law, that without it the requirements of the law cannot be fulfilled.

The education for a qualification to practice pharmacy, with its contingent expenses, is the premium imposed by Parliament upon the privileges it has conferred on those to whom the practice of pharmacy is entrusted. Parents who propose to train up their sons to this occupation have no more right to expect relief from the expense of the latter or supplementary part of the education than they have from that of apprenticeship itself. The Pharmaceutical Society has not yet been asked to subsidise apprentice fees, but hitherto it has to a great extent subsidised the supplementary education supplied in its own school, and it is now called upon to extend the same or some equivalent assistance to other schools.

I agree with those who think that the subsidising of our schools, under existing circumstances, is not the method best calculated to ensure their maintenance in a healthy, vigorous, efficient, and permanent condition.

I would not exonerate the society from all responsibility with reference to our school arrangements. The great and important educational work which the society originated, and by the accomplishment of which it has acquired a well-merited reputation, the real basis of its present power and influential position, will continue to claim from it the fostering care of a parent. The society has obtained the means of making educational establishments independent, and it cannot confer a more important benefit upon them than by rendering those means available through the judicious exercise of its influence.

The principal cause of weakness and dependence in our school arrangements is the insufficiency of the fees charged for lecture attendance. The practice of charging such low fees arose from a desire to encourage education and to extend as far as possible the influence of the means so laudably provided at the expense of promoters, not partakers, of these benefits. At one time pharmaceutical students had free admission to the lectures and even a bonus offered in addition, in the shape of prizes. That was the time of hottest competition between the supporters of ignorance and indifference on one hand, and a combination of good men seeking to improve the position prepared for their successors on the other hand. We have heard of competition between rival stage coaches, the proprietors of which have lowered the fares until at last they have carried their passengers for nothing, and I have even heard of a spirited competitor, who, in such a case, has offered to give a bottle of wine into the bargain. The promoters of pharmaceutical education and advancement have acted upon a somewhat similar principle, but with a much better motive to justify their conduct.

Now, is it necessary to perpetuate the system of subsidising our schools? Can we not make them independent? Treating them as the offspring of the Pharmaceutical Society, would it not be the natural solicitude of a parent to see them capable of taking care of themselves? Yet a just and judicious parent, after petting and spoiling a child, and making it dependent on home for all its resources, would not at once cast it off without capital to start with on its own account, or any remunerative occupation on which to depend for its future support. The society under the pressure of circumstances has made the business of pharmaceutical education an unprofitable one. It has spoilt the education market, and it owes it as an imperative duty alike to teachers and students, to endeavour to put the process of school teaching on a more satisfactory footing before withdrawing the support it has hitherto so liberally afforded.

Why should pharmaceutical students expect to have expensively illustrated lectures provided for them at a charge of 2½*d.* a lecture while the usual charge for similar lectures elsewhere is about two shillings? At the Government school of Mines, a school established at considerable cost to the Government, and conducted on terms not illiberal to students, the fee for attendance at forty lectures on inorganic chemistry is £4, or at the rate of two shillings a lecture; whereas the fee for attendance at more than a hundred lectures delivered in the school of the Pharmaceutical Society on chemistry and pharmacy and the physics relating thereto, is twenty-one shillings, or at the rate of two pence-halfpenny a lecture.

It may be questioned whether at any time it was sound policy to depreciate in this way the value of lecture teaching, by charging fees which are so utterly at variance with those usually charged, and so disproportionate even to the bare cost of their production. Our two-penny lectures are no doubt often estimated at the value we attach to them, and the society that provides them at considerable sacrifice and expense is barely thanked for its liberality. But admitting that there was sufficient justification for the course originally adopted in providing lectures at a cost to the students which left them no excuse for not availing themselves of such means of instruction, the same thing cannot be said with reference to the future. The law now renders education necessary, and those who provide it are entitled to be paid a fair value for the benefits conferred in meeting the demand thus created.

It is neither just nor fair, since the occasion for it has ceased, that we should continue the practice of underselling in the lecture-market. We have not done so with our practical classes, and it has been shown that as regards mere current expenses, *they* can be made self-supporting. May we not hope to see the lecture classes put, perhaps not suddenly, but gradually, upon an equally satisfactory footing?

I think it is the duty of the Society to endeavour to accomplish this object. It would be a manifest injustice to throw the burden of an unprofitable undertaking on to the professors, and to expect them to take the responsibility of providing education for a class of students who have been led to believe that it would be supplied to them at merely nominal fees.

I do not even think, if the Society could and should bring about such a change in regard to lecture arrangements as would assimilate the fees with those charged for similar lectures in other schools, that it would be practicable to meet all expenses from this source, that is, to pay for premises, and stock-in-trade, as well as to meet current expenses, out of the fees paid by students. Something must be done in the way of endowment. Our practical school in Bloomsbury Square was liberally endowed by Jacob Bell, in addition to what has been done for it by the Society. The lectures in the same school may also be said to be endowed, by the stock of apparatus and specimens in the museums and elsewhere, and the premises, the use of which is supplied by the Society. Without these where and what would the school be?

But here a question presents itself. It may be asked, how can we approve of endowment, and at the same time condemn subsidisement? I think there is a wide difference between them which justifies our doing so. Endowment gives strength, while subsidisement represents and engenders weakness. The one is capital indicating power, and the other is pension indicating dependence, and implying deficiency of energy or renunciation of effort. All our best schools are endowed, but not subsidised.

I cannot conceive it possible to establish schools such as we require without endowment. What have we been doing for the Chicago College of Pharmacy? And have we not stronger claims at home, for the endowment of schools for our own students?

It appears to me that there are two objects the Society ought to aim at, namely, first to establish a scale of lecture and class fees sufficient to meet the current expenses of the central school, over which it has complete control, and when the change involved in the accomplishment of this object has been fairly tested and found to be effectual, to proceed in the next place to the endowment of the school to a sufficient extent to ensure its permanence and efficiency, without further aid from the Society.

In carrying these objects into effect, increased facilities would be given for the starting of provincial schools with some prospect of success. If a scale of remunerating fees were adopted at the central school, a similar system would naturally follow and could be more easily maintained in the provinces. Means would thus be afforded of ascertaining to what extent and where further school accommodation was required and could be creditably and efficiently supported. Such schools in due course would claim, and no doubt receive assistance from the Society, as well as from those more immediately connected with them, who would be required to contribute in some way to their endowment.

It has been represented that any attempt to establish and maintain schools affording complete and thorough pharmaceutical education, must fail while the prevailing system of coaching or cramming pupils is allowed to exist. I do not agree with this opinion, but of course if the cost of attending our recognised schools should be increased, the difficulty they would experience in contending against the inducements to adopt a short and easy process of preparing for examination would be augmented.

Dr. Attfield thinks that the pernicious system of cramming pupils for examination can only be suppressed, either by requiring candidates for examination to show that they have studied for a specified time in a specified way, or by altering the character of our examinations. We shall no doubt all agree that if any thing could be done to encourage the lengthening within certain limits, or to discourage the undue shortening, of the time occupied in acquiring the knowledge of which evidence is to be given at the examinations, it would be an important point gained. I must say, however, that I doubt the practicability of enforcing the adoption of a fixed curriculum of education for all pharmaceutical students, and I should be sorry to see any material alteration made in the constitution of our Board of Examiners. But this brings me to the consideration of the next question,

What is the best method of testing the qualifications of those to whom certificates giving the right to practice pharmacy are granted?

With reference to this question we must not lose sight of the legitimate object of our examinations, which is to protect the public from the injurious effects of ignorance in those who would undertake the exercise of important duties affecting the public health. Our examinations are not intended for the discovery of the extent of a candidate's knowledge so much as of his want of knowledge. They are designed rather as a test of his weak points than of his strong points. The knowledge to be tested is of a varied but special and technical nature, involving an acquaintance with drugs, their natural sources, their commerce, composition, and properties, the uses to which they are applied in medicine, the methods by which they are prepared for such uses, the physical agencies employed in the preparation of medicines, the chemical changes which occur in their production, and the means of distinguishing them from each other, the good from the bad, the genuine from the spurious or adulterated.

It is not a high degree of scientific attainment in any of the branches of knowledge comprised in this carriculum that is most wanted, but a general proficiency in all, and great ignorance in none.

The examiners by whom the required qualification will be best ascertained are those who possess the full qualification themselves, and whose practical experience enables them to determine where and what allowances may be admitted without detriment to the interests of the public.

If the object of the examinations were the testing of the extent to which candidates had carried the acquirement of knowledge in the higher branches of the departments of science included in the curriculum, it might be desirable to have men on the Board of Examiners who were devoted exclusively to the cultivation of those sciences; but as such an object is not and ought not to be contemplated, any alteration in that respect in the constitution of the Board would, I believe, be detrimental to its usefulness.

I am not aware of our examinations having in any respect failed to accomplish what is required of them. The examiners consist of the best men that can be found willing to undertake the duties, and belonging to the class most capable of making a judicious selection of those to whom the practice of pharmacy may be safely entrusted. As the system of compulsory examination proceeds, and students present themselves who have commenced their pharmaceutical education with a full knowledge of what they have to pass through and prepare for, some modifications, will, no doubt, be made in the method of testing the qualifications of candidates. Without going to the extent that has been suggested, I think something might be done to encourage legitimate study, and to discredit cramming. At the examinations of the University of London, although candidates for degrees are allowed to get the required knowledge in any way they please, they have to state in general terms how their studies have been conducted. This, no doubt, serves as a guide to the examiners. With a similar object, when the practical class of the Pharmaceutical Society was under my direction, I latterly always obtained from every student on entering, a statement of the opportunities for study that he had previously availed himself of, by which I was better able to judge of the further studies best suited for him. Information thus obtained would probably prove useful at our examinations.

The weaknesses and defects which are associated with particular kinds of education are most easily discovered by methods of examination having that special object. If candidates were required to state where, when, and how their education had been conducted, the information thus furnished would enable the examiners to conduct the examinations with better effect. And thus, without imposing any particular programme of education upon all students alike, encouragement would be given to such as afforded the best results, while imperfect and superficial teaching would be subjected to its merited discredit, whatever that might be.

I would not in any respect alter the constitution of the Board of Examiners. The introduction into it of men exclusively devoted to the pursuit of science would be calculated to weaken the feeling of responsibility of the non-professional members of the Board, and to lower the importance of the position occupied by them. Such a change would also be likely to induce the adoption to some extent of a different style of examination from that hitherto pursued. It would I conceive be a great mistake to endeavour to suppress superficial teaching by giving to the examinations a higher and more scientific character.

It is not by putting questions on abstruse or difficult subjects, or highly scientific but practically unimportant subjects, or questions the meaning of which is not easily comprehended, or which relate to subjects not generally known to persons well informed in the department of knowledge to which the examination relates, that the legitimate objects of examination are most fairly and effectually realized. Questions belonging to one or other of those classes may give an air of learning to the operations of the examining board, and may increase the appearance of superiority of the examiners over the examined; but they are not calculated to elevate the character of the examinations in the estimation of those most capable of forming a just and impartial opinion with reference to them.

In examinations such as those entrusted to our Society, none but plain, simple, and I may almost say, common-place questions, need ever be used; and if, to the extent to which the examinations are carried in any department of knowledge, the examiners be well informed and practically familiar with the subject-matter referred to, and time enough be allowed for the testing process, there will be little to fear from the effects of any mere process of cramming, Time, however, is an important element in a trustworthy examination ; and it is, I believe, by extending and economising its employment that improvement will be effected, more perhaps than in any other way, in this department. One method of economising the time of the examiners would be by making the Minor, as well as the Major examination, to a great extent a written one. But even then the *vivâ voce* examination would admit of extension with advantage, so that the effect of these changes would be not to lessen but to increase the work of the examiners. A great augmentation of this work seems in fact to be inevitable, on account, not only of extension of the time devoted to each candidate, but also of increase in the number of candidates for examination. To meet the demand thus made on the Board of Examiners, I would suggest the appointment of assessors rather than additional Examiners. There is a good deal of work connected with the examinations which might be advantageously assigned to competent assessors, and the examiners would thus be spared much of their labour. Should the Society be relieved of the charges hitherto incurred for education, it would be able to devote more of its resources to the establishment of a thoroughly efficient system of examination.

The work of examination is the all-important work of the Pharmaceutical Society to which the best energies of its best men may be honourably and beneficially devoted. The provision for education which the Society has made, and by the establishment of which it has laid the foundation of its power, and obtained the confidence of all classes, both in and out of Parliament, will be a lasting evidence of disinterested zeal and generous devotion in a cause, the carrying out of the objects of which has been so far accomplished, that the Society may now prepare to apply its available means in another direction, in support of what has become its great and primary object.

CHEMICAL NOMENCLATURE.*

BY PROFESSOR A. CRUM BROWN.

Setting aside in the meantime "trivial" or "proper names" (names which are simply arbitrary words or marks, each indicating, in virtue of a convention applicable to each individual case, a particular substance), there are two systems, or kinds of systems of chemical nomenclature. These may be distinguished as 1st, the composition system, and 2nd, the functional or relational system, or class of systems. In the first the name of a compound indicates the elements or radicals contained in it, and sometimes their proportions. Thus Chlornatrium, Chloriod, dreifach Chloriod, Siliciumwasserstoff, etc. In English we have few names so distinctly compositional in form (we have, indeed, zinc methyl and all the other allied names), but many of our names, although functional in form, are really compositional. Thus, chloride of A means with us nothing more than, or different from, a compound containing the elements chlorine and A; and chloride of sodium, chloride of iodine, ter-chloride of iodine, siliciureted hydrogen not only represent the same substances as the German names just quoted, but tell us neither more nor less about the substances than these German names do. On the other hand, functional names indicate the chemical relations between substances. We may take as examples such names as the anhydride, the amide, the aldehyde, the nitrile of acetic acid. These derivatives of acetic acid contain no acetic acid, but they stand in certain definite relations to that substance, and the anhydrides, amides, aldehydes, and nitriles of other acids stand in the same relation to them. What is still, notwithstanding the efforts of modern chemists, the common popular nomenclature of salts, although originally intended as a compositional nomenclature, might with perfect consistency, be retained as a functional nomenclature. The objection to the term "muriate of soda" was that the substance so named contains no soda. But the amide of benzoic acid contains no benzoic acid. Soda contains oxygen; muriate of soda contains none (unless chlorine be an oxide), but the nitrile of benzoic acid contains no oxygen, although the acid itself does. The name muriate of soda originally meant the *compound* of anhydrous muriatic acid, $2HCl-H_2O$, and anhydrous soda Na_2O, $(2HCl - H_2O) + Na_2O$. We may now, if we please, use the name to mean the result of the action $2HCl + Na_2O-H_2O$. If we do so, the name becomes a functional one, and the phrase "muriate of," or, what is neither better nor worse, "hydrochlorate of," expresses the complex operation—addition of hydrochloric acid and simultaneous separation of water. Similarly, in the case of such names as sulphate of potash, nitrate of oxide of silver, etc., the phrases "sulphate of," "nitrate of" express the complete operations, addition of sulphuric, or nitric acid, and simultaneous separation of water.

While the old view that salts are compounds of anhydrous acids and anhydrous bases is now abandoned by most theoretical chemists, a relic of this view still remains in the most advanced systems of nomenclature, producing an inconsistency really inconvenient to the teacher and student.

The objection taken to the name hydrochlorate of soda was not only that the substance contains no soda, but also that it contains no hydrochloric acid ; this objection is perfectly valid against the name as a compositional one, but does it not equally hold against the words sulphate, nitrate, acetate, etc.? If we are to have hydric sulphate and hydric acetate for sulphuric and acetic acids, why not hydric muriate for muriatic acid? That this question is not altogether an absurd one will be obvious if we consider that all chlorides are not muriates. Those substances which are by general consent called salts stand in a definite genetic relation to the correponding acids (or the hydric salts of the series), and it is inconvenient to have the same general name—chloride—applied to substances which do stand in this relation to hydrochloric acid, and also to those which do not. We may divide the chlorides into two groups, very different in character in their extreme members, and gradually shading into one another. We may take chloride of sodium as a representative of the one, and the chloride of phosphorus as a representative of the other. Chloride of sodium is a muriate; the chloride of phosphorus might be better described as the double anhydride of muriatic and phosphorous acids. We may call the acids and acid anhydrides negative, the hydrated bases and anhydrous bases positive ; arranged in a series, we find the series a continuous one from the most positive or basic oxides or hydrates to the most negative ; it is, however, convenient to have a zero point, and it is no disadvantage if this zero point be an arbitary one. When we come to express numerically the amount of positiveness or negativeness of those oxides and hydrates, it will be necessary to have a zero point, and a very convenient one is that which corresponds pretty nearly to the generally understood limit between bases and acids, and depends upon the direction in which the action $A + \text{water} = B + \text{hydrochloric acid}$ takes place; where A is a chloride and B a hydrated or anhydrous oxide.

* Paper read before the Chemical Section of the British Association at Brighton.

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PHARMACEUTICAL EDUCATION.

IT is with much pleasure that we call the attention of our readers to a paper on this subject from the pen of Professor REDWOOD, in which he deals with the various points that have been raised not only in the discussion at Brighton, but also by correspondents in this Journal. The Professor's long, and we may say special, experience of this subject, enables him to speak of it authoritatively, and we think few will fail to acknowledge that he does so likewise with a thoroughly catholic appreciation of the various interests involved.

It is with especial satisfaction that we find the Professor decisively urging opinions which we have on several occasions ventured to suggest when referring to the subject of pharmaceutical education. In the first place, while recognizing the necessity that has arisen for extending the scope of our educational arrangements, the important fact that the former action of the Society is incompatible with the altered conditions now existing is not lost sight of; the incomplete, and, in some respects, insufficient nature of the Society's past efforts is fully admitted, as well as the necessity for entirely remodelling our educational arrangements. This important fact has been too much overlooked by many who have expressed their opinions on the subject of late, and we think Professor REDWOOD has done good service by urging it upon the consideration of those who take an interest in the future welfare of pharmacy in this country.

At the same time, those who have been active in advocating the support of pharmaceutical education by the Society, will no doubt rejoice to find Professor REDWOOD in no degree disposed to exonerate the Society from responsibility in this matter, especially during the present period of transition; but we would strongly urge upon the consideration of those who, as we have been told, by Mr. PICKERING, and others, are thoroughly roused in regard to the aid to be given to education, the clear and forcible manner in which the essential characters of pharmaceutical education are set forth and insisted upon by the Professor. Those who fairly consider this aspect of the matter will, we believe, fully agree with him in his pleading for the practical and thorough nature of any educational work that is to be undertaken, and for the self-supporting action of any schools that may be established. The efforts hitherto made by the Society in the cause of education have done their work in establishing the present requirements of the law, and whether the system adopted with that object was politic or not, we think there is little doubt that it is now an anachronism: its continuance indeed, under existing conditions would tend to depreciate rather than promote education, and we entirely agree with Professor REDWOOD in thinking it the duty of the Society to endeavour to make every department or branch of the School of Pharmacy satisfactorily self-supporting.

THE NEW ADULTERATION ACT.

THE question raised by our correspondent "Pharmaceutist" as to the eligibility of pharmaceutical chemists for the office of public analyst under the New Act is, we fear, one that can scarcely be answered satisfactorily for them, if the wording of the Act be strictly interpreted. The specified requirement is the possession of "competent *medical*, chemical and microscopical knowledge," and it would appear to restrict these appointments to medical men. At the same time we agree with our correspondent in thinking, as we have repeatedly stated in this Journal, that there is no class among which more competent persons could be found to hold the office of public analyst than the pharmaceutical chemists. Indeed, we would go further than our correspondent, and say that however well-qualified medical men may sometimes be to fill this office, the nature of their occupations is such as to render them far less able to perform its duties satisfactorily than would be the case with pharmaceutical chemists; and we trust some steps will be taken to afford them an opportunity of rendering the services for which we believe they are frequently so well fitted.

THE OPENING OF THE SESSION.

WE have to remind our readers that the next evening meeting of the Society will be held on Wednesday, the 2nd of October, and that on this occasion the Address to Students will be delivered by Mr. STODDART, of Bristol. Ladies are invited to attend this meeting; and the distribution of sessional prizes and certificates will take place then. The Council also invites for this evening and the following day the exhibition of any articles of novelty or otherwise especially interesting to pharmacists, and for this purpose intending exhibitors should communicate at once with the Secretary.

THE LIBRARIANSHIP OF THE LONDON INSTITUTION.

We understand that it is not the intention of the Board of Managers of the London Institution to fill up the vacancy occasioned by the decease of Mr. J. C. Brough, F.C.S., until after November. The salary is £200 per annum, with apartments, coals and light, and payment for whatever lectures may be delivered by the librarian. He is expected to reside in the house, and superintend as representative of the Board.

INDIAN OPIUM.

With regard to the blight which has seriously attacked the poppy crops in the opium agencies of Behar and Benares, and which has been the subject of some anxiety amongst the authorities in India, there seems to be great fears that it will prove to be of fungoid origin. At first it was thought more than probable that the blight might be attributed to the exhaustion of the soil, consequent upon constant poppy crops without any change or rotation, coupled with insufficient manuring. Dr. King's recommendations on these points, which are contained in a letter addressed to the Secretary to the Board of Revenue, Lower Provinces, are well worth the attention of the opium cultivators, as there can be no doubt that a careful system of tillage would much enhance the value of the crops. He says, "If starvation be the cause, the remedy lies in manure, and by far the best manure and one universally obtainable is cow-dung. This, however, is at present the chief fuel of the people in the drier districts, and little of it reaches the fields, except possibly in the form of ashes, the value of which, as compared to that of the unburnt dung, is but small. Whether this 'blight' be really a special disease or not, it could do no harm were the local opium offices to be instructed to exhort the ryots to burn as little cow-dung as possible, in order that they might save it for manure, and also to collect the filth and sweepings of their villages and put them on their fields. Natives have a great many fancies about the application of manure. They think, for instance, that only rotten cow-dung is of any use, and that if applied fresh to the fields this manure will burn up the crops. They should be disabused of such notions. It may not be quite out of place to draw the attention of the Board in this letter to the progressive exhaustion of the soil which is going on in the drier parts of the country. An Indian field has little rest. In the rotation of cultivation there is no intervention of a fallow year, or of one or two years in grass, as in England. In fact there is really no rotation. Mixed crops are grown in one field, and that often for years in succession. Efficient manuring is unknown, and many fields are never manured at all. The best manure is used as fuel, and, I fear, must to a great extent continue to be so until cheap firewood is supplied to the people. Trees of all sorts other than fruit-bearers, are ruthlessly cut down, and none are planted in their places, natural reproduction being relied upon. But natural reproduction is impossible as long as goats and buffaloes are allowed without let or hindrance to browse down any seedlings that may by chance appear. From the rapid disappearance of all timber, the dependence of the people on dung for fuel is daily increasing. It is, I think, obvious to any one looking carefully into the matter that this state of things cannot last very much longer. The only wonder is that it has lasted until now, and that the soil has not long ago refused to yield. The poppy plant being a gross feeder, its cultivation is one of the first that may be expected to fail from the cause above indicated. As has already been mentioned, I do not say that this 'blight' is really the result of exhaustion, but I do not think it unlikely, and until the cause of it can be settled, I think it would be wise to insist on higher cultivation, and on every ground I consider it is advisable for Government to delay no longer the establishment of fuel plantations in all the barer dry districts."

Notwithstanding Dr. King's excellent advice, as we before said, we fear there is too much reason to believe that the blight is referable to a fungoid growth. Some poppy leaves which have been sent home and submitted for examination to an eminent mycologist have been proved to be attacked by *Cladosporium herbarum* and a species of *Peronospora*, perhaps *P. arborescens*, which attacks *Papaver Rhœas* in this country.

THE COLLAPSE OF CUNDURANGO.

Whether this plant be a species of *Gonolobus Marsdenia*, or any other genus of Asclepiadeæ, it seems nearly to have run its course in a pharmaceutical point of view. From a report of the British Vice-Consul at Guayaquil we learn that it has caused a great amount of speculation in its native country. The Government, having received favourable reports of cures effected by it from medical men in the interior, hastened to send samples to Europe and the United States in order that its curative properties might be tested by competent men. Several speculators, and orders to buy it arrived from the United States, and the price was quickly run up to 100 dollars per quintal. The reports of its use in the hospitals of Europe and the United States proved that, unfortunately, it is not the much desired specific for curing cancer, and its value consequently fell to almost nothing. Several commercial firms in New York have declined to receive consignments of it unless the freight is prepaid, as they cannot sell it for enough to cover the cost of its carriage from Guayaquil to New York.

Provincial Transactions.

NORTHAMPTON CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The Monthly Meeting of this Association was held August 30th, 1872. The President, Mr. H. J. Masters, said he was very pleased the question of provincial education had been considered so fully at the meeting of the Pharmaceutical Conference, and hoped they would be able to discuss Dr. Attfield's paper at their next meeting. He then congratulated the Secretary, Mr. Druce, upon having obtained the prize of books which was open to all who had passed the Minor in honours during the year.

Mr. J. Tutton read a paper on "The air we breathe," in which he explained the composition of the atmosphere, described the physical and chemical characters of the gases of which it was composed and the impurities it contained, and explained in a lucid manner the law of gaseous diffusion, the production of ozone, and the phenomenon of lightning.

After the discussion a hearty vote of thanks was passed to Mr. Tutton. The President said he was glad they were now able to carry out the plan of a circulating library, and the Committee would meet at the earliest opportunity to draw up a code of rules for its management, and also to arrange for the commencement of the winter session.

HALIFAX CHEMISTS AND DRUGGISTS' ASSOCIATION.

Sept. 19, 1872.—Mr. Stott, President, in the chair. A report from the Treasurer was read, showing a balance in favour of the Association of £4. 9*s*. 7*d*., after which the Secretary brought before the meeting the sale of vermin killers. A free discussion took place, particular stress being laid upon the recent remarks of the coroner at Leeds with respect to the non-registering of them. In order to be on the safe side it was resolved, "That no packets of vermin killer be kept in stock of less value than 3*d*. for the future, and that all sales be duly registered."

The system of early closing adopted by the trade last winter was the next subject discussed. The feeling was unanimous in favour of continuing the same plan for the ensuing winter months, viz., putting up the shutters at 7 o'clock, and finally closing at 8. Mr. Dyer trusted that before long the Society would make an attempt at closing somewhat earlier on Saturdays now that the 11 o'clock Publicans Act was in force. He thought if the shutters were put up at 9 o'clock, and the shop door finally closed at 10, it would prove a great blessing to the trade in many ways. After a few remarks on the Food and Drug Adulteration Bill as affecting our interests, the President called the attention of the meeting to the proceedings of the managers of the Civil Service Stores. They were about extending the chemical department, and he thought it was time that something should be done. He saw a few days ago at the station a hamper of medicine from the stores directed to one of his customers, and he was informed that not only members of Parliament but a Cabinet minister in this neighbourhood were supplied by the company. Mr. Dyer quite agreed with the President in his remarks as to the injury this company is inflicting upon the retail trade. A friend of his the other day was quoting to him a list of prices of articles in the fancy and perfumery line, most ruinously low. What steps did the President think could be taken under the circumstances? The President said that public opinion ought to be brought to bear upon it by means of the press, drawing the attention of members of Parliament to the illegality of servants of the Crown engaging in trade on their own account, and by meetings such as these. The Secretary thought that other trade organizations, such as the drapers, grocers, etc., would have to take the matter up, and thus a powerful support might be given to the National Chamber of Trade. He thought it was the duty of the Pharmaceutical Council to test the legality of the company dispensing prescriptions. The subject was adjourned till the next meeting.

THE BRIGHTON ASSOCIATION OF PHARMACY.

At a meeting of the Committee, held at the Town Hall on the evening of Thursday last, the proposed rules were considered, amended, and ordered to be printed, and a copy to be sent to each principal, assistant, and apprentice in the town; and in order that all may have an opportunity of joining the association, it was thought desirable that a personal application should be made, and that the following be deputed to call on the members of the trade in their respective district:—Messrs. Savage and W. H. Smith for the east; Messrs Gwatkin, jun., and Ettles for the north; and Messrs. Cornish and Mathews for the west.

Proceedings of Scientific Societies.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

Address of the President of the Chemical Section.

One of my fellow-students in the laboratory of the late Professor Graham began the study of chemistry because he wanted to be a geologist, and he had read in some Geological Catechism that, in order to be versed in that science, it was necessary, as a preliminary step, to gain a knowledge of chemistry, mineralogy, zoology, botany, and I know not what besides. My friend became a chemist, and found that enough for the exercise of his faculties. Yet the catechism had truth on its side; for so intertwined are the various branches of observational or experimental research, that a perfect understanding of one can only be obtained through an acquaintance with the whole cycle of knowledge. Yet, on the other hand, who can survey the whole field even of modern chemistry? There was a time doubtless, in the recollection of the more venerable of my auditors, when it was not impossible to learn all that chemists had to teach; but now that our 'Handbook' has grown so large that it would take a Briareus to carry it, and it requires a small army of abstractors to give the Chemical Society the substance of what is done abroad, we are compelled to become specialists in spite of ourselves. He who studies the general laws of chemistry may well turn in despair from the ever growing myriads of transformations among the compounds of carbon. We have agricultural, physiological, and technical chemists; one man builds up new substances, another new formulæ; while some love the rarer metals, and others find their whole souls engrossed by the phenyl compounds. How is this necessity of specialization to be reconciled with the necessity of general knowledge? By our forming a home for ourselves in some particular region, and becoming intimately conversant with every feature of the locality and its choicest associations, while at the same time we learn the general map of the country, so as to know the relative position and importance of our favourite resort, and to be able (when we desire it) to make excursions elsewhere. To facilitate this is one of the great objects of the British Association. The different sections are like different countries; and, leaving the insular seclusion of our special duties, we can pass from one to the other, and gain the advantages of foreign travel. From this chair I must of course regard chemistry as the centre of the universe, and in speaking of other Sections I must think of them only in their relation to ourselves. There is that rich and ancient country, Section A, which, according to the Annual Report, comprises several provinces, Mathematics, Astronomy, Optics, Heat, Electricity, and Meteorology. It was when the idea of exact weight and measures was projected into it that Alchemy was transmuted into Chemistry. As our science has become more refined in its methods its numerical laws have become more and more significant; and it may safely be predicted that the more closely it is allied with general physics, the greater will be the mathematical knowledge demanded of its votary. But till lately the chemist and the astronomer seemed far asunder as the heavens and the earth, and none could have foretold that we should now be analysing the atmospheres of the sun and stars, or throwing light on the chemical composition of planetary nebulæ and the heads of comets. There is in this, too, as in other things, a reciprocal benefit; for we are encouraged to hope that this celestial chemistry will reveal to us elements which have not yet been detected among the constituents of our globe. Light, Heat, and Electricity: how intimately are these associated with the chemical force, or, rather, how easily are these Protean forces transformed into one another! The rays of the sun coming upon our earth are like a chemist entering his laboratory: they start strange decompositions and combinations not only in the vegetable kingdom, but also among the inorganic gases and salts! they are absorbed selectively by different bodies which they penetrate, or are refracted, dispersed, and polarized according to the chemical composition and structure of the substance. All this has been the subject recently of much scientific research; and I need scarcely remind you of the beautiful art of photography as one of the results of photo-chemistry, or the benefits that have arisen from a study of circular polarization, indices of refraction, and especially spectrum-analysis. In regard to the latter, however, I would remark that while the optical examination of the rays emitted by luminous vapours has yielded most brilliant results, there is another kind of spectrum-analysis—that of the rays absorbed by various terrestrial gases, liquids, and solids—which has already borne valuable fruit, and which, as it is far more extensively applicable than the other, may perhaps play a still more important part in the Chemistry of the future. The dispersion of the rays of the spectrum is certainly due to the chemical nature of the body through which they pass; but this is yet almost unbroken ground waiting for an explorer. As to heat, it has ever been the tool of the chemist; and it would be difficult to over-estimate the significance of researches into the specific heat or the melting and boiling points of elements and their compounds. The laws of chemical combination have been elucidated lately by thermo-chemical researches; it has been sought to establish a connection between the absorption or radiation of heat and the complexity of the chemical constitution of the active body; while the power of conducting heat, or of expanding under its influence, offers a promising field of inquiry. As to electrical science, one department of it (Galvanism) is strictly chemical; the electrolytic cell does our work: and indeed we claim half the electric telegraph; for while the needle may oscillate in Section A, the battery belongs to B. Last in Section A comes meteorology; and there are chemical questions concerning the constitution of the atmosphere, its changes, and the effect of its occasional constituents upon vegetable and animal life, which merit the deepest attention of the physiologist, philanthropist and statesman. If we turn to Section C, there is an outlying province belonging to us—namely, mineralogy, which lies on the frontiers of geology. A vast and very promising region is the origin and mode of formation of different minerals; this has attracted some explorers during the past year; but in order to investigate it properly, the geologist and the chemist must travel hand in hand. Geology, in demanding of us the analysis of earths and ores, rocks and precious stones, repays us by bringing to our knowledge many a rare element and strange combination. When we pass from C to D (that is, from the crest of the globe to the organized beings that inhabit and adorn it) we are introduced into new regions of research. When organic chemistry was young, Cuvier said of it, "Dans cette nouvelle magie, le chimiste n'a presque qu'à vouloir; tout peut se changer en tout; tout peut s'extraire de tout;" and though we have now learnt much of the laws by which these magical transformations proceed, they far transcend the dreams of the French philosopher; there is yet no visible limit to the multitude of products to be derived from the vegetable and animal world, and their changes seem to afford boundless scope for chemical ingenuity. The benefit here also is reciprocal; for the physiologist enters by our aid into the wonderful laboratory of the living plant or animal, and learns to estimate the mode of action of different foods and medicines. There have lately been some good researches of this character. The difficulties are great; but the results to be achieved are worthy of any effort. There may be little intercourse between us and the geographers in E; but we stand in no distant relationship with many of the subjects discussed in F. Economic science embraces the chemical arts, from cookery upwards; such imperial questions as that of the national standards, or the patent laws, interest us greatly; the yield of our corn fields is increased through our knowledge of the constituents of soils and manures; and upon many of the chemical manufactures depend in no small degree the commerce and wealth of Britain. In this most important branch of technical chemistry we need the skill of the mechanician; and this introduces us to Section G. One of the questions of the day illustrates the connection between these varied departments of study. Statistics prove that the consumption of coal is now advancing, not at the gradual pace which recent calculations allowed, but at a rapidly accelerating speed; and they make the householder anxious about rising prices, and the political economist about the duration of our coal-fields. It is well known that there is a great waste of fuel throughout the country, as the maximum of heat produced by the combustion is very far from being ever utilized; and it will be for the combined wisdom of the chemist, physicist and mechanician to devise means for reducing this lavish expenditure, or to indicate other available sources of power. While this correlation of the natural sciences renders it desirable that the votary of one should have some general acquaintance with the rest, the correlation of all knowledge shows that no education can be complete which ignores the study of nature. A mind fed only on one particular kind of lore, however excellent that kind may be, must fail of proper nourishment. I am not going to say a word against philological studies; I am too fond of them myself for that; I could wish that the modern languages were taught more, and the classic languages were taught better, than they are at present. But what I contend for is, that chemistry (or some cognate branch of science) should have an honoured place in the education of every English lady and gentleman. I say purposely "an honoured place;" for at present where chemistry is introduced we too often find the idea latent which was expressed by one principal of a lady's college, who told a friend of mine that he was to give the girls a course of pretty experiments, but that she did not expect him to teach them any thing; and we know that when boys repeat chemical experiments at home it is looked upon as an amusement, a philosophical one no doubt, but rather objectionable, inasmuch as they spoil their mother's towels and singe their own eyebrows. Of course, some knowledge of chemistry is indispensable for a large number of our manufacturers, and for members of the medical profession, while it is extremely valuable to the farmer, the miner and the engineer. It will also be readily granted that information about the air we breathe, the water we drink, the food we live upon, the fuel we burn, and the various common objects we handle, must be of service to every man. But we are met by the advocates of the old system of education with the remark that the value of school-teaching does not depend so much upon the information given as upon the mental training. This I admit—though it seems to me that if the same training can be secured by two studies, the one of which (like the making of Latin verses) gives no information at all, while the other (like chemical analysis) imparts some useful knowledge, we should prefer the latter. But I hold that, as a means of educating the mental faculties, chemistry, faithfully taught, has in many respects the advantage over literary studies. There is superabundant scope for the exercise of the memory: the powers of observation are developed by it to a wonderful degree; the reasoning powers may be well disciplined on the philosophy of chemical change, or the application of the laws of Dalton, Mitscherlich, and Avogadro; while the imagination may be cultivated by the attempt to form a conception of the ultimate particles of matter, with their affinities and atomicities, as they act and react upon one another under the control of the physical forces. And I might speak of higher considerations than mere intellectual culture; for surely the works of the Allwise and Bountiful Creator are a more truthful and a purer subject of contemplation for the opening minds of youth, and more in accordance with Christian ideas, than are the crude notions of a past stage of civilization, and the ignorant and gross fancies of a defunct paganism. There is another requirement in education—the training of the mind to the discovery and recognition of truth. For this purpose, philological studies have no fitness; mathematical studies, though peculiarly adapted for it, apply only to cases where demonstrative proof is possible; but the study of physical science is remarkably well fitted for teaching the proper methods of inquiry, and the strict relations between theory and fact. Now, the historian, the politician, the mental philosopher, the theologician, or any one else who desires to influence the thoughts of his fellow-men, should be in a position to distinguish between truth and error in his own department; and his mind may be well disciplined for this by a study which is less liable to be disturbed by human passions, predilections, or wishes, and where the conclusions are more readily brought to the test of observation or experiment. Our Government insists on a certain standard of education for all who are allowed to teach in our elementary schools. In those schools which receive no State aid, it is only public opinion which can insist that the teacher shall be duly qualified himself. Such bodies as the British Association form this public opinion, and will deserve well of their country if they demand that these masters and mistresses shall know something of the material universe in which they move, and be able to impart to every child such scientific knowledge as shall afford him an interesting subject for thought, give him useful information, and discipline his mental powers. Among the many services rendered by the monthly reports of the progress of chemistry which the Chemical Society publishes, and the British Association helps to pay for, there is one which is rather salutary than pleasant. They bring prominently before our notice the fact that in the race of original research we are being distanced by foreign chemists. I refer not to the quality of our work, about which opinions will probably differ, but to the quantity, which can be determined by very simple arithmetic. This is a matter of no small importance, not only for the honour of England, but still more for the advancement of science, and the welfare of man. From the Physical Chair of this Association last year, a note of warning was uttered in the following words, after a reference to the sad fate of Newton's successors who allowed mathematical science almost to die out of the country:—"If the successors of Davy and Faraday pause to ponder even on *their* achievements, we shall soon be again in the same state of ignominious inferiority." The President of the Chemical Society also, in the last Anniversary Address, drew attention to the diminished activity of chemical discovery, and to the lamentable fewness of original papers communicated. He traces this chiefly to the "non-recognition of experimental research by our universities," and suggests that in the granting of science degrees every candidate should be required, as in Germany, to prove his ability for original investigation. Concurring in this, I would remark that other causes have also been assigned, and other suggestions have been made. There is the small recognition of original research even by our learned societies—at least such recognition as will come home to the understanding of the general public. It is true the Fellowship of the Royal Society is awarded mainly for original discoveries, and there are two or three medals to be disposed of annually; but these distinctions fall to the lot of the seniors in science, often men who are beyond the need of encouragement; and though they doubtless are serviceable as incentives, there is many a beginner in the honourable contest of discovery who is too modest even to hope for the blue ribbon of science. While the Victoria Cross is awarded to few, every soldier who has borne part in a victory expects his clasp; and so might every man who has won victory over the secrets of nature fairly look for some public recognition. It has been suggested, for instance, that the Royal Society, in addition to the F.R.S., might institute an associateship, with the letters A.R.S., designed exclusively for those younger men who have shown zeal and ability in original research, but whose discoveries have not been sufficient to entitle them already to the fellowship. It is suggested, too, that the Chemical Society might give some medal or diploma, or some similar distinction, to those who contribute papers of sufficient merit. But beyond this is the non-recognition of scientific research by society in general. We can scarcely expect the average enlightened Englishmen to be anything but scared by a graphic formula, or a doubly sesquipedalian word containing two or three compound radicals; still he need not continue to talk of the four elements, or of acids being neutralized by sugar. But, indeed, the so-called educated classes in England are not only supremely ignorant of science; they have scarcely yet arrived at the first stage of improvement—the knowledge of their own ignorance. Then again there is the excessive preference of practical inventions over theoretical discoveries—or rather, perhaps, the inability to appreciate anything but tangible results. Thus, a new aniline compound is nothing unless it will dye a pretty colour; if we speak of the discovery of a new metal by the spectroscope, people simply ask, What is it useful for? and the rigorous determination of an atomic weight has for them no meaning, or interest or beauty. The general appreciation of science must be of gradual growth; yet there are wealthy men who know its value, and who might well become the endowers of research. There are, indeed, at present funds available for the purpose—such as the Government grant, and the surplus funds of this Association; but the money is given simply to cover actual outlay; and this, though very useful, scarcely meets the case of those young philosophers who have no balance at their bankers, and yet must live. Will not some of these wealthy men endow experimental scholarships, or professorships, in connection with our colleges, institutions or learned societies? As an instance of the good that may be effected in this way, the Fullerian professorships may be cited; and, as a very recent example, worthy of all honour, may be mentioned the purpose of Mr. J. B. Lawes, not only to continue his elaborate experiments at Rothamsted throughout his lifetime, but to place his laboratory and experimental fields in trust, together with £100,000, so that investigations may be continued in the wider and more scientific questions which the progress of agriculture may suggest. The Government of our country, through the Science and Art Department, renders good assistance to the teaching of science; and if the recommendations of the Royal Commission on Scientific Instruction and the Advancement of Science be adopted, the introduction of practical examinations for the obtaining of certificates for a superior grade of science-master will certainly foster a spirit of research. It has generally been held that the promotion of research is within the legitimate scope of Government; and where, as in the case of Aristotle and Alexander, genius and industry have been sustained by princely munificence, the happiest results have ensued. Yet this question of Government aid is a delicate one; for genius, when put into swaddling clothes, is apt to be stifled by them; and were science to depend on political favour or imperial support it would be a fatal calamity. Still I think it will be everywhere admitted that science might with propriety be subsidized from the public funds in cases where the results may be expected to confer a direct benefit upon the community, and where the inquiry, either from its expense, its tediousness, its uninteresting character, or the amount of co-operation required is not likely to be carried out by voluntary effort. The astronomical work which is paid for by Government bears upon navigation, and answers both these requirements; and it is easy to conceive of inquiries in our own science that might equally deserve the assistance of the State. Some of these might also more than repay the outlay, though perhaps the profit would not fall into next year's budget. I believe that this diminution of original research, which we deplore, is partly due to a cause in which we rejoice—the recent extension of science-teaching. The professorships of chemistry are scarcely more numerous now than they were twenty gears ago, while the calls upon the professor's time in conducting classes or looking over examination papers have greatly augmented. Thus, some of the most capable men have been drawn away from the investigation of nature; and in order to afford sufficient leisure for the purpose, means must be found to multiply the number of the professorships in our various colleges. While the rudiments of science are being infused into our primary education, now happily becoming national, while physical science is gradually gaining a footing in our secondary and our large public schools, and while it is winning for itself an honoured place at our universities, it is to be hoped that many new investigators will arise, and that British chemists will not fall behind in the upward march of discovery, but will continue hand in hand with their continental brethren thus to serve their own and future generations.

Parliamentary and Law Proceedings.

AN ACT TO AMEND THE LAW FOR THE PREVENTION OF ADULTERATION OF FOOD AND DRINK AND OF DRUGS.

(10*th August*, 1872.)

Whereas the practice of adulterating articles of food and drink and drugs for sale, in fraud of Her Majesty's subjects, and to the great hurt of their health and danger to their lives, requires to be repressed by more effectual aws than those which are now in force for that purpose.

Be it therefore enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:

Penalty on persons adulterating articles of food or drink or drugs.

1. Every person who shall wilfully admix, and every person who shall order any other person or persons to admix, with any article of food and drink, any injurious or poisonous ingredient or material to adulterate the same for sale, and every person who shall wilfully admix, and every person who shall order any other person or persons to admix, any ingredient or material with any drug to adulterate the same for sale, shall for the first offence forfeit and pay a penalty not exceeding fifty pounds, together with the cost attending such conviction, and for the second offence shall be guilty of a misdemeanour, and be imprisoned for a period not exceeding six calendar months, with hard labour.

Penalty on persons selling articles of food or drink or drugs which they know to have been adulterated.

2. Every person who shall sell any article of food or drink with which to the knowledge of such person any ingredient or material injurious to the health of persons eating or drinking such article has been mixed, and every person who shall sell as unadulterated any article of food and drink, or any drug which is adulterated, shall for every such offence, on a summary conviction of the same before two justices of the peace at petty sessions in England, or before two justices of the peace in the justices of the peace court, or before the sheriff substitute of the county, or before any magistrate acting under any general or local Police Act in Scotland, or before justices at petty sessions or a divisional justice in Ireland, forfeit and pay a penalty not exceeding twenty pounds, together with such costs attending such conviction as to the said justices, sheriff substitute, magistrate, or divisional justice shall seem reasonable; and if any person so convicted shall afterwards commit the like offence, such justices, sheriff substitute, magistrate, or divisional justice shall cause such offender's name, place of abode, and offence to be published, at the expense of such offender, in such newspaper or in such other manner as to the said justices shall seem desirable.

Vendor to declare mixture at time of sale.

3. Any person who shall sell any article of food or drink or any drug, knowing the same to have been mixed with any other substance with intent fraudulently to increase its weight or bulk, and who shall not declare such admixture to any purchaser thereof before delivering the same and no other, shall be deemed to have sold an adulterated article of food or drink or drug, as the case may be, under this Act.

Pharmacy Act, 1868, *and* 23 *&* 24 *Vict. c.* 84. *incorporated with this Act. Proviso*, 33 *&* 34 *Vict. e.* 26.

4. The Pharmacy Act, 1868, and the Act twenty-third and twenty-fourth Victoria, chapter eight-four, for preventing the adulteration of articles of food and drink, shall be deemed to be incorporated in this Act: Provided always, that in the application of this Act to Ireland the Act passed in the session of Parliament held in the thirty-third and thirty-fourth year of the reign of Her present Majesty, chapter twenty-six, intituled "An Act to regulate the sale of poisons in Ireland," shall be deemed to be incorporated in this Act instead of the Pharmacy Act, 1868.

Appointment of Analysts.

5. In the city of London and the liberties thereof, the commissioners of sewers of the city of London and the liberties thereof, and in all other parts of the metropolis the vestries and district boards acting in execution of the Act for the better local management of the metropolis, in England the court of quarter sessions of every county, and the town council of every borough having a separate court of quarter sessions, or having under any general or local Act of Parliament or otherwise a separate police establishment, in Ireland the grand jury of every county, county of a city, and county of a town, and town council of every borough, and in Scotland the commissioners of supply at their ordinary meetings for counties, and

the commissioners or boards of police, or, where there are no such commissioners or boards, the town councils for boroughs, within their several jurisdictions, may, and when required so to do by the Local Government Board in England, or by one of Her Majesty's Principal Secretaries of State in Scotland, or by the Lord Lieutenant or other chief governor or governors in Ireland, shall, for their respective city, districts, counties, or boroughs, appoint and remove one or more persons possessing competent medical, chemical, and microscopical knowledge as analysts of all articles of food, drink, and drugs purchased within the said city, metropolitan districts, counties, or boroughs, and shall pay to such analysts such salary or allowances as they may think fit; but such appointments and removals shall at all times be subject in England to the approval of the Local Government Board, in Scotland of one of Her Majesty's Principal Secretaries of State, and in Ireland of the Lord Lieutenant or other chief governor or governors.

Inspectors of nuisances, etc., may submit articles to be analysed.

6. The inspector of nuisances or the inspector of weights and measures, or the inspector of markets, one or all of them, as the local authority appointing them shall think fit to determine, in every district, county, city, or borough, shall procure and submit samples of articles of food or drink and drugs suspected to be adulterated to be analysed by the analyists appointed under this Act, and shall, upon receiving a certificate stating that the articles of food or drink or drugs are adulterated, cause a complaint of an offence against this Act by the party selling or adulterating such articles of food or drink or drugs to be made before a justice of the peace, and thereupon such justice shall issue a summons requiring the seller or the adulterator to appear before two justices of the peace at petty sessions in England, or before two justices of the peace in the justice of the peace court, or before the sheriff substitute of the county, or before any magistrate acting under any general or local police Act in Scotland, or before justices of petty sessions or divisional justices in Ireland, to answer such complaint, and such summons shall be served by delivering the same, or a true copy thereof, upon the premises where such samples were obtained or sold, and the expense of such prosecutions, if not ordered to be paid by the party complained against, shall be deemed part of the expense of executing this Act.

Analysts to make reports quarterly to local authorities.

7. The analysts appointed under this Act shall report quarterly to the local authorities appointing them the number of articles of food, drink, or drugs analysed by them under this Act during the foregoing quarter, and shall specify the nature and kind of adulterations detected in such articles of food, drink, and drugs, and all such reports shall be read at the meetings of the local authorities appointing such analyists.

Proof of identity of articles submitted to analysts.

8. On the hearing by the justices, sheriff substitute, magistrate, or divisional justice of any complaint under this Act in any district, county, city, or borough wherein analyists shall have been appointed under this Act, the purchaser, or inspector of nuisances, or the inspector of weights and measures, or the inspector of markets, as the case may be, shall prove to the satisfaction of such justices, sheriff substitute, magistrate, or divisional justice that the article of food or drink or drugs alleged to be adulterated was delivered to the analysts in the same condition as regards its purity or impurity as it was when received from the seller.

Purchaser of articles of food, etc., may require same to be analysed.

9. Any purchaser of any article of food or drink or drugs in any district, county, city, or borough where there is any analyst appointed under this Act shall be entitled, on payment to the inspector or inspectors appointed under this Act of a sum not less than two shillings and sixpence nor more than ten shillings and sixpence, which shall be accounted for to the local authority appointing such inspector or inspectors, to have any such article analysed by any analyst who may be appointed for such district, county, city, or borough, and to receive from such analyst a certificate of the result of his analysis, specifying whether, in his opinion, such article is adulterated, and also whether, if it be an article of food or drink, it is so adulterated as to be injurious to the health of persons eating or drinking the same, and such certificate, duly signed by such analyst, shall, in the absence of any evidence before the court to the contrary, be sufficient evidence of the matters therein certified, and the sum so directed to be paid for such certificate shall be deemed part of the costs.

Articles of food, etc., ordered for analysis to be received, and samples retained by inspectors.

10. All articles of food, drink, or drugs to be analysed by the analysts appointed under this Act shall be received by the inspectors appointed by the local authorities, and from all such articles of food, drink, or drugs samples shall be taken and sealed in the presence of the analysts by the inspectors, to be retained by them and produced in case the justices, sheriff substitute, magistrate, or divisional justice shall order other analyses to be made.

As to expenses of executing Act.

11. The expense of executing this Act shall be borne, in the city of London and the liberties thereof, out of the consolidated rates raised by the commissioners of sewers of the city of London and the liberties thereof, and in the rest of the metropolis out of any rates or funds applicable to the purposes of the Act for the better local management of the metropolis, and in counties out of the county rate, or out of the grand jury cess in Ireland, and in boroughs out of the borough fund, and in Scotland out of the police money in counties and boroughs respectively.

Proceedings by indictment, etc., not to be affected.

12. Nothing in this Act contained shall be held to affect the power of proceeding by indictment, or to take away any other remedy against any offender under this Act.

MEDICAL ATTENDANCE BY DRUGGISTS.

Yesterday Mr. Richards held an inquest at the White Hart, Vine Court, Commercial Street, on Joshua Charles Salmon, aged one year and five months. The child had been attended by Mr. Stubbs, druggist, Commercial Street, from the 11th to the 15th instant (when it died suddenly). Mr. Richards animadverted severely upon the fact of druggists usurping the functions of qualified medical men. Verdict "Death from natural causes."

Mr. Richards held another inquest yesterday afternoon at the Knave of Clubs, Club Row, Bethnal Green, on Margaret Elizabeth Hughes, aged three months, who had died from want of her natural aliment. In this case the deceased had also been attended by a druggist named Mr. Swire. As in the previous case, Mr. Richards indulged in some rather severe strictures. A similar verdict was returned.

Review.

SCIENCE PRIMERS. CHEMISTRY, by Professor ROSCOE, F.R.S. PHYSICS, by Professor BALFOUR STEWART, F.R.S. London, Macmillan and Co., 1872.

Every teacher of science must at times have felt the want of sound elementary text books on science, suitable for quite young boys. The science-primers before us admirably supply this want, so far as regards the elements of chemistry and physics. We are glad to observe further that Mr. Huxley is engaged on a similar primer, introductory to the study of natural science. The series is published at a wonderfully cheap price, a shilling each; the type is excellent, the cuts are numerous and useful, and the binding seems to be strong. The fact that the authors are such men as Professors Roscoe and Balfour Stewart is a sufficient guarantee that they have been carefully compiled and thoughtfully adapted for the purpose intended.

We are glad to notice that in the chemistry primer, Professor Roscoe has departed from the unphilosophical method of beginning with a study of the elements. To start, as is usual, with oxygen or hydrogen, perplexes a child with something totally new to him, which he cannot, therefore, connect with his previous knowledge; and, further, in dealing with an element as distinguished from a compound, it introduces the conception of an abstract idea, of which a child is incapable. With great wisdom Professor Roscoe begins as follows:—"Here are four things which we all know well—fire, air, water, earth,—let us try to learn what science teaches us about them;" then the author goes on to explain that we come to know about these things by handling or examining them, and that we call this examination experiment, describing what kind of experiments properly belong to the study of chemistry. The following headings to the sections under the first division, fire, will show how the book proceeds. "What happens when a candle or a taper burns?" "Besides carbonic acid gas, there is another substance formed when the candle burns, viz., water;" "When a candle is burnt, nothing is lost;" "Heat is felt when chemical union goes on." In the next division we are told about the air: "What the air contains;" "What goes on when we breathe air?" "What sort of action have plants on the air?" and so on. At the end of each division the lesson is summed up under the head of "What we have learnt." After dealing with the elements of the ancients and broadly explaining their nature in the light of the present day, the author leads the learner up to the elements that modern science has revealed. The properties of the principal elementary bodies are then described, and the book ends with an explanation of the meaning of combining proportions and chemical equations, so lucid as to be quite within the comprehension of the average boy. We remark in passing a little inaccuracy that called forth a letter in the pages of a contemporary. On page 26 hydrogen is said to burn with a pale *blue* flame. Mr. Barrett has shown that a flame of pure hydrogen, of any tint, is slightly brown; the blueness so commonly noted being due to the presence of sulphur, usually derived from the decomposition of the spray from the sulphuric acid employed in generating it; the presence of carbonic acid in the breath of the operator, or in the air of the room, also often leads to a deceptive appearance of the flame.

The primer by Professor Balfour Stewart on physics follows the same general scheme as the chemistry primer. It is, perhaps, not quite equal to its predecessor, but then Professor Roscoe has had the advantage of many years' experience in teaching both young and old boys, and also the aid derived from noting the weak points in the host of elementary books on chemistry that have been published. Professor Stewart is the first to write in the English language a simple and sound primer on physics, and we anticipate much good from its publication. The section on the "Use of certain Forces," p. 10, is capital, and will excite that wonderment and interest in a boy which urges him on to learn more. But the Author will allow us to make one or two suggestions that struck us on looking through his work. We think that occasionally the language or illustrations are a little too childish, young boys are apt to resent this more than many writers imagine. Again, we think it is a mistake to explain a thing too fully in a schoolbook; if every difficulty is made laboriously clear in his text-book, a lad gets into a habit of reading without care, and expects to be pushed up every round in the ladder of knowledge. The business of a teacher is to help his pupil out of the difficulties he gets into, and stimulate him to fresh exertion. We rather expect a teacher will find some little difficulty in using this physic primer as a class-book; we may be wrong, but we should be glad if the author could at some time make the experiment. Then in explaining the electrical machine, there is a serious but very common error, which will puzzle the learner, as the reverse statement is made in the next sentence. On p. 116, after describing the prime conductor of the electric machine and how it is armed with points, the Author goes on to say, "Now you have already been told that points have a great tendency to draw off electricity. The consequence is, that these points draw off, or collect, the positive electricity of the glass and carry it to the conductor, where it remains, since the conductor stands upon glass supports." This is incorrect. The points discharge on to the machine the negative electricity induced upon them by the positive of the excited glass, and then the prime conductor remains positively electrified by its loss of negative. That the Author's rendering is not put for the sake of simplicity is evident from the next sentence, where, in explanation of why we get a spark by putting our knuckle to the prime conductor, we read, "The reason is that the positive electricity of the conductor separates the two electricities which are together in my finger, driving away the positive, which is of the same kind as itself, to the earth through my feet, but, on the other hand, attracting the negative itself. The two electricities then rush together through the air and unite with each other, and in so doing they form a spark."

Even this latter paragraph is open to the objection that a lad gets an idea from such a statement that the two electricities are something substantial, always indulging in the bad habit of knocking up against each other and thereby splintering off sparks. Is any notion more common than that lightning is some sort of Greek fire poured out of a charged cloud, which relieved of its burden, furiously rushes to its neighbour and hitting it a terrific blow, makes the subsequent thunder. Now we think a child should be taught that when we see lightning we do not see electricity but only one of the results of that force, namely, air made to glow fearfully hot along all the devious track of the discharge. Then he might be shown how gases can be made white hot, having previously learnt how platinum gets incandescent, owing to the resistance it presents to the discharge. Another point in the primer we think capable of improvement is an enlargement of what is said on magnetism. The same objection exists in Professor Stewart's larger text-book on 'Physics,' where this subject is treated in rather a meagre way; here only two or three lines are devoted to it, and the fundamental law of magnetism is not even alluded to. There is, of course, much to be said about the impossibility of dwelling on everything in a primer, but every boy has seen a compass and ought to know something about it; and such instruction would not be forgotten from the law of the association of ideas.

There can be no doubt that the essence of all effective teaching is to fasten each additional link in the chain of knowledge on to that which preceded it; thus by rising from what is already familiar to that which is less familiar, the child, and the man too, gets a firm hold of facts and a just view of phenomena. It is because this method is followed so largely in these primers, admirably so in the chemistry primer, that we believe they will be found a powerful means of diffusing elementary scientific instruction.

Correspondence.

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

Adulteration of Food and Drugs Act.

Sir,—The "Adulteration of Food and Drugs Act" passed last month provides that persons to be appointed as analysts must be possessed of "competent *medical*, chemical and microscopical knowledge."

The word "medical" was also in the Act last year, and attention was called to it, I think, sir, by yourself, in the Journal. I communicated at the time with the members representing the town in which I live, and they gave notice of an amendment to have the word altered or omitted, sending me down the printed clause as they proposed it should stand, which would have been quite unobjectionable. After all, however, the word has crept in again this year.

As a rule, I venture to say that a man who is a pharmaceutist, and possesses, as many do, the requisite chemical and microscopical knowledge, is much more fitted to be an analyst under this Act than most medical men, but is he legally eligible? I am afraid that he is not, and if this be so, has not the Parliamentary Committee of the Council of the Pharmaceutical Society been caught napping?

There are a good many pharmaceutists interested in this matter, and I think it would be well if the Council ascertained from their legal adviser exactly how we stand.

Pharmaceutist.

Pharmaceutical Chemists and Members of the Pharmaceutical Society.

Sir,—J. L. is not the only person who protests against admitting registered chemists to be members of the Pharmaceutical Society by payment. I consider it would be a step in the right direction to discontinue granting membership to any except those who pass the Major.

A complaint has been made that few present themselves for the Major degree. If the practice now condemned be continued, will preparing for the Major be of use to any one? The public do not, or will not know the difference between the Major and the borrower of his plumes. Moreover, the Major gets no substantial recompense either from the medical profession or the public.

I could show that the Major degree is at present useless, but perhaps I need not.

Professor Attfield, some time since, stated that the Bell Scholarships profited any profession but that of pharmacy; and the same may be said of the Majors,—many of whom even if they go into business leave it for another.

Although the Society may have got a larger return by the adoption of the practice complained of, yet, by the same means, she has been drained of her best blood—her best men have left her.

The claims of the Majors upon the Society are very great, perhaps greater than those of the apprentices now entering. For the former have been induced to work hard, to invest much capital, to think highly of their calling; and for what? Nothing worth the labour and money expended.

The Majors ought to be a body of chemists well known to the public—as distinct as physicians are from surgeons instead of being totally disregarded by the Society. Many means might be suggested, not only of keeping the Major, but also of improving his position. The Major on leaving Bloomsbury Square and commencing business generally buries his talents under a bushel. This should not be; and as I believe it to be the duty of the Society to encourage her past students I suggest that the Society institute a series of money prizes for the Majors in business. That the prizes be substantial and remunerative, and be given for original investigations or compositions on subjects connected with any branch of pharmacy. We are behind hand in this country in such a matter.

A Major in Business.

Disinfectants and Antiseptics.

Sir,—When discussing this subject in your impression of August 31st, you justly expressed regret that there was no *ex cathedrâ* utterance as to the true merits or demerits of chloralum as a disinfectant. The chief difficulty in obtaining such utterance would appear to me to lie in settling the value of the qualifications of the occupant of the oracular chair. It is to be presumed, for instance, that to many, the utterances of the 'British Medical Journal' are of cathedral importance. Nevertheless, on the very same day whereon you published your remarks, that periodical, relying on a statement of Mr. Stanford, that "Chloride of calcium is the most practicable, cheap and powerful of all disinfectants," favoured the proposal to introduce £200,000 worth of that substance into the London sewers, with the object of preventing the evolution of sewer gases! This is the result of the combined wisdom of a pharmacist and a medical editor!

Such *ex cathedrâ* utterances would certainly be no improvement on the resolutions of the Board of Trade relative to disinfectants. The latter body, when the Shipping Medical Scale of 1867 was drawn up by them, ordered carbolic acid to be the only disinfecting substance on it, although it was well known that, owing to its peculiar odour, it was so little suited for trading vessels, that many shipowners made a rule of refusing to take it on board, even on freight. Urged, however, by the Shipowners' Association to substitute some inodorous substance for the offensive carbolic acid, the Board at length ordered the addition to the Medicine Scale of chloride of zinc. But after a year or two they suddenly discovered that the latter substance, on account of its poisonous character, was too dangerous to be longer retained in the Scale—not seeming to be aware that carbolic acid, which still occupied, and even now occupies, the place of honour on the Scale, was quite as deadly a poison—and not having apparently sufficient knowledge to think of anything better, and being no doubt importuned by the publicity department of the Chloralum Company, thereupon directed it to be displaced by the preparation of the latter concern. Nevertheless, foolish as all this is, it is wisdom itself when compared with the chloride of calcium proposal of the 'British Medical Journal.'

One of the Laity.

London, September 4th, 1872.

[*** We are glad to insert the above letter, but take leave to demur to some of the statements contained therein. In the first place it was not so much the absence of *ex cathedrâ* utterances as to the value of chloralum that we deplored, as the absence *even* of that too readily attainable recommendation. The 'British Medical Journal' is doubtless perfectly competent to take up cudgels as to the "Chloride of Calcium" question, but as a matter of fairness in quotation, we must point out that the favouring of the proposal by our contemporary was distinctly subject to the proviso "if the salts were as effectual as Mr. Cooper imagines them to be." Lastly, the Shipowners' Association or the public have as yet failed to prove that carbolic acid injures either the cargo, the gear, or the hull of a ship, if the acid be properly packed and secured, and used as directed in the 'Medical Guide.' The solution of chloride of zinc was not, according to our own knowledge and belief, restored to the Scale on the petition of the Shipowners' Association, and it is very properly considered more dangerous than carbolic acid, because it is colourless and inodorous.—Ed. Pharm. Journ.]

Displacement.

Sir,—After the reading of Messrs. Stoddart and Tucker's paper at Brighton, a discussion took place (as reported in your Journal of Saturday the 14th) which turned chiefly on the subject of preparing essence, or strong tincture of ginger. It is a well-known fact that when the essence is displaced with water after the process has proceeded a short time, it stops, and even sleeping over it, as suggested by Mr. Stoddart, does not surmount the difficulty. A magma or "muck" (as Mr. Giles terms it) is formed, which it is presumed stops the progress of the water—but does it? The two following observations rather shake one's faith in this orthodox belief:—1st, The displacement proceeds pretty rapidly at first, until the "brown ring" mentioned has thoroughly formed. 2nd, If you remove the "muck" with a spoon and place it in another percolator, water will pass through it there.

The fact then is evident—it is the brown layer, consisting of precipitated resinous matter, which, forming a waterproof diaphragm, necessarily stops the process; remove this, and it proceeds until another similar layer is formed.

Now it seems clear to my mind that Mr. Stoddart's process, as applied to essence of ginger, is not nearly so satisfactory as that of the Pharmacopœia, as regards mixing the whole of the spirit with the ginger in the first instance; for on displacing with water, the dark layer of precipitated resinous matter would form much earlier, and the loss from its more frequent removal would be greater.

CHARLES SYMES.

York Place, Birkenhead,
September 16th, 1872.

PHARMACEUTICAL EDUCATION.

Sir,—The criticisms that have been lavished on Mr. Schacht's scheme for provincial pharmaceutical education, and on its predecessor, that of Mr. Reynolds, have, perhaps, been numerous enough, yet it seems to me that from this multitude of counsellors, not wisdom, but rather confusion has resulted. I cannot see that we are one step nearer the mark than we were last year at this time.

Then, as now, it was universally admitted to be necessary, in order to raise the status of the pharmacist and improve the character of his work, that he should receive a good general and a thorough scientific education, and that with the latter only should the Pharmaceutical Society concern itself,

Men of a certain stamp of mind can scarcely be expected to understand the disinclination for study evinced by so many young men. They seem to believe that a desire for knowledge and the power it confers would of themselves be sufficient to put every one on the alert, and that the complaint of employers ought rather to be, "my employees are devoting so much time to study that my interests are being neglected," instead of the, alas! too prevalent cry, "my employees won't learn, and think themselves injured if the necessity for study is urged upon them."

It is certain, however, that every one who aspires to an independent position as proprietor of a pharmacy must somehow acquire enough to satisfy the Board of Examiners; and as the requirements of that body are not likely to grow less, while the capacity for imbibing knowledge by the young does not improve with age, it seems to me a cruel thing to hesitate any longer in providing a sufficient stimulus to exertion.

I think it may be assumed that the offer of cheap instruction has failed in almost every case; and I am glad of it. It convinces me that in pecuniary matters things have not come to the pass that arrangements need be made for half-a-dozen young men to read out of the same Manuals, or for providing science lectures at a mere fraction of their actual cost. The real difficulties are *time*, which must be conceded by employers, and *disinclination for study*, which must be overcome by employees.

I will take the latter first, and commence by stating that I have not the slightest sympathy with the idle young man who prefers smoking his pipe and sipping his beer to improving his mind and securing his future prospects, nor would I consult his feelings in any arrangement to be made. On the other I cannot see that the diligent young man should to be regarded as one so very meritorious that he ought to be petted and caressed. The tendency to that sort of thing has already, I fear, made some who would otherwise have cast in their lot with the diligent, hesitate and conclude that after all study cannot but be a very disagreeable process. The stimulus that I would provide is, the by no means "clever" expedient of an "Act of Parliament," one that shall exhibit as little as possible of that "management" which finds favour in so many eyes. I should like to see that muddling compromise of 1868 (I am happy to say that I had nothing to do with it except in the way of denunciation) superseded in most, if not all, its provisions relating to examination by one strictly logical and to the purpose. Is it not absurd, that while so much pains has been taken about the qualifications of the master, no restriction has been placed upon his choice of a subordinate? According to the present state of the law a youth may enter a pharmacy and continue in it till grey-headed, dispensing to the public the most delicate and dangerous remedies without ever coming before an examiner to prove his competency. Can this be for the good of the public or even of the unqualified dispenser?

The examinations that I would insist on are three,

1st. Before entering a pharmacy as apprentice or student, a youth should be compelled to pass a Preliminary examination to test his general educational qualifications.

2nd. Not less than, two years say, after this he should be permitted to present himself for the "Assistants" examination, and without first passing this he should not be permitted to "dispense poisons."

3rd. Before commencing business on his own account, he must pass either the Minor examination (giving the title of Chemist and Druggist) or the Major examination (giving the title of Pharmacist). I would not allow a choice of appellations, nor would I permit a druggist's shop to be called a pharmacy.

It will be observed that the Minor and Major examinations are to be alternative, not consecutive, and as the passing of either would enable one to assume the responsibility of conducting a business, care should be taken to make each a sufficient test of capability.

Another most necessary provision would be one compelling the present employees within a definite period (one or two years after the passing of the Bill) to present themselves for either the Preliminary, Modified, or Assistants examination, as the case may be. Those failing to pass should without hesitation be remitted to occupations better suited to their abilities.

This proceeding will of course be denounced as harsh, unjust, nay, positively cruel. I affirm, on the contrary, that it would be an act of great kindness to let those unfitted for the trade know the fact as early as possible. It would be, in my opinion, an act of cruelty to allow a young man to continue in a position of subordinacy from which it would be hopeless for him to expect to emerge. As for giving an extension of time, that would merely render his chance of passing still more problematical.

I think, then, that on every ground we are justified in taking some such step as that I have indicated. The knot we have contrived with so much pains is not to be unpicked, it must be cut. Don't let us stand shivering on the brink of the stream, but resolutely take a header and have done with it.

Well, then, suppose a legitimate and general demand for pharmaceutical education to have arisen, and superseded the penny and even sixpenny lectures of the present, how is the demand to be met? Clearly by the establishment of additional pharmacy schools. Not all of them to be necessarily permanent, but all to be efficient and receiving substantial pecuniary aid from the Pharmaceutical Society. I should be prepared to spend in this way a large portion of the invested funds of the Society. The employment of peripatetic lecturers as advocated by the 'Chemist and Druggist' would tend much to reduce the cost of the scheme, and further its efficiency. The cases of certain young men (there are very few of them I expect) who find themselves injured by the passing of the Pharmacy Act of 1868, would have to be treated individually.

Little need be said as to the concession of time by employers. Should any prove so cantankerous as to decline to afford reasonable facilities for study, the persons injured will have to resort to the same plan that has proved so successful in other humble callings. A monster meeting of chemists' assistants would at least be as permissible as one of bakers, lamplighters, wood-cutters, etc., and doubtless not less successful.

Mr. Hampson has truly remarked, that the general public does not demand high pharmacy, and it is equally true that when it is supplied to them, they are unwilling to pay for it. Neither do provincial medical men as a rule apprehend the advantage that would result to the sick, from the division of labour between the prescriber and the dispenser. But we are all advancing together, and it is to be hoped that some day the British Philistine will become wise enough to perceive that the character for encyclopædic learning credited to, if not assumed by, his medical attendant is not always strictly merited, and will act accordingly.

It must be understood that I would not assent to spend any sum whatever on class teaching in the provinces (except perhaps, in two or three district centres) unless with the definite object of winding up our affairs and putting things straight for the future.

I do not believe in tiding over the difficulty. Ten, twenty, thirty years hence, it would still face us or more probably our successors.

THOS. B. GROVES.

Weymouth, September, 1872.

Sir,—In that part of Mr. Schacht's address which apparently refers to me, I am puzzled by the following statement: "It is not the same" (as the Government system), "but the principle is identical with it; and I am quite willing to admit that I owe everything to the suggestions which that scheme has given." "Not the same," yet identical. "Not the same," yet everything copied from it. Different, yet identical! How funny! I should rather think that if it is "identical with the Government system," and if he owes everything to it, that it certainly is the Government scheme; must be it, and cannot be anything else. Mr. Schacht further states that the scheme has "stood the test of many years' trial at the hands of the Government authorities." To have spoken fully and fairly he ought to have mentioned the growlings the Government has received during the same time; but, I fear, Mr. Schacht's tendency is to describe the bright side of a picture.

Were the eighteen-penny book worth the money I should immediately get it; but as I know its contents, I prefer not to open my purse.

The next paragraph I am sorry to see. I do not know whether Mr. Schacht is disposed to treat me with silent contempt or not, and I do not know why he should mention anything of "the anonymous charges." (?) Although I write anonymously, it is not that I am ashamed of my name. I do so because my first letter was signed anonymously, and then I did not think I should be obliged to write more than that letter. I regret not putting my name to my first letter, because I disqualified myself from reading a paper on the subject to the British Association; but I have consoled myself that I may still be allowed to use my pen in the Journal. "The scheme of the Government has only just escaped a collapse." This I still stick to. At the time I wrote, that the chemistry classes were foremost in my mind, whence proceeded all the growlings and dissatisfaction; and if I had said "the chemical section of the department has all but had a collapse," I should have better expressed my meaning.

The next sentence, "That every one who knows anything about it is disgusted, pupils and teachers alike," was corroborated by the newspapers a few weeks ago. Perhaps Mr. Schacht would very gladly keep this corroboration in the background. "At Brighton the Science Department got a very severe handling," and again, Dr. Wood stated "that the less teachers and pupils had to do with the Government the better." This, sir, was before the British Association. I am sorry I was not there. I should vastly have enjoyed the sight of Mr. Schacht stepping into that company of experienced men with his paper.

In stating "there is this year one-sixth the number of students there was in recent years," I referred to the students of chemistry classes; if Mr. Schacht's point be carried he will teach chemistry chiefly, not physical geography or human physiology, etc. Why, then, should he show statistics of these subjects, or of all the subjects together, and not of those he wishes to teach? Will Mr. Schacht confine his remarks to the chemical students? It is they who have growled and who have diminished in numbers; not any others.

Now, I will tell Mr. Schacht that I am a teacher of science teachers; that I have trained more than thirty teachers, and that all of us, three years since, were fully employed. Last session, however, instead of their being about forty classes and hundreds of students, there was only one teacher, one class, and about twenty students, in a thickly-populated district of nearly half a million of people. If the same feeling pervaded the whole body of teachers as those under my wing—which I have no doubt of, for I am one of 200 science teachers still "on strike"—it amounted practically to a collapse, for chemistry at any rate.

Mr. Schacht is a very funny arguer. "I am not a defender of the Government scheme at all," says he; yet he sticks to it tenaciously, and will hear nothing against it. A practical teacher, who can speak of all the objections, is, in his eyes, of less importance than the 'Blue Book' "got up" to appease "My Lords." A writer with sound reasons at his back, who was accidentally drawn into the debate, but who unfortunately signed his first letter anonymously, is "to be left alone." Under the circumstances, sir, I consider that neither I nor my anonymous charges (?) ought to be left alone. I have a right, I believe, to express my views, to ask Mr. Schacht any question as to why he does this thing or the other, and also a right to expect him fully to answer me; and if he be a lover of truth, if he desire a full and fair criticism, he will welcome me and my anonymous charges (?) and not "leave me or them alone."

A Country Major Associate.

Sir,—Yesterday I read with great pleasure the very interesting report of the discussion at Brighton on the all-important scheme of Provincial Pharmaceutical Education.

Certainly it is one of such magnitude that I am afraid nothing can ever come out of it that could in any way do good to the future position of the Pharmaceutical Society.

As a Local Secretary, I naturally keep a sharp look out for any movement that might either be beneficial or detrimental to the Society,—and more especially—to the whole body of chemists and druggists, both metropolitan and provincial. And in looking (with a provincial view) at the very efficient working of the Pharmacy Act, I cannot help thinking there are many amongst us who are crying, "What is this new scheme?" I can assure you, sir, that many of us in this part of England feel bitterly the effects of the Pharmacy Act, not only in loss of sale, but also in the difficulty we have even now of getting assistants to help us to gain our daily bread. And what is the cause of the latter effect? Simply this. Since the compulsory examinations have been established young men prefer taking situations in large towns where there are already facilities for obtaining the benefit and instruction of duly qualified teachers; many politely informing us that "Salary is no object!"

But the remedy proposed for this state of affairs is, in fact, that which has been in a great measure our ruin, viz., schools in large centres. If this scheme comes to pass, we, in small towns, who cannot by any means support a local association, will be left to drudge through the daily routine of our business as well as we can by the aid of porters.

Now, my remedy for the want of general education would be as follows:—

1st. Make the Preliminary examination the first step into the trade by making every youth pass it before he is bound an apprentice.

2nd. When the lad is out of his time compel him to pass the Minor, so as to qualify him as an assistant.

3rd. Finally let him undergo the ordeal of the Major for his final certificate to enter business on his own account.

For it is well known that the present standard of the Minor examination is by no means a qualifying test of a man's abilities to take up a position as a chemist and druggist. By the plan above given, we should be provided with a well-educated apprentice; assistants able to instruct the apprentices; and, lastly, you would have in the trade men of scientific attainments who could do more by individual instruction throughout the length and breadth of the land than any 8, 10 or 20 schools spread over England.

It must not be thought that I wish to deny any youth his chance of education, but let him find it himself: if he is able let him have his session or part of a session at Bloomsbury, as many of us have had in years gone by; and a better laboratory, museum, etc., cannot be wanted, than those now existing at 17, Bloomsbury Square.

The time has not, I think at all events, yet come for us to do anything beyond trying to perfect our present educational arrangements in London and endeavouring to raise our status by steady industry and self-enlightenment.

I should never have troubled you, sir, on this subject, but I fear that the few are legislating for the many (not in an improper spirit, for I believe they have the matter at heart), to the detriment of the smaller branches of the trade in small towns. It is merely a work of time; and until we get a larger number of examined Major men as masters in the trade, we should not find much reward for our labours; we must remember that "Too many branches weigh down the tree."

I would also in conclusion add that, in my opinion, the mere good or bad attendance at lectures would be perfectly valueless, for I well know the ridiculous farce played by many at such places, not excepting our own under Professors Redwood and Bentley.

A Local Secretary in an Eastern County.

September 11th, 1872.

Sir,—I have read with very much interest the various articles and letters which have appeared lately in the Journal on the above subject, and should have been well satisfied to have left the question in the hands of those able men who have taken it up, and are fully capable of carrying it to a successful issue; but the paper read by Professor Attfield at the late meeting of the Pharmaceutical Conference has raised some fresh points which are worthy of discussion, and a few remarks from a student's point of view may not be altogether out of place if you can find room for them in your next week's number.

The Professor has drawn a gloomy picture indeed of the present state of pharmaceutical education; and from his stand-point I can see that it may be hopeless, inasmuch as he would have every pharmacist to be prodigiously clever; but I maintain that though there may have been fewer prodigies of genius developed of late years, there has certainly been a larger amount of knowledge more widely diffused among the great bulk of employed assistants. They have awaked to the fact that they are no longer mere machines capable of grinding out so many pills per diem, but are in the majority of cases earnestly striving to gain that intelligent information with regard to the drugs they are every day handling, which they feel is required of them. And if, in isolated cases, resort is had to a "coach" to get them through the examinations, though I would condemn it in a man of average ability as damaging to that spirit of self-reliance which is the great secret of success, still it is often advantageous (to prevent waste of energy and constant diminution of the chances of success) to be directed just into those particular channels of information wherewith our present enlightened Board of Examiners think it necessary that the thirsty student of pharmacy should be refreshed.

In sober earnest the remedy for undue "cramming" lies with the examiners, in so varying the questions which they put to the students as to make it impossible for one set to "get up" those which have been put to their predecessors in the examination room. And here I would just wish to have a definition of this "cramming" which seems to be Professor Attfield's nightmare. If it is a fact that those who undertake to prepare youths for examination, manage to obtain knowledge of what questions are likely to be put, and only instruct their pupils in the answers to these in the shortest time possible, then I am fully prepared to join the Professor in wholesale condemnation of such dishonest conduct. But if the epithet be applied to the endeavour to store the mind with those facts from the Pharmacopœia and other sources, which (in addition to satisfying the Board of Examiners) will be useful to the student in after life, then I maintain that this form of "cramming" is commendable even though it may result in the outstripping of a lazy student of considerable genius by an industrious one of somewhat lower ability. And if, in the few weeks preceeding the examination, the young pharmaceutist's mind is frequently too well charged with information to retain it all for a very lengthened period, still a large amount of useful knowledge is stored up for future use; and the effort of mind is good for the student himself, especially if he is afterwards called upon to undergo any competitive examinations, in which the man with the best-trained memory is almost sure to bear the palm.

I must protest strongly against any artificial test being put to students as to their having attended any lengthened period at a recognized school of pharmacy. For, though I fully appreciate the advantages to be gained from association with other earnest minds under proper and efficient guidance, and would heartily recommend such a course to those who, having completed their apprenticeship, and passed the Minor examination, are not content to remain mere undergraduates, but aspire to taking their degree in pharmacy by passing the Major with credit, still the fact must be borne in mind that there are many who in after years will become the backbone of the Society who are not able at that period to afford the necessary outlay of money, and still less, at a later period, of the necessary time, to secure such a privilege. And yet many of these have bravely struggled against adverse circumstances, and even while engaged in active business, have steadily set to work in their few hours' leisure time in the day, and qualified themselves for the "Major." Shall we, then, by any artificial tests, throw stumbling-blocks in the way of intelligent industry, which the possession of a good degree of wealth alone can overcome? Shall we not rather stimulate and encourage it in every way possible? I may safely appeal to Professor Attfield which class of students have mostly turned out best under his instruction,—those who have been sent by their friends well provided with cash to spend *ad libitum*, or those who have exercised some self-denial and saved up in order to obtain the benefit of a few months' systematic training. The revelation of this fact, if it could be arrived at, would be interesting, and I feel sure it would be a sufficient answer to some of those who are inclined to make pharmacy a profession only open to the wealthier classes. Indeed, the failure of artificial tests in the medical profession is sufficiently demonstrated in the Professor's own paper, from which I will quote a clause or two. "The medical students who support the 'medical crammers' are chiefly those whose friends, having driven them into medicine against their will, have bribed them by a too full purse. These men take care to be present in the body at lectures, and hence get their schedules signed, but at other times follow their own foolish ways, and at last have to seek the aid of the crammers." I confess to fearing that a somewhat similar state of things will prevail in pharmacy if we arbitrarily attempt to make it too professional.

Then what is the remedy for the present defects? Surely in endeavouring to keep out of the body altogether those who have no taste for science, and in endeavouring, by every means in our power, to encourage those who are bent upon improving themselves in their hours of leisure, and placing efficient means within their reach for such improvement. Much may be done by employers, I am confident, in this respect. Before taking an apprentice I would suggest some such questions as these—

1. Have you any decided taste for natural history and chemistry, and how have you shown it in your hours of leisure at school?

2. Have you a fair knowledge of mathematics, such as working simple algebraic equations, and a problem from the first book of Euclid?

3. Have you passed the "Preliminary examination" with a fair knowledge of the rudiments of Latin?

With regard to the second of these questions, I am quite sure that the standard of arithmetic in the Preliminary examination is too low. The questions are often such as a boy at the top of the lowest form of a middle-class school of the present day ought to have no difficulty in answering; and I have frequently noticed that, in demonstrating a chemical reaction upon the board, persons much above the school-boy age, who attempt to instruct others in chemistry, disregard in a most painful manner that simple rule that "two sides of an equation should always be equal."

It seems to me that another important step might be gained by making the Minor a written examination instead of a *vivâ voce* as at present, with the exception of a short time for each student to show his familiarity with practical dispensing. This would prevent altogether the getting up of those catch-questions so frequently given by examiners of the old school, and would give the nervous student sufficient opportunity to recover his self-possession and do himself justice, whilst the barefaced ignoramus would be discomfited.

CHAS. FRYER.

Alexandra Road, Croydon,
September, 1872.

Sir,—At the present time the position of the Pharmaceutical Society, with regard to giving aid to education, and also the best method of education, are being very warmly, almost fiercely, discussed—and it is the duty of every one connected with pharmacy to contribute his quota towards solving this difficult problem; and certainly, since the passing of the Pharmacy Act in 1868, no question has been discussed which so much concerns the well-being of pharmacy as these, for, not only are those affected who are at present in business, but also those who will be masters at a future time. Professor Attfield's paper, read before the Conference, discloses a state of things which is fearful to contemplate, which is a disgrace to every man calling himself a chemist and druggist. The Pharmacy Act, which was to have done so much for pharmacy, has, in this matter, done no end of harm; it has created a demand for counterfeit chemists; for a class of impostors, and has supplied it, too. How can we expect to raise the status of the trade, or expect the public to respect the title of chemist and druggist, when a system of deception and of falsehood is fostered amongst our ranks, and almost legalized by Act of Parliament? Clearly such a system requires to be dealt with at once, and with an unsparing hand. But now the question comes up how to do so. As pointed out by Professor Attfield, the only remedy is compulsory education, and this may be obtained either by increasing the time and area of examination, or by causing the student to attend so many sessions of a school of pharmacy. Of these two methods, I think the latter the most practicable, and it might be carried out in the following manner.

According to the May report, the Pharmaceutical Society derives an income of £7000 from all England in the form of subscriptions and examination fees. Now, there are in round numbers fifty counties in England which gives £140 as the sum annually drawn from each county by the Society in the form of fees and subscriptions. The Society annually has a surplus of about £2000, and with this might be established 25 schools of pharmacy, one for each two counties, and placed in the most central city, and having each an annual grant of £80. Then let the Board of Examiners demand from each candidate for Minor or Major a certificate that he has attended two or more sessions, either at the local school or at Bloomsbury Square. Let the local association have lectures and classes on botany, chemistry, and materia medica, and also a dispensing counter; in fact, a regular session. By these means will that usurper, "cram," be done away with at once and for ever.

It may be urged that local associations should be supported by the surrounding locality; under this scheme such would be the case, for the annual grant of £80 would be a share of the money drawn from the county by the Society. Others might urge that local schools are not wanted at all; let the students go up to Bloomsbury Square; but they do not consider the expense of attending two or more sessions there. Others again profess that no local school is of any use unless self-supporting, and they point with pride to Bloomsbury Square, but omit to state that it costs them £600 per annum. If this scheme were adopted, we should see no more of the indifference of students; they would know that they must attend either the Square or the local classes, and would buckle to it with the best face possible under the circumstances, instead of wasting their apprenticeship as at present, and trusting to a month at a "cram shop" to get them through the Minor when their time is out. And can they be blamed for preferring a month so spent to spending their time for three or four years over dry books? By this scheme, instead of having about one-tenth of the apprentices at study, we should have at least nine-tenths, and the London "crams" might shut up shop at their earliest convenience. The indifference of the masters would also disappear; the country members and associates of the Society would know that they got something for their money besides the Journal in the form of aid to their own district. Another objection might be raised, that if, for instance, a school were established in Norwich, it would be unfair to Lynn and to Yarmouth; but it should be remembered that neither Norwich, Yarmouth, nor Lynn could separately support a school; yet under this system, by combined effort, they could support one in the most central place for all.

Another argument in favour of this scheme is its inexpensiveness. The Society need have no "back-bone of gold" to carry it on, for the annual surplus would be amply sufficient for all purposes, while in two or three years many of the schools would be self-supporting, owing to the large number of students attending them. £80 per year at first sight seems a small income for an association; but it must be remembered that there would be the fees of the students. Norwich, for instance, contains between 40 and 50 assistants and apprentices, and taking all Norfolk at about 60 more, and reckoning subscriptions at £1 per session, gives an income of nearly £200 per annum.

There are often heard complaints of the trade, owing to the large number of men with little or no capital in it. Were this scheme to be adopted, it would, to a great extent, do away with this, for when a man went to place his son to the trade he would find that it required such an expenditure, both of time and money, that only those who could well afford it would place their sons to it. As things stand at present, it is said, and with a great deal of truth, too, that this trade is a refuge for all men with a little more brains and much less capital than the ordinary trader. Make the obtaining of the Minor certificate more difficult, fewer will enter the trade, and those who do will come with more capital. And it is in this particular that Mr. Schacht's scheme, beautiful as it is in many respects, would do more harm than good; it would still further lower the status of the trade and throw it open to every one. And it must be remembered that even when backed up by Government, it has proved a signal failure. During the last two or three weeks I have made inquiries as to the working of the Government scheme with regard to the student, and the result is anything but gratifying. Even at the Teachers' Training College, the students have to learn by rote about one hundred equations; and the chances are that the equations required at the examinations will fall amongst them. Not one student in ten understands them. This, with a little smattering of chemistry from any elementary text-book, and a trifle more of graphic formulæ from the examiner's own book, and they are sent forth to teach others chemistry (?). Then, again, unless a student belongs to a registered class, every disadvantage is offered him, and even if he passes the examination he obtains no prize. Clearly such a scheme was formed for the teacher, not for the student. If Mr. Schacht takes a rotten scheme like this for his model, he will find in practice that he has committed a grave mistake. No scheme would so foster "cram" as this; and it would do even worse; it would cause the studies of an honest student to run in one groove, so that students would not learn chemistry or botany, but merely a a botanical or chemical catechism. With regard to the other systems proposed, the majority are practically worthless, on account of one grand flaw, viz., that of coaxing and petting and paying the student to study. No one ought to expect technical education for a mere nothing; like every other commodity, it has its price; but by the tone adopted lately by many leading pharmacists, many students have inferred that education is to be provided for them gratuitously just when it is their sovereign will and pleasure to study.

T. G. S.

Norwich, Sept., 1872

Sir,—So much has been written advising chemists to reject all youths as apprentices who have not passed the Preliminary examination, that it has become a pharmaceutical aphorism, and one must be rather of an antediluvian cast of mind who ventures to think differently.

Let us see what the result of the new dogma will be. We may assume that the only candidates for examination are those who have some knowledge of Latin, and think they will pass it. Fifty per cent., or more, of these likely ones fail, the others who don't try we need not consider, but their number must largely exceed the former. The consequence will be that soon there will be very few apprentices to choose from; they will go up in the market, and correspondingly their premiums will go down.

Some of us have been bold enough to think that an apprentice should be something more than a drudge, and that time and opportunity should be allowed for attending classes for qualifying for a responsible position, but all this means expense and must be paid for in the premium, which cannot be the case if my first position is correct. A certain amount of commiseration has been expressed for assistants and a "Modified" examination provided for their benefit; a little, I think, might be reserved for all the youths who hope to be druggists and are just leaving school. I would not by any means do away with the Preliminary, but I would not shut the door in their faces, as we are advised, till this be passed, for the reason I have already stated; and for another and weightier one, namely, this,—we are punishing these youths and their parents for the sins of our middle-class schoolmasters, on whose heads the punishment ought to fall, and whose manifold shortcomings will, I hope, ere long come under the discipline of some middle-class Forster, who will reserve some of his energy and the nation's money for them and not spend it all on the over-much sympathized with working classes.

Actual experience beats a great deal of theory. I will trouble you with mine; it will doubtless find a parallel with others. In the last few years I have had five apprentices—all respectable youths—all sent as their parents supposed to good schools, and all paid a premium of £100 or more. I merely mention this to show that their parents were not poor, so as to seek cheap schools. All these youths were sixteen; all had learned Latin, and all were intelligent well-conducted lads. Two only could translate a single line of Cæsar, and, strange to say, they had been educated at the Ripon Grammar School, now being remodelled, owing to its not satisfying the requirements of the Endowed Schools'

Commissioners. Whatever its faults it did one thing well—it taught Latin. Would that all other schools, not being disintegrated, could say the same.

The other three would have found it difficult to construct the simplest sentence of nominative verb and object without mistake, and their Latin education is consequently all to begin, though one of them had done the first book of Cæsar. How boys are taught in such slipshod fashion I cannot make out; it seems to me that the foundation is badly laid, and there ought to be more time spent over the five declensions and conjugation of verbs than there is. One step should be made sure before another is taken; for want of it we have these failures. We want some stern supervision of these private schools; then schoolmasters would not dare to let such work pass muster, and the parents' money and the boys' time would not be so wrongfully wasted. We want some guarantee from every schoolmaster that he can and will do his duty. There's the rub, and till this is done there will be these failures. The question is then, how best to meet existing difficulties and patch up the schoolmaster's miserable work. The only plan and the merciful one is to take these lads as they are, and either teach them Latin ourselves or send them to night classes to learn, and give them all the help we can. In this way I got one of my three aforesaid through the Preliminary; the other two are yet to be passed. Of course I wish it was done, and think it a great shame I should give my time to teach these lads what their school ought to have done; but under existing circumstances I see no other plan. Feeling one's own deficiencies in Latin, and knowing also that there are hundreds no better, who nevertheless read prescriptions daily, and having also some doubts as to the profundity of the Latin of the prescribers, one is tempted now and then to doubt whether it is absolutely necessary to be able to translate a passage of Cæsar without a dictionary before one ought to be allowed to be a chemist. This is, however, such a heresy that one scarcely dare say all one thinks; nevertheless there may possibly be something in it.

26 & 27, *Commercial Street, Leeds*, W. SMEETON.

Pharmaceutical Education.—"Reformer" writes expressing surprise at the objections urged against the increased outlay incurred by a higher class of pharmaceutical education. He is of opinion that the remuneration would be increased in greater proportion, since the stringency of the examinations would exclude those not sufficiently intellectually trained, thereby diminishing competition. He thinks that for the full development of pharmaceutical education it will be necessary to comprize such subjects as Euclid, algebra, and natural philosophy.

Mr. J. C. Coles, of Chippenham, writes to say that it is with country members of the trade that the majority of young men pass their first year of study, and he thinks this proves that any aid the Society can afford should be general rather than central.

DISPENSING AND DRUG DEALING SURGEONS.

Sir,—I was much gratified upon reading the article in the Journal for Sept. 7th, concerning the question of medical men keeping retail shops and dispensing their own medicines; it is one of vital importance to the chemist, and I trust the subject will be fully ventilated. If the existing antagonism between medical men and druggists is to be removed, it must be by both parties making concessions, which would prove mutually advantageous, each restricting themselves to their proper and legitimate functions—the chemist confining himself to the dispensing of prescriptions and the retailing of drugs and chemicals, and the medical man visiting his patients, and sending his prescriptions to the druggist for preparation, thereby removing to a great extent the present temptation for the chemist to trench on his prerogative by prescribing across the counter; a certain amount of counter prescribing would of necessity still exist, for the chemist is and must remain the "Poor Man's Doctor;" they (the poor) will come to us for advice and medicine for minor ailments, and I presume the medical man would consider it rather *infra dig.* to supply either for the small remuneration the druggist receives for his trouble.

As the chemist of the future is to be something higher and more worthy of the title than in the past, provision must be made to enable him to keep up his dignity by furnishing the means to live out of the proceeds of his business, a matter which, as things exist at present, he finds somewhat difficult,—the closing of the surgeon's retail, and the transfer of his dispensing to the chemist would go a long way towards this desirable object, while, on the other hand, the medical man would get a *quid pro quo*, and a fertile cause for the present jealousy and ill-will now existing between the two parties would be removed. Trusting you will do your utmost to bring about this desirable consummation.

Newport, Isle of Wight, CHEMIST.

MAJORS AND MEMBERS.

Sir,—In Mr. Carteighe's letter to you, published last week, extracts are made from the Registrar's Reports as to Members elected in 1870 and 1871, and by which it appears that more pharmaceutical chemists were elected than passed the Major in these years.

The following extract therefore, supplementing the Reports referred to, may be somewhat explanatory and perhaps useful:—

Passed the Major in

1852	53	56	60	61	63	65	66	67	68	69	70	
1	1	1	1	2	1	1	2	3	9	38	19	= 79

Associates before August 1st, 1842 5

Elected Members in 1870 . . . 84

Passed the Major in

1853	59	64	67	68	69	70	71	
1	1	3	3	8	8	20	17	= 61

Associates before August 1st, 1842 2

Elected Members, 1871 63

ELIAS BREMRIDGE, Secretary and Registrar.

17, *Bloomsbury Square, September 26th*, 1872.

Mrs. Stockman and Family.—The following sums have been thankfully received in aid of the above family: Mr. J W. Britain, Hampstead, 2*s.* 6*d.*; Amicus, 1*s.*; Messrs. Robbins and Co., Oxford Street, £1. 1*s.*; Mr. T. Hodsoll, 5*s.*; Pharmacist, 10*s.*; Friends, per Mr. Spurling, Brompton, £1. 3*s.*; Mr. Tylee, Bath, 10*s.* Further contributions are much needed, and will be received with many thanks by G. Perfect, Havelock Park, Southsea, and Charles Mumby, Pharmaceutical Chemist, Gosport, Trustees.

W. B. Clark.—We have handed your letter to the Board, who, in framing their new regulations, will doubtless take your suggestions into consideration.

The Editor of the 'Grocery News.'—The paper you refer to was read in the Chemical Section of the British Association at Brighton, and was published *in extenso* in the 'Brighton Daily News.' Our report was derived from the same source.

Mr. James Stedman writes in reference to a case reported at page 239 in our last number to state that the composition of his powders was not correctly given by Dr. Hughes.

A. B. C.—By simple solutions is intended those in the B. P. and others in common use in medicine and Pharmacy, but *not* in that volume.

T. Hugh Jones.—We refer you to the number of the journal in which the recipe appeared.

X. Y. Z.—Formulæ for this preparation have repeatedly been given in the journal.—*Vide* I. 857.

D. Jenkins.—We do not know of any authorized form: 3 grains of the scales in one fluid drachm of syrup make a nice preparation.

Z. (Dulwich).—The plant is *Erigeron canadense.*

"*Justice.*"—(1) It would certainly be unlawful to keep a druggist's shop under the conditions you mention. (2) We do not quite understand this question. (3) You had better communicate with the Registrar on the subject.

P. J.—(1) The sale is legal. (2) The case you mention would not come under the Adulteration Act, we think, unless the salt were sold as medicine.

COMMUNICATIONS, LETTERS, etc., have been received from "Inops," Mr. P. L. Simmonds, "Justitia," Mr. G. J. Cutcliffe, S. W. W., Dr. J. Leon Soubeiran, Mr. E. B. Vizer, Professor Attfield, Mr. S. K. Bennett, G. L., A. P. S., Mr. Jas. Copley, Mr. R. G. Mumbray, Mr. D. B. Sharp, Mr. C. Fletcher, "An Apprentice," Mr. J. Mackay, "A Student," Mr. J. Farr, Mr. W. H. Hayward, Dr. Cameron, Mr. G. W. Stephens, Mr. H. Minett, Mr. H. J. Whitred, Mr. J. Hutchinson, Mr. J. Archer.

PHARMACEUTICAL EDUCATION.

BY PROFESSOR ATTFIELD.

At the close of the prolonged discussion on Pharmaceutical Education which I had the honour of introducing at the Brighton meeting of the British Pharmaceutical Conference, time forbad a reply to the remarks I had invited. A report of the proceedings having now appeared in the PHARMACEUTICAL JOURNAL, I proceed to reply to some questions that have been raised, and make one or two additional observations.

The want of a succinct statement of what has already been done for pharmaceutical education in Great Britain must have been felt by every one interested in the present position of the subject. Such an account was offered in the first and chief part of my paper. The labour involved in the production of that portion was considerable, but is more than rewarded by the testimony given to its faithfulness and usefulness.

Respecting the present and prospective aspects of pharmaceutical education some dissent from my opinions was expressed; but this, I think, mainly because what was meant by education was not defined by me with sufficient fulness. By pharmaceutical education, pure and simple, I understand that knowledge which a man desires and acquires to fit him thoroughly for his calling, irrespective of any examination, voluntary or compulsory, or any title, legal or honorary. Having such knowledge, full in amount, but not more than is sufficient for the purpose just stated, a student necessarily, that is as a matter of course, passes the Minor and possibly the Major examinations of the Pharmaceutical Society; afterwards retaining that knowledge, together with all mental culture its acquirement has afforded. The Pharmacy Act of 1852 stimulated education of this kind. Such education demands the expenditure of a considerable amount of time on the part of the student; but the Council of the Society has always set before pharmacists a course of study of this nature as a standard, and education of this character is what has been aimed at by the promoters, managers and officers of the various schools of pharmacy which have been started from time to time throughout the country, more or less in connection with, or aided, or countenanced by the Society. But there is a method of obtaining knowledge—that is, short-lived knowledge—occupying far less time than that necessary for the acquirement of the kind of education just described. Barristers and others sometimes have occasion rapidly to work up a subject for the temporary purposes of debate, argument, or advocacy. It produces no sort of culture as respects the subject itself, and passes from the memory as rapidly as it entered; but it accomplishes its object legitimately enough. Persons possessing it are for the time well *informed*, not *educated*, in the subject. When, however, such information is acquired and employed for the purpose of passing such an important public examination as our "Minor" or "Major," I maintain that its use is in an ordinary sense of the word illegitimate, to be deprecated by every right-minded pharmacist, and, if possible, prevented. This is the kind of ephemeral knowledge which is confessedly taught and notoriously employed in England (not at present, apparently, in Scotland) to what many besides myself know to be an enormous extent to enable men to pass the examinations mentioned. I find that in imparting such information methods are employed other than the one mentioned in my paper —a process, "cheating" Mr. Stoddart and Professor Foster term it, involving downright violation of the spirit of the eighth commandment, and under which I include (and only under such) any variation in the mode having for its object the ascertaining what questions an examiner may get into the habit of asking. Questions of this kind—"stock questions," as Mr. Carteighe calls them—some of which, as every examiner knows, must in the nature of things be put to almost every candidate, are those to which I alluded in my paper as being commonly asked, and which I mentioned as those the crammed candidate knows will be asked before he enters the room. I repeat that I think no language used in denunciation of the process can be too strong. Whatever be the process, however, it is the practice of giving and receiving mere information, and that of an ephemeral character, to which I wish to draw serious attention; a practice, the adoption of which by so large a number of students goes far to explain the cause of failure of all such more recent attempts to establish provincial schools of pharmacy as that described by Mr. Hampson; a practice which, by keeping so many students out of the classes, would, in my belief, prevent the success of the plans of education proposed by Mr. Reynolds, Mr. Schacht, or even that which "comes from Jötunheim;" and a practice which is already damaging, and which, if allowed to develope at its present rate, will sap the foundation of that true pharmaceutical education which the Pharmaceutical Society fosters and promotes, and has ever fostered and both directly and indirectly promoted in the metropolis and provinces.

With regard to the means of preventing this "coaching," the principle of the proposal which was stated during the discussion as emanating from the examiners themselves, deserves, in my opinion, the cordial support of all pharmacists of influence or in authority. It is that of requiring documentary evidence of lengthened education in at least one, and that the most important subject of examination. I have little doubt that if this plan were carried out, it would be found to work so successfully that it would be extended to the other chief subjects of examination. This is the plan advocated in my paper. My cherished ideas are apparently identical with those already entertained by the examiners, and hence, by the way, the contributor to the discussion whose remarks seem to indicate that he thinks my ideas involve a low estimate of the powers of our examiners, must please extend his censure to the examiners themselves. I repeat, that so far from attacking the examiners, I support them, and give little countenance to the adoption of the method employed at the London University of examination by special experts in each subject. It is not the examiners, but the system which the examiners have to carry out, that I venture to criticize—a system, the weak point of which is, a point in which it differs from that of all other Boards, that it does not at present possess as a guarantee against excessive cramming either documentary evidence of education, or the special searching powers of professional questioners having plenty of time at their disposal. Nay, if there is one subject in which our examiners might already be said to be professional examiners, it is in that termed "pharmacy," yet this is precisely the one in which the Board is asking the co-operation of the Council respecting power to require external evidence of education. I say that if in the subject in which the examiners are most likely to detect superficial information, they desire to have their hands strengthened by certificates of attendance for a certain number of years in a pharmacy, then any proposal that in the other chief subjects similar certificates of attendance for a stated time in a recognized school should be required, cannot logically be considered as uncomplimentary to the Board. Dr. Edwards thought that while the strong point of my paper was advocacy of thoroughness in education, its weak point was support of this schedule system. I submit that my friend's remarks only touched the abuse of the method, and not the method itself. I can speak from eight years' personal experience of its working in a large medical school; and while I know how formerly in some schools it was inefficiently carried out, I also know how easily its abuse can be and is now generally prevented. Professor Redwood's suggestion that candidates should be required to state where, when, and how their education had been conducted, would be useful to the extent to which it were made effective. The plan might be anything between a mere form and the recognition of certain schools, or rather certain modes of education to the exclusion of superficial teachers and teaching. Effectively carried out, it would end, I believe, in the system I have urged for adoption. Under any circumstances its tentative value is considerable.

A few sentences on the question, "Does the prospect of remuneration warrant much outlay for pharmaceutical education, or, briefly, does it pay?" Listen to Professor Markoe, himself a pharmacist engaged in trade. "What you, Professor, want to see done in England we have already accomplished in America. In the States a man is prevented either by law or the force of public opinion from opening a shop unless he can pass an examination *and* has attended a certain length of time in a recognized school of pharmacy, as well as worked practically at dispensing. You see, we give no opportunity for the rise of 'coaching' or 'priming.' Then the expense of education keeps out of pharmacy the crowd of poor and ignorant men that would otherwise enter; and so we have a smaller number of pharmacists in proportion to population than you have, and each business, consequently, is larger; besides, our pharmacists pull together better than if they were less well educated, and so get more fairly remunerative prices from the public and the confidence and help of the medical men." To my remark that this course seemed to discourage brain-power unless associated with money-power, Professor Markoe answered that a pharmacist received no premium with a pupil, and thus was enabled to turn a lad away if he had no aptitude for pharmacy; or, on the other hand, to keep him, and even, after a time, pay him and in other ways give him the means and opportunity of rising. He also alluded to the system as one under which there was always a good supply of well-paid assistants. I am hoping soon to hear more about pharmaceutical education in the various States of the Union.

I do not see why the system of education I support should not in due time be adopted to the extent suggested by the Board of Examiners, and carried out from year to year at such a rate and in such a manner that existing interests should not in any way be affected.

PRESENTATION TO M. CHEVREUL.

A very interesting episode took place at the *séance* of the French Academy of Sciences of September 2nd, on the occasion of what may be regarded as the academic jubilee of the Dean, the famous chemist, M. Chevreul. The fiftieth year of his membership does not strictly occur till 1876; but it is well know that he would have been elected in 1816, had he not urged the Academy to give the vacant place to M. Proust. M. Faye, as president of the Academy, intimated that the members had resolved, as a token of their estimate of his works, and their regard for his personal character, to present the venerable Dean that day with a medal, without waiting for the arrival of the formal jubilee. M. Dumas, in an eloquent and gracefully-worded speech, recounted the many valuable services rendered by M. Chevreul, and at the same time bore testimony to the personal character of the man. After M. Elie de Beaumont, who had been pupil of M. Chevreul, had added a few words of veneration and respect for his old master, the latter attempted to respond, but had simply to express his inability to do so.

LEEDS SCHOOL OF MEDICINE.

The Winter Session of the Leeds School of Medicine commenced on Tuesday, October 1st, when the Introductory Address was delivered by J. D. Heaton, Esq., M.D.

In the evening the Council, with old students and others interested in the school, dined together at the Great Northern Hotel.

In replying to the toast of "Former Members of Council and Lecturers," proposed by Mr. Wheelhouse.

Mr. R. Reynolds said he was quite sure they were right in having instituted such a gathering as that, and in having recognized the importance of maintaining the *esprit de corps* of their profession. He could not forget that he was there representing pharmacy in some degree, and that they stood towards the medical profession, he supposed, as a sort of poor relation, but they were anxious to maintain the credit of the family. Those connected with pharmacy had before them at present the great problem of how they were to educate their young men. The Pharmacy Act of 1868 had rendered education compulsory. It had provided for examinations, but had made no provision whatever for schools, or a system of education. But in a country like England they must not look to the Government to establish such schools. They must follow the example which the medical profession had set them; they must go through those modest attempts of which the chairman had spoken when the Leeds School of Medicine was satisfied with doing honest work—doing it in rooms which made no pretension as public buildings—and they had now got similar work before them. They would admit, if pharmacy were essential or complementary to the skill of the physician, that it was impossible that work should be done well without the requisite instruction was afforded to those who were to undertake that work; and the very kind way in which those connected with pharmacy were treated by the profession generally gave them much encouragement. They found that a great difficulty existed from the want of previous training in their pupils. Their boards of examiners told them of deficient education, and they had students who translated "*summo mane deglutiendus*" as "to be taken in the morning in jelly," and *lactis vaccini recentis*," as "recent vaccination being calmer." But they were honestly trying to do their best, and as being in charge of the ordnance department of the army, they would certainly try to keep the powder dry.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 5, 1872.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE NEW SESSION.

THE ceremony of presenting prizes to the successful scholars of a past session, and offering words of welcome and advice to the intending students in the Society's School of Pharmacy at Bloomsbury Square, is always a very pleasant occasion. And this was truly the case on Wednesday last. Seldom has the assemblage been more numerous; the gratulations which met the recipients of prizes could not have been heartier; while it is no disrespect to his predecessors to say that no more appropriate address has been delivered to the students than the wise and genial words of Mr. WILLIAM WALTER STODDART.

It was only natural that at such a meeting allusions should be made to topics which have special interest at the present time, when the educational arrangements of the Society are the subject of so much discussion, and so great difference of opinion. The remarks of Professor ATTFIELD in reference to the Bell Scholars who studied in the Laboratory during last session, formed an appropriate sequence to the discussion at the Council-table in the morning of the same day. The Committee of the Council in making their report seemed to be of opinion that the abolition of the Senior Bell Scholarship, and the increase of the normal number of Junior Scholarships to two, would tend to ensure the instruction being given to a class of men likely to remain in the ranks of pharmacy, and that so, the immediate object of the Scholarships,—the advance of scientific pharmacy,—would be best attained. But it is very significant that of the three Junior Bell Scholars of last session, one has already entered a medical school, while another appears only to have been restrained from leaving the business by the prospect of a desirable foreign engagement. We are afraid that, under the present conditions of pharmacy, this is only natural on the part of aspiring, intellectual and well-educated young men; and that such cases would continue to occur whether the Scholarships were Senior or Junior. But now that the Council appears to have decided upon abolishing the Senior Scholarship, and instituting two uniform Scholarships under reconstructed conditions, it is doubtless desirable that these conditions should, as far as possible, be framed so as to secure the object in view. To this end we have no doubt that any suggestions from those who have well considered the subject will be cheerfully received by the Committee appointed to report as to the details of the scheme.

One very pleasing testimony of the relations which exist between the teachers and the taught at the Society's School, was the very beautiful balance which the past students have subscribed for to present to the late Demonstrator, Dr. TILDEN. In him the laboratory students have sustained a severe loss, both as a teacher and friend. But we do not doubt that in the gentleman who has been appointed to succeed him, who has for the last three years acted as Assistant Demonstrator, they will find that the Council have provided for them a teacher who to experience adds the desire worthily to supply his predecessor's place.

It is gratifying to be able to add, that up to the present time the number of students entering is highly satisfactory, and there appears to be every prospect of a most prosperous Session.

THE NEW ADULTERATION ACT.

IT will be seen upon reference to the report of the proceedings of the Council at their last meeting, that the doubt expressed by a correspondent and alluded to in these columns, as to the eligibility of pharmaceutical chemists for the office of public analyst under the new Adulteration Act, has been submitted for the opinion of the Society's solicitor. We are glad to find that gentleman is of opinion that the medical knowledge required is not that of the physician as to the cure of disease, but such knowledge of the properties and characteristics of medicines as would be possessed by those who are in the daily habit of handling and dispensing them. We hope that so reasonable and desirable a reading of the words of the Act will be sustained, in accordance with the views we have already expressed as to the special fitness of pharmaceutical chemists to fill offices in which a practical knowledge of chemistry is required.

WE have been favoured by Professor ATTFIELD with two letters relating to his paper on Pharmaceutical Education, which he received too late to allow of their being read at the meeting of the Conference at Brighton. One of these is from Mr. FRAZER, who has taken an active part in reference to education as a member of Council; the other is from Mr. WALKER, who has had considerable experience in educational matters. In order to complete the series we have great pleasure in giving them insertion, and they will be found printed at pp. 278–9.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

October 2nd, 1872.

MR. A. F. HASELDEN, F.L.S., PRESIDENT, IN THE CHAIR.

MR. W. SCOTT BROWN, VICE-PRESIDENT.

Present—Messrs. Atherton, Betty, Bottle, Frazer, Greenish, Hampson, Hills, Mackay, Owen, Radley, Sandford, Savage, Schacht, Shaw, Stoddart, Sutton, Urwick and Williams.

The minutes of the previous meeting were read and confirmed.

Elections.

A former member of the Society having paid up his arrears of subscription, together with his subscription for the present year, and a nominal fine of one shilling, was restored to membership.

Two members who had paid their subscriptions for the current year, together with a nominal fine of one shilling, were restored to membership.

Members.

The following Registered Chemists and Druggists were elected Members of the Society:—

Heathcote, Henry Charles......Winster.
Langford, Charles...............King's Lynn.
Lowe, Walter....................Manchester.
Rowe, Sampson Taylor ....Redruth.
Thorpe, Joseph..................Blackley, near Manchester.
Wright, William Frederick ....Leamington.

ASSOCIATES.

The following gentleman having passed the Modified Examination, and being in business, was elected an "Associate in Business" of the Society:—

Friend, William.............Thornton Heath.

The following, having passed their respective examinations, were elected Associates of the Society:—

Minor.

Bishop, Charles Edward........Bristol.
Court, George Frederick ......Worcester.
Evans, Gwilym..................Swansea.

Modified.

Snook, Joseph John............London.

FINANCE.

The report of this Committee was received and adopted, and sundry payments were ordered to be made.

LIBRARY, MUSEUM AND LABORATORY.

The report of the Library, Museum and Laboratory Committee was received and adopted.

DEMONSTRATOR OF PRACTICAL CHEMISTRY.

Mr. John Moss, F.C.S., who has for the past three years filled the office of Assistant-Demonstrator of Practical Chemistry, was appointed Demonstrator of Practical Chemistry, *vice* Dr. Tilden, resigned.

RESIGNATION OF AN EXAMINER.

A letter was read from Mr. Augustus Bird, tendering his resignation of the office of Examiner on the ground that he had retired from business for some years, and that he felt that a gentleman actively engaged in the duties of the profession was better fitted for such a position.

"Resolved—That the resignation of the office of Examiner by Mr. Bird be accepted, and that the Secretary be instructed to write to him, to express the regret of the Council at the dissolution of the connection."

THE JACOB BELL MEMORIAL SCHOLARSHIPS.

The following recommendations of the Special Committee appointed to report upon the Jacob Bell Memorial Scholarships were taken into consideration, according to notice:—

1. That the Senior Scholarship be abolished.
2. That there be two Junior Scholarships of the value of thirty pounds each, and that the Council, when granting free laboratory instruction, do also grant free attendance to the lectures.
3. Eligibility.—Candidates must be Registered Apprentices of the Society under twenty-one, and have passed not less, or been engaged for not less, than three years in the pharmacy of a Registered Pharmaceutical Chemist or Chemist and Druggist.
4. Subjects of Examination.—*Latin*:—Virgil; the three first books of the Æneid; Latin prescriptions; translations of Latin into English and English into Latin; translations from any Latin pharmacopœia, and parsing. *English*:—Composition and parsing. *Arithmetic*:—The four first simple and compound rules, fractions, and decimals; the British and metrical systems of weights and measures.

The examinations to be wholly in writing, and in case of candidates unable to attend No. 17, Bloomsbury Square, to be conducted under the same conditions as the "Preliminary," and such safeguard as the Council may from time to time deem expedient, and that the papers written by the candidate be numbered, *not named*.

The examination to be conducted by two members of the Board of Examiners, and the award made (subject to the approval of the Council) by a Committee of the President, the Vice-President, and the two said examiners, who shall take into consideration the means, position, and surroundings of the candidates, as well as the number of marks obtained in the competition, and preference shall, where practicable, be given to those least favoured by fortune.

Notice to be given that the successful candidates will be expected to present themselves for the Minor and Major examinations.

Mr. WILLIAMS moved—

"That the recommendation of the Special Committee appointed to consider the Jacob Bell Memorial Scholarships be received and adopted."

He said the matter had been under consideration for some time, and that it was the opinion of the Committee that giving the senior scholarship was offering a prize to young men who had received a considerable amount of instruction, whereas it did not encourage young men who really wanted to learn their business. It rather acted as a superior prize given for attainments, which really tended to pass the recipients out of the business instead of retaining them in it. This view was so strongly impressed upon the Committee, that they had thought it better to leave out the subject of pharmacy and botany from the competitive examination for candidates. He thought what they wanted was to try and encourage the young members and apprentices to pursue their studies so as to qualify them for worthily filling the position in which they would be hereafter placed when conducting the business of chemist and druggist. It was found that practically the Bell Scholarship was a prize given to the students in the laboratory, whereas they should strive to make it a general prize open to all young men in the country. He only wished they were in a position to recommend that, instead of two, there should be two dozen junior scholarships, and he should be very glad if the funds of the Society could be spent in that way, so that their laboratory might be filled with young men from all parts of the kingdom who had gained the right to study there by their proficiency in the studies they had already undergone. However, they were not able at present to go beyond the sum of money already invested in the name of the Jacob Bell Memorial Scholarships Fund. If, however, that system worked well, the time might come when it might be extended, and in that way he believed they might very much help forward provincial education. He would only add that these recommendations had been well considered by the Committee, who had met many times, and had had the benefit of the opinion of the examiners who had tested the candidates.

Mr. STODDART seconded the motion, saying he was satisfied the committee had well considered the matter, and he was quite willing to fall in with their suggestions.

Mr. SCHACHT said he heartily concurred in the principles laid down by Mr. Williams, and carried out in the resolution, that the alteration proposed was wise and proper; but he must object to a portion of the last two clauses, namely, that which stated that the examiners should take into consideration the means, position, and surroundings of the candidates, and that preference should be given "to those least favoured by fortune." That was a very generous doctrine to recognize where possible, but not in such a place as the examiners' room. The first condition was, talent should be the criterion of merit in the candidate, and taking into account the primary object for which the scholarships were instituted, that should still be the rule; and the examiners, instead of being directed to favour any one, should not travel out of that strict line of justice, but should simply decide who was the best man. Again, the last sentence he thought should be made more emphatic.

Mr. MACKAY also agreed with the principle of abolishing the Senior Scholarships, but desired to supplement very strongly what had fallen from Mr. Schacht. He suggested that the Council should agree or disagree with the principle of abolishing the Senior Scholarships; and if this were agreed to, he thought it would be wise to let the matter go back to a committee for further consideration as to the details of working out the examination. As to the examiners inquiring into the means and surroundings of the candidates, it would be placing them in a most peculiar position, and would be, in fact, reviving an inquisitive system, such as had last been heard of in Spain some years ago. Such a thing was most objectionable, and especially so when they had seen in days past, and no doubt would see again, that the son of an ordinary baker might become the senior wrangler.

Mr. WILLIAMS said it was only intended that, where the marks were equal, preference should be given to the candidate who had had fewest opportunities of study.

Mr. BOTTLE concurred with the remarks of Mr. Mackay, and added that the elected candidate himself would be placed in a very unfair position if it were understood that he was selected on account of his poverty.

Mr. SUTTON said if they had to choose between two shipbuilders, one of whom had used only an adze, and the other had been provided with all kinds of tools, and the vessels were equally well constructed, they would certainly prefer the man who had accomplished the most with the fewest opportunities.

Mr. OWEN said he hoped that would be borne in mind in awarding marks.

Mr. WILLIAMS said the marks were awarded before such questions came under consideration at all.

Mr. SANDFORD said he was much averse to seeing the Senior Scholarship abolished, though he was not averse to men leaving the profession to go into something better. They had just had an instance in their own institution; Dr. Tilden, who was a Bell scholar, having now left pharmacy to take a higher position, but he would still be a credit to the Society, and advance its interests. In addition to that, very recently one of the best men belonging to the Society had been talking to him about its future; and said he hoped to encourage research and a further prosecution of study by the members of the trade by instituting a sort of senior scholarship. He thought that if six or eight young men every year could be induced to enter the laboratory and work there for a time after passing the Major examination, it would tend greatly to advance the interests of pharmacy. It must also be recollected that when this Fund was first established, a circular was sent round which contained this passage:—"The details, including the extent of the proposed scholarships and the conditions on which they shall be awarded, necessarily depend on the amount o subscriptions obtained, but the Council feel assured tha such a sum will be subscribed as will enable them to establish not only minor scholarships for young men les favoured by fortune than by industry, but also one, at least, for the advancement of high scientific attainmentst so that there may thus be two classes of scholarships tending to advance the reputation and dignity of the Pharmaceutical Society." That was the principle which started the scholarships, and on which the money was raised, and he thought they would be to some extent breaking faith with those who contributed if they abolished the Senior Scholarship. This question of principle should be decided first before going into any detail, and it must not be forgotten that they had the opportunity, which had been used, of giving two Junior Scholarships when there had not been candidates for the Senior.

Mr. BROWN said he intended to propose an amendment:—

"That this Council receives and adopts Clauses one and two of the Recommendations of the Special Committee (omitting the word 'junior' in Clause two), and refers back the details for further consideration and future report to the Library, Museum, and Laboratory Committee."

That would at once bring before the Council the question to which Mr. Sandford was speaking.

Mr. MACKAY said he would second that amendment.

Mr. SAVAGE thought the Senior Scholarship had already been practically abolished, for several times there had been no senior candidates, and unless the system was modified he did not see how they could come in.

Mr. SUTTON said the Society ought to keep its aims as high as possible; and by keeping up the standard of education, they would be able to get a position equal to that of any chemical or medical society, but this could not be done without hard work.

Mr. ATHERTON said by abolishing the Senior Scholarships, they would do away with any reward for proficiency in pharmacy, since by the new code of regulations the scholarship would only be given for proficiency in elementary education. It hardly seemed to him proper that the Jacob Bell Scholarship Fund should be devoted to such purposes. It ought certainly to be so dealt with as to incite extra exertions in young men to make themselves more efficient pharmacists, and therefore he thought they should either retain the Senior Scholarship or modify the proposed examination. In fact, he should prefer doing away with the Junior Scholarship and modifying the Senior.

Mr. URWICK felt greatly in favour of retaining the Senior Scholarship, thinking it must result in good to the Society; for if a man distinguished himself by attaining it, wherever he might go the credit which attached to him would be reflected on the place where he was educated.

Mr. GREENISH thought it would be most injudicious to do away with the Senior Scholarship; and although there had been no candidates for it on some occasions, education was advancing, and probably in the course of a year or two, applicants would be forthcoming. Just at the present time, when they were desiring to advance education in every possible way, it would be most unwise in his opinion, to make this alteration, especially when if there were no competitors for the Senior Scholarship, two Juniors might be given, so that no injustice was committed.

Mr. Hampson said it appeared to him that if the scholarships were given for elementary education alone, it would really defeat the intention of the founders of the Fund, who evidently designed to promote the advance of pharmacy distinctly.

Mr. Hills said he should not like to give a silent vote upon this question, but would only say that he adhered to the view of the Committee of which he had been a member, that the Senior Scholarships should be abolished, and two Junior Scholarships established instead. At the same time, he thought the examination might be so modified as to contain something at least relating to pharmacy.

Mr. Betty said he was glad to hear at least one gentleman come forward and support in the Council the views which he had advocated in Committee, namely, that in the present state of things the Senior Bell Scholarship was not really useful to the Society or to the trade at large. If it were really contended for and awarded, it would no doubt be of great use, but when it appeared the conditions were such that it fell into abeyance, and they had to take refuge in the plan now suggested, common sense seemed to point out that they should do formally what they had to do in reality. He was still of opinion that it was practically of more utility to the Society to diffuse education rather than to confine it, in however brilliant a star, to one or two spots. If every year there were introduced into the business two Junior Bell Scholars who had received such an education as would do themselves credit, it must certainly be more advantageous than having one Senior Bell Scholar, which was about the average.

Mr. Frazer said he should prefer to retain the Senior Scholarship; firstly, because it would be keeping faith with the subscribers—especially as when candidates did not appear, two Junior Scholarships were awarded; and secondly, because as education was advancing, it was to be hoped that in the near future candidates would be forthcoming.

Mr. Brown said he would now move the amendment which he had mentioned, believing it would be much more generally beneficial to the whole trade throughout the country to award two Junior Scholarships every year than to continue the old system. His amendment proposed to abolish Senior Scholarships, but it excepted all that followed; and he certainly did not agree with the conditions, the qualifications of the candidates, and particularly the paragraph with reference to the subjects of examination, which he thought might fairly be extended with great benefit to the candidates themselves.

Mr. Williams said the words "least favoured by fortune" had been introduced into the recommendations simply because they were in the draft deed, and therefore the Committee thought it best to retain them. He, for himself, did not like them. At the same time it simply meant this, that if two men had equal marks the award should be given to the poorer man. It should be borne in mind that it was simply a question of age, and whether they considered it was as desirable to take a man of twenty-four and give him a year's instruction, as to take a young man of eighteen or nineteen. That was the practical way of looking at it. He quite agreed it was desirable to advance science, but they ought principally to advance pharmacy. As to keeping faith with the subscribers of the fund, he could only say they had the solicitor's opinion in their favour, and the original subscribers would have no cause to complain.

Mr. Hills said the deed had never been completed.

Mr. Williams said he had no objection, in order to save needless division, to withdraw his resolution in favour of the amendment.

Mr. Sandford said he looked through the deed from end to end, and could not find any words in it authorizing them to alter the institution of the scholarships; the Council had only power to alter the arrangements for the examinations. He contended that if the deed had been executed, they would not have been able to abolish the Senior Scholarships, and although they might do it legally in consequence of the deed not having been completed, he thought there was still a moral objection.

Mr. Brown's amendment was then put as an original motion, and carried by a majority of 12 to 8.

Adulteration of Food and Drugs Act.

The President said there was in the last number of the Journal an Editorial note headed "New Adulteration Act," referring to a letter in which a doubt had been expressed, as to the eligibility of pharmaceutical chemists to be appointed as analysts under the Act; and the question was raised, whether the wording of the Act should be strictly interpreted so as to exclude pharmaceutical chemists. Now, it having been pointed out to him that if this were not settled, it might deprive some of their members of the opportunity of being appointed as analysts under this Act, he had requested their solicitor to attend and give his opinion as to what was the real legal meaning of the word "medical" in the Adulteration Act. In his view it did not refer to the special knowledge possessed by a medical man, but simply to a knowledge of medical substances, or of materia medica. He would, however, ask the solicitor to state his opinion upon the matter.

Mr. Flux (solicitor) said he had referred not only to the Act in question, but to section 34 of the Medical Act, which bore upon the question, and he had put his opinion into writing as follows:—

"*As to the Appointment of Analysts under the Statute* 35 *and* 36 *Victoria, cap.* 74.

"I consider that appointments of pharmaceutical chemists, or chemists and druggists, who may in the opinion of the appointors be 'persons possessing competent medical, chemical, and microscopical knowledge,' will be within the letter and in accordance with the spirit and intention of the statute.

"Had the intention been to exclude persons not *medical practitioners*, words of description in accordance with statute 21 and 22 Victoria, cap. 90, sec. 34, would have been used.

"'Chemical knowledge' is not in fact and is not by law presumed to be limited to registered 'chemists and druggists,' and likewise 'medical knowledge' is not, in fact or by law presumed to be limited to 'medical practitioners.' Knowledge of materia medica appears to me to be 'medical knowledge;' the statute which defines the examinations of pharmaceutical chemists and chemists and druggists (15 and 26 Vict. cap. 56) speaks of knowledge in materia medica and in pharmaceutical and general chemistry, as essential in the examined persons, and excludes 'the theory and practice of medicine.' The Pharmacy Act, 1868 (incorporated with the 35th and 36th Vict. cap. 74), in sec. 17, speaks of 'medicine dispensed by a person registered under this Act,' and in sec. 24, 'of articles usually taken or sold as medicines,' thus contemplating the dispensing and selling of medicine by chemists and druggists. The law assumes that every man has knowledge of the articles in which he deals, and it must be considered to assume knowledge of medicines or medical knowledge in a recognized dispenser or seller of medicine.

"The competency required is competency 'to analyse;' and I believe that the true intention of the statute is to authorize the appointment of any person whomsoever, who may possess competent microscopical knowledge, in combination with competent medical knowledge and competent chemical knowledge for analyses, and that the competency as to medicine and chemistry is to be ascertained in the same way as competency as to the microscope, viz., as a question of fact and not by reference to any register.

"Wm. Flux.

"3, *East India Avenue Road*,
2nd October, 1872."

After some discussion it was resolved:—

"That this Council thoroughly endorses Mr. Flux's opinion, and entertains no doubt as to the legal eligibility of pharmaceutical chemists, chemists and druggists, and others, possessing the requisite knowledge for appointment as analysts under the Adulteration of Food and Drugs Act, 1872."

PARLIAMENTARY.

The Report of the Parliamentary Committee was read. It included a revised form of circular with reference to the sale of vermin killers, which had been approved of by the solicitor. The Report and Recommendations of the Committee, with a verbal amendment, were received and adopted, and a copy of the amended regulations was ordered to be sent to every Chemist and Druggist and Coroner throughout the kingdom.

It was resolved—

"That the Registrar be instructed, and is hereby authorized, to erase from the Register the name of Thomas Holden, of Burnley."

Mr. SUTTON read a letter which had been sent to him by the coroner for the city of Norwich, calling his attention to the facts of an inquest which had lately been held in that city, on the death of a child which had been poisoned from an overdose of an opiate inadvertently administered, but where the jury had expressed a strong opinion that medicine of sufficient strength to kill a child should not be sent out without a label stating what the proper dose for certain persons of different ages would be. With this letter was sent a phial containing the residue of the medicine. The mixture contained about one-third of its bulk of laudanum, and was simply labelled "Nurses' Drops," with the name of the seller, there being no poison label or caution whatever.

Mr. WILLIAMS said that it was not the duty of chemists and druggists to give scales of doses.

Mr. SUTTON said it was evidently a case in which a prosecution might have been instituted by the police for selling poison without a caution label. The mixture was sold over the counter and not prepared from a prescription.

After some conversation, it was resolved—

"That the coroner of Norwich be informed by the Secretary that the sale to which he had called attention was an offence for which the police or any person might have prosecuted the seller, but that it was not the province of the Society to take action in the matter."

FEES TO LOCAL SECRETARIES.

Mr. SUTTON brought forward the motion, of which he had given notice—

"That Local Secretaries who have to superintend the examination of candidates for the Preliminary examination shall be allowed the sum of five shillings for any single candidate whose examination he shall superintend; if the number of candidates exceeds one, the sum of two shillings and sixpence each shall be allowed."

Mr. SANDFORD seconded the motion.

Mr. BOTTLE said Mr. Hills had also a resolution to bring forward for setting apart a sum of money towards defraying the expenses of local secretaries in coming to London to attend the Anniversary Meeting. He thought the two matters might well be considered together. It appeared to him that it was rather *infra dig.* to give a man five shillings for sitting three hours, and should prefer awarding half a guinea for each examination without regard to the number of candidates.

After some remarks from Mr. WILLIAMS and Mr. SAVAGE,

Mr. MACKAY suggested that the whole matter had better be referred to a committee.

Mr. HILLS said on a previous occasion he had brought forward the idea of making some recognition to local secretaries for their services, which he was desirous should be acknowledged in some way or other. Whether that should be done in the way suggested by Mr. Sutton or as proposed by himself was to him a matter of comparative indifference. He was quite willing that the whole matter should be referred to a committee to devise some plan which should carry out both Mr. Sutton's and his own idea.

It was ultimately determined that it should be referred to the General Purposes Committee to consider and report upon the whole matter.

EXAMINATION FEES.

Mr. FRAZER brought forward the following motion, of which he had given notice—

"That this Council, fearing that the present rate of examination fees forms an obstacle to many young men entering on the studies necessary for passing these, hereby appoint a special committee to examine into the whole question, and this especially, as to the propriety of reducing the fee for the Preliminary examination by one half, and also as to giving all candidates for the different examinations who failed to pass the first to have two other opportunities of passing without the necessity of making further payment. The Committee will further consider the question of giving all candidates who have passed the Preliminary the option of passing the Major, or such a modification of it as will embrace all the essential features of the Minor at once, without the necessity of passing the Minor also. And further that should these Resolutions be adopted, I propose that all who shall have passed the Preliminary examinations before they come into force shall be admitted to pass the Minor on payment of two guineas, and the Major one of four guineas, and that all our present Minors shall be allowed to pass the Major on payment of one guinea, thus securing that all our present students and assistants shall be able to take our highest honours on a payment of six guineas, instead of ten guineas, as at present. But it is to be understood that in the event of these changes being adopted, there shall be no portion of any of the examination fees returned to the non-successful candidates on their failing to pass the various examinations."

Mr. FRAZER said he was convinced in many cases the saving of fees was a matter of importance to apprentices, and when he looked at the fees exacted by other bodies, it did appear that their own scale was fixed rather too high. In Glasgow the fee for passing the Faculty of Physicians and Surgeons was only ten shillings, and having paid that, the student could present himself for a second examination without further charge. In the Pharmaceutical Society of Philadelphia the fee was four dollars, to be paid once for all, and the fee payable in that city on obtaining the highest diploma was only ten dollars. In the London University the fee for the Preliminary examination was £2, but the candidate had two other opportunities of passing without further charge. Their students, however, had to pay four guineas for three examinations. He believed that the loss to the revenue would be very inconsiderable if they adopted the principle of not returning any portion of the fees to unsuccessful candidates. Last year the fees received from 802 apprentices who passed the examination were £1684. Had the fee been one guinea instead of two, the direct loss would, of course, have been £842 but against this must be credited £333 received from 317 students who failed; £144 from 137 Minors, and £21 from 20 Majors, who were also rejected, making in all £498, to be set off against the loss of £842, leaving a net loss of only £344. Besides that he thought they might count on a portion of this loss being made up by an increase in the number of candidates. He had not taken into account those who passed the Modified examination; because as it was only a temporary affair he did not propose any alteration with regard to them. He was more anxious, however, with regard to the portion of his resolution which gave all candidates passing the Preliminary the option of passing the Major or a modification of it at once, without the necessity of passing the Minor also, than he was with regard to the reduction of the fees, because he was satisfied that in many cases young men who were really qualified to pass, did not do so from a dislike to passing these repeated examinations. Only the previous month one of his most efficient assistants left the trade altogether on the double ground of the fees he would be required to pay, and the necessity of undergoing an examination, especially preliminary, at the hands of men, some of whom might be his juniors in point of age and experience. It did not at all follow that a reduction of the fees necessitated a reduction in the standard of education, nor did he think, as had been suggested by some correspondents in the Journal, that it would have the effect of introducing a race of paupers into their ranks.

Mr. Schacht said he should be glad to second Mr. Frazer's motion, but he thought the time would very shortly come when it would be desirable that the whole subject of the examinations and examination fees should be reconsidered. From what he had recently heard, he believed that a report was being drawn up by the Board of Examiners, which would, ere long, be presented to the Council; and he would rather suggest to Mr. Frazer the desirability of letting this subject, which was a very large one, be referred, as he indeed suggested, to a special committee; that it should stand over altogether until the report he had referred to was received from the examiners, so that the whole matter might be considered together.

Mr. Frazer said he had no objection to this course.

Mr. Mackay thought the time had not yet come for any such alteration as was suggested; at any rate, it had better stand over until the examiners' report came forward.

Mr. Frazer said he should be quite content with this course, especially as he had no doubt that in the meantime it would be ventilated in the columns of the Journal, as had been the case with the education question. Indeed, had it not been for that question looming in the future, he should have been prepared with a much more radical proposal with regard to the fees.

The President said it was not unlikely that the examiners would agree upon their report in the course of the present month.

Mr. Williams said he believed that instead of a reduction in the fees for examinations, an increase would have to be made.

Mr. Urwick said the great evil seemed to be that so many persons who passed the Minor acted upon the maxim of "Rest and be thankful;" and therefore the question was, whether they should not make the Minor examination more strict and more practical, making the Major examination more an honorary one.

Lady Students.

Mr. Hampson moved according to notice:—

"That ladies be admitted to attend the lectures and the laboratory of the Pharmaceutical Society."

He said, ten years ago a resolution was passed at the Council to the effect that lady students were not to be admitted to the lectures; but as it was not recorded in any of the transactions, many of the members were probably unacquainted with it. In 1862, perhaps the admission of lady students to the classes and laboratory might appear a step fraught with great danger, and tending to revolution; but in the present day, in remembrance of the social and educational changes that had taken place, he could not for a moment assume that the present Council, elected on a much broader basis, would endorse the decision of their predecessors, which was, in fact, most arbitrary, unjust and impolitic. The doors were closed against lady students during the attendance of Miss Garrett; but he understood that the professors, who were well able to form an opinion on this question, uttered no cry of complaint or alarm, and that the presence of the lady, who since then had risen to a more distinguished position, produced no inconvenience whatever, but on the contrary, had a salutary influence on the order and decorum observed by the classes. By the Pharmacy Act, 1868, ladies were admitted to the examinations, and were legally qualified to practise pharmacy; and two ladies had already passed the Modified examination with considerable credit. The introduction of the word "person" in the Act of Parliament showed clearly to his mind that the framers of the Act did not intend to shut out lady students, and therefore it was manifestly an arbitrary proceeding and diametrically opposed to the spirit of the Act of Parliament to exclude any person of respectability on account of sex from the instruction necessary to enable her to pass the examination. No doubt it was difficult for some persons to leave the well-beaten groove of custom in this or in other matters; but unless there were some solid reasons for denying admission to lady students, he thought they were bound to afford them the same facilities as gentlemen. Since giving notice of the resolution, he had endeavoured to discover any such reasons, but had failed to do so. As to the notion that it was dangerous and unwise to have a mixed instruction in any college, he thought that was unworthy of being discussed. Indeed, he was in favour of mixed education from the earliest age continuing through the whole process of national and scientific education. He admitted there was a feeling against female education in these kind of matters, but so there was against their writing books, and doing a variety of other things which they were now accustomed to do to the advantage of themselves and the community at large; and in these days of relentless competition he, for one, would not stand in the way of opening out any path by which a woman might obtain an honest livelihood.

Mr. Brown seconded the motion, saying he could see no possible harm which could result from its adoption. He certainly considered that ladies were put in an anomalous position with regard to the interpretation put upon one provision of the Act, since, in case of the husband's death, they were recommended to sell their business as quickly as possible, because they were not able to carry it on. If they were allowed to attend the lectures, this unfortunate state of things might, in some cases, be remedied; and he might add that he had known two instances in which a business, which had not prospered very well under the care of the husband, had thriven much better when conducted by the widow. It was quite possible that in the case of medical and anatomical lectures there might be considerations rendering it undesirable that the two sexes should attend such instruction together; but, with regard to botany and materia medica, there was nothing of that kind, and seeing that it would enable a man to train up his daughter, if he thought fit, to take a part in his business, he thought it only just that a needless restriction should be removed.

Mr. Williams said he should be glad to support the resolution if it were confined to attendance at lectures, as he did not think it would be wise just now to include the attendance in the laboratory.

Mr. Hampson said he believed the laboratory course was the most important, and he was quite sure that if any ladies attended it, they would conduct themselves properly, and no harm would ensue.

Mr. Hills said the permission could be rescinded in twelve months if it were not found to act satisfactorily.

Mr. Bottle said he also should object to opening the laboratory to lady students at present, though he had no doubt that would come at a future time. He thought special arrangements would have to be made, which he did not think they were just now in a position to provide. A few years ago ladies were not admitted to the Inaugural Meetings and Conversaziones; and when a resolution was passed for inviting their attendance, it was soon found the building would not accommodate them, and they had to go to South Kensington. The same result would probably ensue if they were admitted to laboratory instruction, and therefore he should ask the Council, as a progressive movement, to pass a resolution at present simply admitting ladies to the lectures. If it were found that they appreciated the advantages offered to them, and that there was really any demand on their part for laboratory instruction, he had no doubt it would be provided.

Mr. Mackay said he should support the same view. In Edinburgh Miss Jex Blake had beaten the whole Senatus, and had obliged them to teach ladies, but she could not compel them to teach in mixed classes, and Dr. Macadam had had rooms fitted up in Miss Blake's own house, where he gave instruction to six or eight young ladies.

Mr. Hampson said he had no objection, in deference to the wishes which had been expressed to modify his resolution, confining it to the lecture classes.

Mr. Brown said he consented to withdraw the word "Laboratory," not from any want of faith in the principle, but simply as a matter of expediency, for he really did think that with their present arrangements, they were not in a position to admit ladies to the laboratory.

It was then resolved unanimously that the resolution passed in 1862, prohibiting ladies from attending the lectures be rescinded, and that ladies be admitted to attend as students the lecture classes of the Pharmaceutical Society.

PHARMACEUTICAL MEETING.

Wednesday Evening, October 2nd.

The Opening Meeting of the Session 1872-3 was held at 17, Bloomsbury Square on Wednesday evening last. There was a very large attendance of pharmacists and students, and several ladies honoured the proceedings with their presence.

The Chair was occupied by Mr. A. F. Haselden, F.L.S., President of the Society.

The Secretary having read the minutes of the preceding meeting, the following donations to the Library were announced, and thanks were voted to the respective donors:—

Mycetoma—the Fungus-foot Disease of India; On Gnats' Scales: from Mr. Jabez Hogg (Author),—The New Patent Relating to the Sewage of Towns: from Mr. J. Brough Pow (Author),—Tenth Annual Report of the Birmingham Free Libraries Committee, 1871: from the Committee,—Portion of MS. of a work on Chemistry, by Guyton de Morveau; L'Eucalyptus, by Raveret—Wattel: from Dr. J. L. Soubeiran,—An Experimental Research on the Antagonism between the Actions of Physostigma and Atropia: from Dr. T. R. Fraser (Author),—Sketch of the Geology of the Neighbourhood of Banbury: from Mr. T. Beesley (Author),—Edinburgh University Calendar, 1872-73: from the University,—Report of the Curator of the Botanical Exchange Club: from Dr. Trimen,—Pharmacopœia Helvetica, 1872: from the "Société Suisse des Pharmaciens,"—Memoir—R. Chambers and W. Chambers: from Mr. T. H. Hills,—Smithsonian Report, 1870: from the Smithsonian Institution,—Glasgow University Calendar, 1872-73: from he University,—Chemistry—General, Medical, and Pharmaceutical, Fourth Edition: from Professor Attfield (Author).

The President said: It is customary upon occasions like the present, for the Chairman to address a few words of welcome to those assembled. To avoid repetition, I will ask you, if possible, to call to remembrance those spoken by myself twelve months ago, more especially the allusion to the pleasure derived from the presence of those kind friends and visitors who take an earnest interest in our proceedings and prosperity. To me an evening meeting like this, the harbinger as it were of the future, carries with it associations of an enjoyable character, which I trust may never be diminished; it connects the past with the future, the Session which has run its course with that which is approaching, the seniors with the juniors, the kind and encouraging words of the Professors (and I expect they will be quite as much so this evening, if not more so, than usual) with their pupils, and the good words of the address with the students new and old. It is a strong link in the chain which binds us together; may it, like a flourishing vine, year by year grow stronger and stronger.

Chemistry and Pharmacy.

The President then called upon Professor Redwood, as the senior Professor, to present his report with regard to the Chemistry and Pharmacy Class.

Professor Redwood said that what he had to submit to them that evening was simply a statement of facts relating to the class which was under his direction in connection with this Society, and had reference to a past Session. But one important object of their meeting was, as their President had very justly stated, to refer not merely to the past but to the future. It was to open a new Session of their school, and in this respect their proceedings would have reference to a future Session. In fact, their meeting there that evening had for its object to bring together the past and the future, and they might say that the past, the present, and the future were all associated in that meeting. They proposed to introduce students of a past to those of a future Session, and to introduce both to those who represented the present existing state of the pharmaceutical body, and to the parents and friends from whom they derived their supply of students, and who had met together with them to do honour to some of the most deserving and successful of those who had studied in the schools of the Society. At the examination which concluded the last Session, in July last, and which was in every respect a perfectly satisfactory Session, fifteen competitors presented themselves in the chemical class for the prizes which were awarded by the Council; of those fifteen, it was his pleasure and gratification to be able to report seven to the Council as having gained a sufficient number of marks by the answers which they had given to the long list of questions which were submitted to them, to entitle them to some distinction. He might here state that fifteen questions were submitted in his class, extending over a very wide area of physics, practical pharmacy, and chemistry, both inorganic and organic, and the answers to those fifteen questions had to determine the claims of the respective parties to recognition and reward. Six hours altogether were appropriated to the answering of these questions—two periods of three hours each; and he might state, as he had already stated to the Council, that, taking the answers as a whole, considering the number of competitors, and the number and character of the questions submitted to them, he had never on any previous occasion, although he had occupied that position now for some thirty years, had more satisfaction in awarding the prizes than he had on this occasion. Of the seven gentlemen who had been successful, the one who stood first—Mr. Robert Higgins Davies—had 90 marks, the highest number which could under any circumstances be given being 100. The one which stood second—Mr. Edward Rammell—had 84 marks. To these gentlemen the Council had awarded the Silver Council Medal and the Bronze Council Medal. Then Mr. Joseph Walker had 76 marks, and Mr. William Ashwell Shenstone 75, to each of whom an honorary certificate had been awarded. And lastly, there were three gentlemen who had 66, 64, and 61 marks respectively—namely, Mr. F. A. Crisp, Mr. A. B. Cortis, and Mr. Hetherington, to whom certificates of merit had been awarded. These were the gentlemen whom he wished to introduce to them, and regarding whom he was sure they would be pleased to ratify and confirm that which he had suggested to the Council, and the Council had determined upon with respect to granting them the marks of distinction to which he had referred.

Chemistry and Pharmacy.

Hours: Ten till One, and Two till Five. Standard number of marks, 100.

1. Define the meaning of the terms "specific gravity" and "density."

2. A specific gravity bottle having a capacity equal to 1000 grains of water when the perforated glass stopper is fixed in its place, is used for taking the specific gravity of alcohol, in an apartment, the temperature of which is 70° Fahr.; explain the probable sources of error in operating under such circumstances.

3. Describe the law, commonly known as Mariotte's law, relating to the effects of pressure on the density or volume of gases, the way in which results have been obtained on which the law is founded, and the limits to the application of the law.

4. What is the principle of hydrostatic pressure in accordance with which the hydraulic press is constructed; and in what way is that principle turned to account in confining the water in the large cylinder of the press?

5. What are the advantages and disadvantages of the hydraulic as compared with the screw press, when used in pharmacy?

6. In distilling water with an ordinary still and worm-tub, how much water is required in the condenser, and what increase of temperature will occur in it, in getting a gallon of distilled water? In what respect would the result differ in distilling spirit? Explain the cause of the difference, and give the data on which the calculations are based.

7. Explain the terms maceration, digestion, elutriation, lixiviation, percolation, and displacement, as used in pharmacy.

8. Describe some of the leading facts which have been established with reference to liquid diffusion. Explain the way in which experiments on this subject have been conducted; the results on which the process of dialysis has been founded; the form of apparatus used for dialysis; and the conditions under which the best results are obtained by it.

9. Describe the production of chlorine from hydrochloric acid and black oxide of manganese; from common salt, manganese and sulphuric acid; and from chlorate of potash and hydrochloric acid. Describe methods of collecting the gas, and what is specially to be observed in applying such methods. Give the specific gravity of chlorine, and the extent of its solubility in water. Describe the nature of its action on vegetable colours, and on infectious matters.

10. Describe the production of sulphurous anhydride from sulphuric acid and mercury, and from sulphuric acid and charcoal; explaining to what extent heat is required to be applied, what the gaseous products will consist of, how the sulphurous anhydride is to be collected, what its specific gravity is, and what the extent of its solubility in water.

11. Describe the action of sulphurous acid as a decolourizing agent, and the difference there is in its mode of action from that of chlorine. Name some of the organic substances to which it is most advantageously applied for depriving them of colour.

12. Describe the effects of different degrees of heat on zinc, and the way in which the metal may be reduced to the coarsely granulated, and also to the finely granulated state.

13. Describe the Pharmacopœia processes for citrate of iron and ammonia, tartarated iron, and phosphate of iron, and refer to any practical points in connection with those processes that you consider important.

14. Define the terms "Alcohol," "Ether," "Aldehyd," "Ketone," and "Olefine," as used by chemists as generic terms, illustrating the application of each term to two or more homologous compounds.

15. Give the formulæ representing the composition of the following bodies:—

Cane Sugar.
Grape Sugar.
Mannite.
Glycerine.
Nitrous Ether.
Oil of Bitter Almonds.

Botany and Materia Medica.

The President then called upon Professor Bentley to state the results of the examination in the Botany and Materia Medica Class.

Professor Bentley said that, although he had not addressed such an audience on thirty or more occasions of a similar character to the present, as his esteemed friend and colleague Dr. Redwood—yet there had been something like twenty-two or twenty-three occasions on which he had had the honour to address an audience at the commencement of a new Session, and he had often said that that day in his life was always a pleasant one. What he had said on previous occasions he could reiterate on this. He cordially endorsed what had been said by Professor Redwood. He had never had a more attentive or more diligent class, or one which exhibited in the whole course of the year a more uniform progress, than that which he had had during the last session. He could say this with perfect confidence, because it had been his practice during the past year to hold weekly examinations, which he found were most conducive to the success of the students. He intended this year to have occasional written examinations, as well as *vivâ voce* ones, and he hoped that the students would avail themselves as far as possible of them, for they brought the Professor more intimately in contact with his pupils; and thus facilities were afforded of testing the progress made and of asking the lecturer himself for an explanation of any particular subject. He felt very strongly upon the subject of examinations; and speaking from experience not only in regard to pharmaceutical education, but also with respect to medical education, he must say that he knew nothing which was more calculated to advance the students than periodical and systematic examinations during the progress of the course. With these few remarks he would proceed to make some observations upon the students of the past Session. He had already spoken of their diligence and good conduct; and when he spoke of their good conduct, he spoke of it not only as regarded that institution but with respect also to the Botanical Gardens, where they had important and rare privileges and opportunities for study,—and he must say as a member of the Council of the Botanic Society that not the slightest breath of complaint had been made during the past year, or, indeed, in previous years, of the conduct of the pharmaceutical students. He might also mention that it was with some satisfaction that he noticed the number of pharmaceutical students was increasing. This was not the time to go into the question of pharmaceutical education, but he might remark that when they considered the numbers of students who attended the classes, it was at all events to some extent a satisfactory test that, even under the present voluntary system, the young men were desirous of availing themselves of instruction. He found on referring to the Secretary's books that in the year 1869-70 there were 111 students attending his lecturers; and they must bear in mind that this was just after the passing of the Pharmacy Act, when there was a great rush of students. In 1870-1, he had 102—a fall of only nine; and in the year 1871-2 there were no less than 113 students attending the class of botany and materia medica. These facts spoke for themselves, and the members could draw deductions from them quite as well as he could. With regard to the terminal examination, sixteen candidates presented themselves. The examination in his class was twofold. It was a test in every respect. There was not only a written but a practical *vivâ voce* examination, and the total marks awarded for the two examinations was 120. Of the sixteen candidates, seven had at his recommendation been awarded prizes or certificates. The first gentleman, the same as obtained the first prize in chemistry, Mr. Davies, obtained 105 marks out of a possible total of 120. The second gentleman, the same again as obtained the second prize in chemistry, Mr. Rammell, got 103 marks. To these two gentlemen had been awarded the silver Council Medal and the bronze Council Medal respectively. The third, who ran exceeding close with the first two, obtained 99 marks, the numbers being 105, 103, and 99, and a certificate of honour had been awarded to the gentleman making these marks, who bore a name which was honoured in connection with that institution—Mr. Frederick Janson Hanbury. The fourth, Mr. W. A. Shenstone, got 93 marks, and was also awarded a certificate of honour. The next three, who got certificates of merit, were Mr. Arthur Brownhill Cortis, Mr. Joseph Walker, and Mr. Charles Harridge Russell. In conclusion, he congratulated these gentlemen on their success, and said that no one ever obtained a medal or certificate in that Society unless he was fairly entitled to it.

The questions for examination were:—

Botany.

Hours: Ten till One.

1. Give a general description of the different kinds of Raphides, and mention the plants and parts of plants where they are respectively found.

2. Describe the internal structure, and external appearance of an Acrogenous or Acotyledonous stem.

3. Define the following:—Phyllode, stipule, crenate, pinnate, pinnatifid, palmatifid, decompound, ligule, tuber, rhizome, corm, and bulb.

4. Define the following:—Involucre, glume, cyme, receptacle, thalamus, follicle, legume, septicidal, syngenesious, primine, testa, and aril.

5. Give the essential characters of the following Natural Orders, and enumerate the official plants which they respectively contain:—*Malvaceæ*, *Rosaceæ*, *Compositæ*, *Scrophulariaceæ*, *Polygonaceæ* and *Liliaceæ*.

Materia Medica.

Hours: Two till Five.

1. Describe the general characters, and botanical and geographical sources of the different varieties of Rhatany. Mention especially how they may be distinguished from one another, and enumerate the official preparations of Rhatany.

2. Describe the mode of extraction, general characters, varieties, and adulterations of guaiacum resin. Mention its botanical and geographical sources, and the means of detecting it when employed to adulterate scammony.

3. Describe the general characters of annulated, striated, and undulated Ipecacuanhas. Mention their botanical and geographical sources, and to what their medical properties are due. Enumerate the official preparations of Ipecacuanha.

4. Describe the botanical and general characters, varieties, substitutions, and adulterations of Chamomile Flowers. Enumerate the official preparations.

5. Describe the general and chemical characters of Dandelion root, and point out especially how it can be distinguished from other roots; also mention the season usually regarded as the best for its collection, and the data upon which such an opinion is founded. Enumerate the official preparations of Dandelion root.

Practical Chemistry.

The President then called upon Professor Attfield for his report in reference to the class of Practical Chemistry.

Professor Attfield said that at the close of the last session, sixteen gentlemen competed for the prizes in the class of Practical Chemistry. Of these sixteen, fourteen continued working during the whole of the two days devoted to that examination; and of the fourteen, ten succeeded in obtaining such a position as to entitle them to the medals and certificates awarded by the Council. Mr. William Ashwell Shenstone obtained ninety per cent. of the standard number of marks. Mr. Shenstone was a Bell Scholar,—one who would remain in, and doubtless be an ornament to pharmacy. The second on the list was Mr. Robert Higgins Davies, who obtained seventy-eight marks. Mr. Davies was also a Bell Scholar, but, the Professor was sorry to say, leaving the practice of pharmacy for that of medicine and surgery: indeed, he had already entered the ranks of medical students in Dublin. Mr. Davies and the third Bell Scholar,—for there were three last year,—Mr. Rammell, had enriched pharmacy with some original investigations during their term of study. These gentlemen had made researches and published papers: Mr. Davies on Sulphite of Magnesium, which would be found in the Pharmaceutical Journal for the 1st June; and Mr. Rammell, in conjunction with Dr. Tilden, on the Resins of Aloes, communicating the results to the Meeting of the British Pharmaceutical Conference at Brighton; they were published in the PHARMACEUTICAL JOURNAL of the 9th September. Mr. Rammell also, like Mr. Davies, gave indications of leaving pharmacy for higher paths of labour, following in that respect the example of too many of the Bell scholars. The Professor took to himself some credit for keeping Mr. Rammell to a certain extent amongst them. He had accepted a situation which, though not in Europe, was in connection with pharmacy, and on the preceding day had sailed for India, to join a large establishment in pharmacy there, so that the bond which bound them together was not snapped, it was only stretched. The third, fourth, and fifth on the list were Mr. Joseph Walker, Mr. Richard Trist, and Mr. F. J. Hanbury, who had obtained respectively, seventy-six, seventy-five, and seventy-five marks. It was due to these three gentlemen to state that through various circumstances they were unable to work at practical chemistry, during every day of the whole Session. They were only able to work for some four or five months each, and, therefore, the position they had obtained was all the more creditable to them. Certificates of Merit had been awarded by the Council to Mr. Daniel Badcock, Mr. Walter B. Bishop, Mr. James Herbert Midgley, Mr. Arthur Brownhill Cortis, and Mr. David Edwards. These gentlemen had gained nearly seventy marks each, and they quite deserved the position they had obtained. With regard to Mr. Bishop, he ought perhaps to say that, like Mr. Davies and Mr. Rammell, he had made some original investigations and experiments during the Session on the commercial purity and impurity of Iodide of Potassium, and had written a paper which would be found in the PHARMACEUTICAL JOURNAL of the 3rd August, and which would be seen to contain evidence of a considerable amount of analytical skill. At the close of the Session, the staff of the laboratory sustained a considerable loss. Dr. Tilden, who had been the senior demonstrator, the senior assistant in the laboratory for some nine years, had succeeded in obtaining the appointment of Lecturer on Chemistry at Clifton College. It would be known to most of those present that the officers of this Society, including the President and Vice-President, the Secretary and the Professors, invited Dr. Tilden to a dinner when he had obtained his appointment, and presented him with a testimonial, showing their regard for him as a colleague and a gentleman. The laboratory students of last Session, and of some previous Sessions, had also, the audience would be glad to know, subscribed a sum of money to show their appreciation of his attention to them, and the result was a present in the shape of the very handsome balance which was then on the table. While congratulating Dr. Tilden most strongly on the appointment he had obtained, he (Professor Attfield) regretted the loss for his own sake, for the sake of the laboratory, and for the sake of the Society. He would add, for the sake of pharmacy, for Dr. Tilden had contributed to pharmacy several valuable papers during the time that he was demonstrator in the Society. It was to be hoped, however, that in this particular respect they had not lost him altogether, for he promised still to give them the results of some investigations. Dr. Tilden had been asked by several of the students to attend there that evening, and had written regretting his complete inability to be present. The letter was as follows ;—

"College Gate, Clifton, Bristol,
"26th September, 1872.

"My dear Dr. Attfield,—My lecture hours are unfortunately arranged in such a way that I find, to my very great regret, I shall be unable to be present at the annual gathering on October 2nd. I shall be glad, therefore, if you will, in my unavoidable absence, kindly offer to those students of the past Session who come up to receive their well-earned honours, an expression of my hearty congratulations on their success and hopes for their future progress and welfare.

"At the same time I should like to say that I hope to hear of the uninterrupted prosperity and usefulness of the School of Pharmacy, and trust the laboratory work in which I have always taken a good deal of interest may long go on as vigorously as heretofore.

"Believe me, my dear Dr. Attfield,
"Yours very sincerely,
"WILLIAM A. TILDEN.

"Prof. Attfield, Ph.D."

The questions for examination were :—

Hours: Ten to Five. Books and Memoranda permitted.
Standard Number of Marks, 100.

1. The substances supplied to you are six pharmacopœial chemicals. Name them.
2. Ascertain the nature of the impurities (if any) present in the two accompanying salts.
3. The paper is supposed to contain arsenic. Ascertain if such is the case.
4. A specimen of urinary deposit is placed before you; ascertain by the microscope the nature of its constituents.
5. Determine volumetrically the amount of carbonate of sodium (Na_2CO_3) in the sample.
6. Ascertain by a gravimetric method the percentage of acetate of lead in the impure specimen before you.

P.S. You are at liberty to select one of the last two exercises, but not to attempt both. The same value in marks is attached to a correct answer in either.

HERBARIUM PRIZE.

The PRESIDENT next called upon Professor Bentley to report respecting the Herbarium prize.

Professor BENTLEY said that amongst the prizes given in connection with the Pharmaceutical Society, he considered one of the best instituted by the Council was that given for Herbaria of British plants. He classed this amongst the best, because it encouraged young men, particularly in the country, to devote some time during their pupilage to the acquirement of knowledge which could not but be essential to them in their future progress. He regretted that on the present occasion only one collection of British plants was sent in for competition; but while he said he regretted there was only one, he need only point to that one to show them that he could not speak in too high terms of the student who had sent it in. When he told them the name of that gentleman, they would be prepared for great things; and when they saw the case opened in which the specimens were contained, they would confess that even he, who was always inclined to encourage students with a good word if he possibly could, had not said all that could be said of the deserts of the gentleman who had collected them. The name of the contributor was Mr. Frederick Janson Hanbury, who had sent in a collection of British plants containing upwards of 700 specimens, nearly half the flora of the British islands. The number was in itself an evidence of the indefatigable industry of Mr. Hanbury. And when he (Professor Bentley) stated that, independently of the number, nearly the whole of England and Ireland had been ransacked for the treasures, he gave an additional reason why they should congratulate Mr. Hanbury. The collection contained not only common plants, but plants of great rarity and interest—of interest even to botanists. Not only had he to take excursions many miles to collect these different specimens, but he had to bring them home, to name them, to select those which were proper for drying, to dry them carefully, to mount them upon paper, and to preserve and arrange them in the systematic and in the beautiful manner in which they now saw them. He (Professor Bentley) need not say any more than that he recommended the Council to give Mr. Hanbury the highest award they were enabled, namely, the Silver Council Medal. The Secretary had mentioned to him, and he wished particularly to speak upon it that day, that several pupils had written to inquire whether plants gathered from botanic gardens were eligible for the herbaria; he (Professor Bentley) replied, certainly not. In large towns the young students could go into the botanic gardens where the plants were all named, but the object of the prize was to encourage the student to exert his own knowledge. The plants for the herbarium prize must be wild plants, collected from native habitats, and named by the student himself; in fact, those conditions constituted the only value of the prize. He thought the Herbaria prizes might be increased; that in different centres, covering, say, an area of twenty miles, prizes might be offered for the best collection of British plants.

The foregoing medals and certificates were then handed to those of the successful competitors who were present, the President congratulating the recipients as they came forward to receive the awards from his hands.

Mr. W. A. Shenstone, one of the successful candidates, the Secretary to the Testimonial Fund to Dr. Tilden, expressed on behalf of the students in the laboratory their thanks to the Council for the encouragements they gave to the students, to the Professors for the able assistance they had rendered the young men in pursuing their studies, and also to the Demonstrators, especially Dr. Tilden, to whom they offered their best wishes on the occasion of his leaving them, and their congratulations on the new appointment he had received.

The Pereira Medal.

The President then said that the highest prize of the year—the Pereira Medal—had been awarded to Mr. William Ashwell Shenstone, to whom he had great pleasure in handing it.

The following were the questions for examination:—

Chemistry.

Time allowed: Two Hours. Standard Number of Marks, 100.

1. How would you separate tin, lead, silver, bismuth, copper, iron, zinc, and magnesia when present together in the form of a powder insoluble in water, and by what tests would you identify each?
2. Describe minutely the process you would employ to determine the percentage of ammonia in spirit of sal volatile.
3. How would you detect the iron in yellow prussiate of potassium?
4. Explain briefly the atomic theory.

Botany and Materia Medica.

Botany.

Time allowed: Two Hours. Standard Number of Marks, 100.

1. Describe various kinds of inflorescence, illustrating each by an example.
2. Give some account of the germination of the seed.
3. What is phu? Name its varieties, and describe the officinal plant.
4. Describe the drupe, utricle, follicle, and siliqua, with examples.

Materia Medica.

Standard number of Marks, 100.

1. State what you know respecting *Hydrastis Canadensis.*
2. On what does the efficacy of *Hyoscyamus niger* depend? State the theories entertained respecting its employment.
3. State the source of the olibanum of commerce, adducing reasons for the assertion.
4. Write a brief account of recent cinchona cultivation.

The Prize of Books.

The President next announced that the Prize of Books had been awarded to Mr. George Claridge Druce, of Northampton.

The following were the questions for examination:—

Prize of Books.

State the best method of dispensing the following prescriptions, assign the reasons for the same, and write the labels in suitable language:—

℞ Potassæ Carb. gr. x.
Potassæ Nitrat. gr. xxx.
Pulv. Sacchari ʒj.
Ol. Amygdal. ʒiij.
Sp. Ammon. Aromat. ʒij.
Aqu. Destill. ad. ℥iv.
M. ft. Mistura.

Capt. quartam partem mane vespereque vel sæpiùs raucitate urgente.

℞ Ferri Redact. gr. iv.
Quinæ Disulph. gr. j.
Ext. Nucis Vomicæ gr. $\frac{2}{3}$.
Ext. Cannab. Ind. gr. $\frac{1}{4}$.
M. ft. pil. j.

bis die sumend nisi cephalalgia superven. dein capt. j. semel in die tantùm.

Mitte xx. in argent involv.

State the proportions of the materials, temperature of the water, and time ordered for preparing the following infusions, and suggest any improvement that might be made:—Buchu, Cusso, Quassia.

Describe and explain the P. B. process for making Acidum Tannicum.

State the ingredients used in and the method of preparing Emplast. Cerat. Saponis.

Enumerate the preparations of the Pharmacopœia which contain lead.

The Bell Scholarships.

The President then said that two Junior Bell Scholarships had been awarded this year, one to Mr. Sidney Plowman, of Boston, the other to Mr. Edward Lawrance Cleaver, of Oxford Street, London. It would be noticed that the honours were equally divided between town and country.

The requisite number of marks was not obtained by either of the competitors for the Senior Scholarship.

The questions for examination were as follows:—

Senior Bell Scholarship.

ARITHMETIC.

Time allowed: One Hour.

1. Reduce $\frac{3}{7}$ of $\frac{2}{9}$ of $\frac{4}{5}$ of $8\frac{3}{4}$ to a simple fraction.
2. What is the cube root of $\frac{1}{2}$?
3. Find two numbers of which the sum shall be 21, and the sum of their squares 225.

LATIN.

Time allowed: One Hour.

1. State where the verb *eo* differs in formation from a regular verb.
2. Give one illustration of the ablative of manner.
3. Put into Latin,—Therefore exercise and temperance can, even in old age, preserve something of pristine vigour.
4. Translate.—Quibus rebus cognitis, Cæsar maturandum sibi censuit, si esset in perficiendis pontibus periclitandum, ut priùs quàm essent majores eò coactæ copiæ, dimicaret.

ENGLISH COMPOSITION.

Time allowed: One Hour.

Write a few remarks on 'Strikes.'

CHEMISTRY.

Time allowed: One Hour. Standard Number of Marks, 50.

1. A litre of carbonic anhydride is passed over red-hot charcoal; what gas is formed, and what is its volume? Explain how the carbon may be separated from carbonic anhydride.
2. A lighted candle burns if placed in oxygen. It will also burn in chlorine. Explain the nature of the combustion in both cases.
3. How would you detect traces of arsenic in potassio-tartrate of antimony?

BOTANY.

Time allowed: One Hour. Standard Number of Marks, 50.

1. How do plants take up food by their roots and leaves?
2. From what plant or plants are the so-called *bay-leaves* obtained?
3. To what natural orders do the common nettle, the white dead nettle, the teasel, and the wallflower belong?
4. Define venation, vernation, and æstivation, and give examples in support of your definition.

Junior Bell Scholarship.

ARITHMETIC.

Time allowed: One Hour.

1. Multiply £27. 19*s*. $9\frac{3}{4}$*d*. by 59.
2. Reduce $\frac{7}{3}$, $\frac{2}{5}$, and $5\frac{1}{6}$ to a common denominator.
3. Divide 9 by ·45.
4. Multiply ·406 by 52.

LATIN.

Time allowed: One Hour.

1. Give the Present, Infinitive, Perfect, and Supine of *sono, deleo, dico,* and *solvo.*
2. Decline *ambo* and *alius.*
3. Put into Latin,—This is what I have to say about friendship.
4. Translate,—Ad hæc Cæsar, quæ visum est, respondit. Sed exitus fuit orationis: Sibi nullam cum his amicitiam esse posse, si in Galliâ remanerent; neque verum esse, qui suos fines tueri non potuerint, alienos occupare: neque ullos in Galliâ vacare agros, qui dari tantæ præsertim multitudini sine injuriâ possint.

ENGLISH COMPOSITION.

Time allowed: One Hour.

Write a few remarks upon one of the following subjects:—

Reading.
Business Habits.

CHEMISTRY.

Time allowed: One Hour. Standard Number of Marks, 50.

1. What is meant by an elementary body? Name six metallic and six non-metallic elements, and explain in what state they exist in nature.
2. Explain the action that takes place when Potassium is thrown into water.
3. How would you prepare Phosphoric and Hydrochloric Acids? Explain the process in each case by equations, and give the tests for distinguishing one from the other.

BOTANY.

Time allowed: One Hour. Standard Number of Marks, 50.

1. What are the differences in leaf and stem between Endogens and Acrogens?
2. Define the following, and give examples of each, tubercule, corm, stipule, bract, perianth, leaflet.
3. Describe the flower of a buttercup, dandelion, and tulip.
4. Whence do plants obtain their food?

MATERIA MEDICA.

Time allowed: One Hour. Standard Number of Marks, 50.

1. How would you estimate the value of a sample of scammony root and jalap?
2. What plant yields common turpentine, and in what manner is the oil of turpentine of pharmacy obtained therefrom?
3. What is the best method for making cherry laurel water, and how would you determine its strength?

The Inaugural Sessional Address.

The President then said: One pleasant duty follows closely upon another. Having distributed the prizes, it remains for me to congratulate collectively the competitors. I am glad to know that more candidates this year have received certificates than usual. Heartily do I rejoice with the successful candidates, and sympathize with the less fortunate, wishing success equally to both in all their future undertakings. To those now entering as students, I will simply say, listen carefully and attentively to the address which will now be delivered by our friend and colleague, Mr. Stoddart.

The following inaugural address was then delivered by Mr. William Walter Stoddart:—

Mr. President, Ladies, and Gentlemen,—

The greatest pleasure any one can enjoy is the companionship of those who are following the same pursuits, or working out the same investigations, whether in the field of science or of literature.

In that position I am placed this evening, having been requested by your Council to address you, with the view of offering a few suggestions as to the best mode of studying the various branches of pharmaceutical education, and thereby ensuring the greatest success. I must confess, however, that I have undertaken the task with very conflicting feelings. On the one hand, I experience some considerable trepidation, lest I fail to fulfil the duty intrusted to my care; while, on the other, I have the satisfaction of knowing that I am in every respect a fellow-student, and therefore can understand and enter into your many difficulties. Whether or not I remove any, will be for you to decide.

I suppose that all of you are anxiously looking forward to the time when, in after life, you will realize the results of the present careful teaching and training.

Proper food is as indispensably necessary for our minds as for our bodies; and the quality of that food will as surely determine the future development of the one as of the other. If you are content to feed your mental lives with worthless literature, you will most assuredly enervate your powers of thought and judgment; but, on the contrary, if strengthened by appropriate reading and a judicious selection of all that is valuable and useful, you cannot avoid ensuring a vigorous intellect. It will enable you to hold your own among your fellow-men, to arrive at the decision of difficult points which will often arise in your daily occupation, and perhaps to guide your brother pharmacists through many a labyrinth which would otherwise end in a disastrous failure.

Everything in this life if neglected will naturally retrograde and decline into sterility and desuetude. God has given us minds, and intrusted them to our care, and if we do not cultivate them, and thereby widen the sphere of thought, we most assuredly neglect a very solemn duty, and prove ourselves unworthy of the gift.

Not one of you is born to live alone, or for yourselves only; nor can you, whether you wish it or not, avoid making some impression on your companions, either for good or evil. I suppose the great majority of pharmacists are obliged to work hard for their daily bread, and to supply the common necessaries of life for those who are near and dear to them. Experience has repeatedly proved that the much-coveted competence—if such a thing be possible for a druggist—will be attained in proportion to the perseverance and to the intelligence evinced by the skill and knowledge of our craft.

Education is very often confounded with teaching, and the error is as great as it is popular. Education is a final result, that is only obtained from a certain amount of labour, especially if facilitated by faithful and able teachers; but do not deceive yourselves in this matter, for it is possible for you to have at your command the most competent professors the world can produce, and yet fail in gaining the least advantage. And why? Because their instructions have not been accompanied by your own individual efforts. You must build your own edifice, and no one else can do it for you; and as with a material building, it is indispensable that you go to a proper quarry, hew the stone with a practised hand, and gradually place layer upon layer, according to a preconceived plan; so it is with your educational structure. The old saying that "what a man sows, that shall he also reap," applies exactly to your case; and just in proportion to the labour bestowed, and the quality of the seed sown, so will the harvest be. There will be no harvest if the seed be not properly sown.

If we were able to obtain the result of every day's work, we should be surprised to find how large a proportion of that work is accomplished by men whose hours of study are in the midst of apparently uncongenial occupations, and who can only make use of a few precious half hours, and those, perhaps, taken from their periods of rest. Nay, more, I believe the man who is occupied the most with daily labour, is the one who does the most towards the completion of his own education and the good of his fellow-men. Faraday, William Allen, Miller, and Stephenson were bright examples of those who never could be accused of wasting a single spare moment.

One great, if not the greatest reason why so few shine out from the general mass, is the want of *observing power*. One of the first things a pharmaceutical student has to learn, is to make proper use of his eyes. This elementary lesson, I am sadly afraid, is too frequently omitted from the curriculum of many an eminent professor. A teacher cannot be too simple or too practical. When once the eye is trained, the slightest deviation from the ordinary course instantly arrests the pharmacist, and calls forth the "why and wherefore" inquiry into every-day occurrences, which are passed by unheeded, simply because they are so familiar. I will give you an illustration or two of what I mean. Most of you, and many thousands more, who have studied chemistry, have made hydrogen gas by dissolving a piece of zinc in diluted sulphuric acid, and have seen the sediment that remains in the solution of zinc. How invariably has this bit of dirt been thrown away as not worth a moment's consideration, or without the slightest idea of inquiring what it was? Nevertheless, nine years ago, Drs. Reich and Richter found this insignificant-looking sediment contained the new element, Indium, especially when the zinc came from the Freiberg mines.

Another still more remarkable instance occurred in the case of Thallium. For many years past, the waste dust had been collecting in the flues of vitriol factories without attracting attention, till Mr. Crookes chanced to examine it, when, to his utter astonishment, he found it to contain no less than the twelfth part of its weight of this curious metal; another new element unique in its properties, both optically and chemically. As you know, its spectrum differs from that of every other body, by a magnificent green band when ignited, and exhibiting the most perfect example of monochromatic light yet discovered.

Nor is there any occasion for you to go to the sulphuric acid manufactory for your material. If you will examine the bismuth, the chloride of zinc, or the hydrochloric acid on your shelves, you will most likely find this extraordinary body to be present in sufficient quantity to develope its spectral phenomena.

How many hundreds of mixtures have been dispensed with quinine, but how few of you have, perhaps, asked for the explanation of that grand fluorescence that always makes its appearance, or supposed you were looking at one of the most marvellous displays of force that chemical physics has ever striven to elucidate? When, however, the eye has been trained to notice the many reactions that occur daily in our pharmacies, the aptitude for education is wonderfully increased.

Is it not to be feared that the tuition in most of our schools and colleges is too exclusively based on the reasoning and not on the perceptive powers of the mind? If so, the inference must be, that the knowledge acquired will be theoretical instead of practical, the library being too much employed and the laboratory too little. I would, therefore, my friends, sincerely urge you to experimentalize, to examine for yourselves, and not to take everything for granted that you hear. You will quickly find that what you once thought a distasteful task, becomes a delightful pleasure.

A good criterion that you are becoming acquainted with your studies, is the conviction that you yet know but little in the broad field before you, and become cautious of the many pitfalls that await those who in their foolish pride think they know all.

"A little learning is a dangerous thing;
Drink deep or taste not the Pierian spring:
For scanty draughts intoxicate the brain,
But drinking largely sobers us again."

You will all have many difficulties and trials to surmount, but then they will be counterbalanced by many commensurate privileges. You are like a traveller in a strange country, and surrounded by innumerable objects of beauty and interest. Now stopped by some deep crevasse or rapid stream, now by some steep ascent or slippery rock. Sometimes the flora of some exquisite glade or the fauna of an extensive forest will arrest the attention. Would an enthusiastic naturalist, do you think, be daunted by such difficulties, or turned back by such obstacles? Decidedly not. On the contrary, he would be only stimulated to make more strenuous efforts to fill his vasculum, or complete his collection.

So is it with you, who are in the midst of equally fascinating objects, though you do not notice them from the before-mentioned familiarity. The exquisite tracery of a slice of sarsaparilla, liquorice, or calumba, the wonderful optical powers of morphia and quinine, or the extraordinary structure of a mustard seed, a lupulinic gland, or the under side of a matico leaf, are only a few of the many examples that with the assistance of a common lens must astonish the most careless. Many of the most charming experiments that were ever exhibited by Faraday or Tyndall may be shown any day in a druggist's shop. Not many months ago I showed to a London optician the spectra of lobelia, digitalis, hyoscyamus, and cannabis, when he was struck with admiration, and declared he had never before seen anything half so beautiful, and asked if I would tell him how they were prepared. My young friends, need I remind you that the answer to his inquiry was a reference to your old acquaintance, the British Pharmacopœia?

May I stop here to remark to my brother pharmacists how much good a master may do his pupil, if he would point out some of these wayside objects, and encourage an *esprit de corps*, instead of exacting the veritable pound of flesh, as is too commonly the rule? By so doing the pupil would often ransack the materia medica with an eager zest, instead of a dogged resignation to what is thought an irksome duty. As Mr. Kingsley says, "A walk without an object, unless in the most novel and lovely scenery, is a poor exercise, and as a recreation utterly *nil*. If we wish to do our children any good, we must give them an object in every walk. We can teach them to find wonders in every insect, sublimity in every hedgerow, and by teaching them to make full use of the limited sphere in which they now are, to make them faithful in a few things, that they may be fit hereafter to be rulers over many."

But I think I hear some of you ask me if there can be much sublimity or many wonders in the rows of bottles with which you are so well acquainted. Stop a moment and consider. Use your observing powers, and invest a little money in that good educational assistant, a moderate microscope, and by its aid look again at these absurdly common things. What do you see? Why many, if not all of these common drugs and chemicals, would fill a large cabinet with exquisite slides. Look, for instance, at the remains of former ages in the prepared chalk or the pretty button-like crystals in the carbonate of magnesia, the beautiful seeds of hyoscyamus, colchicum, linseed or poppy, the raphidian rosettes snugly placed in their little cells in the rhubarb, podophyllum or squill, the restless little nematoids on the vinegar tap, or the elegant fungus that grows and fructifies in the solution of emetic tartar. Time would fail me in anything like an attempt to describe the wonders contained in our bottles and drawers.

There is one warning that I am desirous to impress upon you with great earnestness, namely, the incalculable advantage of a systematic arrangement of your studies. I speak from experience when I say that a loose, indiscriminate manner of study is so much time lost. If you have ever so extensive a library, and dip at random into your Attfield, Bentley, Lindley, Fownes, and Royle, you will make a terrible mistake, and totally put a stop to profitable study. Should any of you attempt to pursue so erroneous a course, however industrious you may be, you will feel extremely uncomfortable when you have to face the Board of Examiners. You will resemble the poor fellows in the tower of Babel, so quaintly described by an old poet:—

"'Bring me,' quoth one, 'a trowel quickly, quick!'
One brings him up a hammer. 'Hew this brick'
Another bids: and then they cleave a tree.
'Make fast this rope,' and then they let it flee.
One calls for planks, another mortar lacks:
They bear the first a stone, the last an axe.
Thus crossly cross'd they prate and point in vain—
What one had made, another mars again.
These masons then, seeing the storm arrived,
Forsake their purpose, and, like frantic fools,
Scatter their stuff, and tumble down their tools."

A method I have always found to work extremely well is to draw up a tabular arrangement according to circumstances. Botany for one day, chemistry for another, materia medica for the third, and stick to it. If you are prevented from enjoying the half-hour allotted to Bentley, pass it over and work with Attfield on the appointed day, but never upset the arrangement. Use every spare five minutes. You will never know till you try what a large amount of work can be performed in a few odd moments. Do not think because you cannot have a couple of hours at a time that you are, therefore, debarred from study. Where there is a will there is also a way. Not one of your predecessors ever had the advantages you possess, the books you have, or the class instruction now offered.

A great outcry is now being made for provincial education; but is there so much need for that extra machinery that many would have you believe? My own experience leads me to doubt it. Every master ought at any rate to be able to direct his pupil *how* to study, and then generally it must be the pupil's own fault if he do not succeed. One man may take a horse to a pond, but not all the energies of fifty can compel him to drink. But work with a firm determination to win, and then you will have no apprehension when you have to meet those gentlemen who form the Board of Examiners. I believe that all the knowledge required to pass the Minor may be acquired by yourselves alone. Lectures and classes are, of course, great helps, and I would be the last to say anything that would tend to lessen the idea of their value. But do not think that genius or more than ordinary ability is required. It is the persevering, resolute, hard-working student that gains the Pereira medal. One who is really determined to reach the goal, and who, by accustoming himself to work, finds his studies become proportionally easier.

I hope all of you have embraced the study of pharmacy in its highest sense, and intend setting to work with brave, earnest and honest hearts. The knowledge you will thus have acquired will last you all your lives, and never evaporate like the temporary makeshift of the crammer. Our esteemed professors will welcome you, and take a delight and pride in guiding you forward with their lectures and their counsel; but I am sure they will tell you that their efforts must be supported by your own individual exertions. Indeed, the whole value of their lectures depends on the use you make of them. Chemistry must be learnt in the laboratory, botany in the field, and dispensing at the counter. A month of practice is worth a year of theory.

Do not think that when you have passed your examination you must put aside all your books, and have nothing else to do but to get a business. It is to you that we older ones look for the future prosperity of the Pharmaceutical Society. You, and not we, will be the gainers by its rise in the social and scientific scale. You will, I trust, see the day that we desire to see, when the examination fees will be cheerfully and gladly paid without thinking them too high, and will some day pass the bye-law enacting that the Major must be reached before being allowed to enter into what I hope will truly be entitled the profession.

We are often met by the old-fashioned assertion, that such an amount of scientific education will unfit you for the proper attention to business, and that you will become too proud for the ordinary duties of the retail counter. It is a very absurd idea; quite as much so as for you to think of commencing business without the necessary experience. I would be the last man in this room to slight business habits. On the contrary, I set the highest value on the young man, who, by punctuality and discriminating care, can show that he has an eye for business, but, on the other hand, I should think very little of an assistant who, however regular in his habits and correct in his accounts, was not able to give a sensible answer to the many unexpected questions that are daily asked by our customers. Would your dispensing powers be lessened by a foreknowledge of the results of a mixture, and therefore of incompatibilities? Would you make any of the preparations the worse, because you knew the chemical laws that control the elements? Or would you be a worse judge of drugs, because your botanical knowledge taught you the characteristics of the medicinal herbs? It would be monstrously absurd to say so. An increase of knowledge will give you a most valuable power, applicable to every circumstance of civilized life. You will be a better tradesman, a better fellow-citizen, and a better pharmacist.

I cannot understand how any one having an acquaintance with the scientific explanation of what is going on around him at home, in the shop, or in the garden, can be content to eke out his existence with only studying the wholesale price list.

I must think better things of you, for it would seem incredible that you could have proved the friendship of such men as Professors Redwood, Attfield, Bentley, or Tilden, and the gentlemen I see around me, in vain. It is not possible that you could enjoy their acquaintance without having a more elevated idea of things than you had before you knew them.

In conclusion, I would again urge you to make full use of the coming session. You will find that when you leave Bloomsbury Square, it will have been no time or expense lost. Never condescend to lower your profession in the eyes of the public, but let them find out, as they very soon will, that you may be depended on for truth, integrity and upright honesty; and, above all, a fixed determination to walk strictly in the path of duty.

The end will be that you will earn the greatest of all earthly rewards, a good name.

> "A spotless name
> By virtuous deeds acquired, is sweeter far
> Than fragrant balsams, whose odours round diffused,
> Regale the guests. Well may such men
> Rejoice at death's approach, and bless the hours
> That end the toilsome pilgrimage; assured
> That till the race of life is finished, none
> Can be completely blest."

May such a lot be yours.

At the close of this address, the PRESIDENT proposed a cordial vote of thanks to Mr. Stoddart, which was carried by acclamation.

It was announced that the next evening meeting will be held on Wednesday, the 6th of November.

BENEVOLENT FUND.

SUBSCRIPTIONS AND DONATIONS RECEIVED DURING SEPTEMBER, 1872.

SUBSCRIPTIONS.

LONDON.

	£.	s.	d.
Baker, A. P., 33, Norfolk Terrace, Bayswater, W.	0	10	6
Bigg, Thomas, Great Dover Street, S.E.	1	1	0
Broad, John, Hornsey Rise, N.	1	1	0
Churchill, J. and A., 11, New Burlington Street, W.	1	1	0
Cornelius, James 73, Camden Road, N.W.	0	10	6
Field, J. J., 22, Upper Gifford Street, N.	1	1	0
Goosey, William, 6, Bull Lane, Stepney, E.	0	10	6
Gorton, John G., 144, High Street, Whitechapel, E.	0	10	6
Hooper, William, 7, Pall Mall East, S.W.	2	2	0
Parkinson and Son, Southampton Row, W.C.	1	1	0
Saunders, Thomas, 30, Conduit Street, W.	1	1	0
Smallfield, J. S., 10, Little Queen Street, W.C.	0	10	6
Strawson, G. F., 101, High Holborn, W.C.	0	10	6
Taylor and Co., 10, Little Queen Street, W.C.	1	1	0
Wallis, George, 183, Newington Butts, S.E.	0	10	6
Wallis, John T. W., 49, Berners Street, W.	0	5	0

COUNTRY.

	£.	s.	d.
Barton-on-Humber, Ingoldby, William	0	2	6
Birkenhead, Reece, J.	0	5	0
Birmingham, Palmer, C. F.,	0	10	6
,, Robinson, Eardley	0	10	6
Boston, Thomas, J. H., and Son	0	10	0
Brynmawr, Jones, A. M.	0	10	0
Bury St. Edmund's, Hardwicke, J. E.	0	10	6
Cheltenham, Butcher, T.	2	2	0
Driffield, Elgey, James	0	10	6
Edinburgh, Baildon, H. C.	1	1	0
,, Brown, D. R.	1	1	0
,, Raimes, Blanshard, and Co.	1	1	0
Guildford, Walton, George C.	0	10	6
Horsham, Williams, Philip	1	1	0
Horton, Great, Lister, Simeon	0	10	6
Hunstanton, Twiss, W.	0	10	6
Kendal, Severs and Bateson	1	1	0
Leamington, Smith, S. A.	1	1	0

	£.	s.	d.
Leicester, Harvey, W. R.	0	10	6
Leith, Wilson, James	1	1	0
Lewisham, Groves, H. F.	2	2	0
Llandilo, Hughes, Thomas	0	10	6
Louth, Simpson, H. D.	0	10	6
Machynlleth, Rees, E.	0	5	0
Manchester, Gibson, Robert (*Hulme*)	1	1	0
,, Halliday, W. J.	0	10	6
,, Woolley, James, Sons, and Co.	2	2	0
Mexboro', Greaves, E.	0	10	6
Middlesboro', Smith, C. S.	0	5	0
,, Taylor, W. R.,	0	5	0
New Brompton, King, T. S.	0	10	6
,, King, W. S.	0	10	6
Newport, Salop, Picken, T. W.	0	10	6
Oldbury, Briggs, George	0	10	6
Peterboro', Loveridge, T. P.	0	5	0
Rhyl, Foulks, W. H.	0	10	6
St. Asaph, Roberts, Peter	0	10	6
St. Leonards-on-Sea, Maggs, S. B.	0	10	6
Scarborough, Whitfield, J.	1	1	0
Sidmouth, Chessall, Rowland	0	10	6
Stony Stratford, Cox, Mrs.	0	10	6
Tenterden, Willsher, S. H.	0	10	6
Upton-on-Severn, Wilkes, Doctor Tyers	0	10	6
Walsham-le-Willows, Wilson, T.	0	5	0
Winchcombe, Howman, Philip	0	5	0
Worcester, Twinberrow, J.	1	1	0
Yarmouth, Great, Walpole, William	0	10	6

DONATIONS.

London.

Good, Thomas, 47, Minories, E.	2	2	0
Hooper, William, 7, Pall Mall East, S.W.	26	5	0

Country.

Oldham, Braddock, George	0	10	6
Hyde, Wild, Joseph	5	5	0

Obituary.

PROFESSOR EDWARD PARRISH.

A letter but just received tells the sad tidings of the decease of one of the most prominent and most widely known representatives of pharmacy in the United States, Professor Parrish, of Philadelphia. Sad tidings, indeed, to all who knew him, for it is given to few men to win their way to the hearts of their associates as he did. Bright and cheerful in manner, and full of thoughtful kindness, the secret of his good fellowship was not far to seek. He held the office of Professor of Pharmacy in the Philadelphia College of Pharmacy, an institution in which he had for many years taken an active interest, and his contributions to pharmaceutical literature had earned for him the honorary membership of many kindred bodies at home and abroad. He had until quite recently nursed a hope of attending the Pharmaceutical Conference at Brighton, and during the meeting the writer received a message from him expressing his interest in the gathering, and regret that he had been compelled to abandon his proposed visit to this country. He was, in fact, just leaving home, on the mission referred to in the letter from which an extract is given below. The loss of his wife a few months ago was a fearful blow to one of his affectionate disposition, but he sought strength in work and hope, and had devoted his time and energies during the spring and summer to the details and practical working of a new State Pharmacy Act. He was a member of the Society of Friends, and, as is well known, to that religious body is now committed the task of distributing the money grants of the United States Government to the native tribes of Indians, and the general charge of negotiations with aboriginal races. The mission in which he was engaged at the time of his death was a labour of love in connection with "Grant's Quaker-Indian policy" by which so much good has already been effected.

The rest may best be told in the words of a letter from his son, Thos. C. Parrish, of Philadelphia:—

"He was sent by our Government at Washington, as a special commissioner, to adjust certain difficulties between the white inhabitants, on our borders, and a very warlike tribe, the Kiowas, and was further instructed to bring to Washington certain of the more refractory chiefs, to bring about a better understanding.

"He fully appreciated the great importance of this mission of peace and goodwill, and left us thoroughly imbued with the spirit of it. He arrived at Lawrence, Kansas, in good health and spirits, and then undertook the task of penetrating into the wilds of the Indian territory to Fort Sill, a Government post. This journey of 300 miles was accomplished by means of a stage ride without intermission or halt, except to change horses. It lasted three days and three nights, and left him thoroughly exhausted with diarrhœa and fever, subsequently running into malarial typhoid fever. After an illness of about two weeks he yielded up his spirit,—pure, noble and true.

"He was buried at Fort Sill by the officer commanding, and his funeral was attended by the entire military and civil population of the post."

Had time permitted, this notice might have been extended and some details added of the life and works of Professor Parrish, but his name is too well known amongst us to need an exposition of his merits as a scientific man and a teacher; and with those who knew him, and there are many even here of the number, memory rather than measured eulogium brings fittest testimony to his goodness.

Henry B. Brady.

Correspondence.

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

Pharmaceutical Education.

The following further letters have been received by Professor Attfield in reference to the paper on Pharmaceutical Education, which he read before the British Pharmaceutical Conference at Liverpool:—

Glasgow, August 12th, 1872.

My Dear Sir,—Though quite unable to find leisure time to do your paper on Pharmaceutical Education that justice that its merits and your own well-established character as a teacher in our Central Institute so amply merits, I am unwilling, through maintaining an absolute silence, to give any one ground to suppose that I could feel uninterested in such a paper, or in the discussion to which it is proposed to form an introduction.

I trust, therefore that you will excuse the hurried character of this note, and I know that you won't quarrel with any angularity that may be noticed in the few remarks my limited time allows me to make.

I at once confess I cannot agree with your scheme any more than you do with Mr. Schacht's, or than Mr. Schacht does with Mr. Reynolds', or Mr. Mackay with either.

Whether we think it "desirable to make pharmaceutical education compulsory," is not, it seems to me, the question to ask; it is so, to all intents and purposes, even now.

You have a wholesome fear of "cram," and think that the best mode of overcoming this is to increase the stringency of the examinations, or to insist upon a prolonged attendance on certain recognized teachers, or at certain recognized schools.

Now, as a practical man, though quite as anxious as any one to see all our future pharmacists as well educated as the most highly qualified men in our business, I do not think that the time has come for increasing the stringency of our examinations, nor do I think that our doing so would lessen the amount of cramming of which you so justly, I have no doubt, complain. The numbers rejected on coming up for their examinations, and the very considerable number of our young men who are hasting out of our business, on account of the character of these and of their money lost, amply proves this position. Then, as to a prolonged attendance at our educational institutes, and the production of certain tickets in proof of this, being held as sufficient to pass our young men without the necessity of their examination by ourselves as a society, I will only point out how futile such a test has hitherto proved in the learned professions.

Then as to my own remedy, I confess at once that I don't know one! Hence the scheme I ventured to bring under the notice of the Council so far back as March last, and repeated, in Committee, in June.

We find everywhere a cry for aid in educating our young men so that they may pass the various examinations required. Well, we have the money. The money in our coffers is not ours or the Council's. The guinea of the humblest pharmacist in the most remote district of the land, is as heavy and as bright as is that of the very prince, be he who he may, of pharmacists, in our great metropolis itself.

Let us, after, as all are willing that we should, amply providing for all our requirements in London, see what our balance-sheet shows we can spare for this purpose; put it aside, let it be £1000 or £2000, and invite applications for it. The security, which I hold to be ample, that the money be well spent, is that before it be obtainable, the applicants, who must be well attested members of our Society, must have dipped their hands into their own pockets for a sum equal to or double that asked from the central fund.

I object to Mr. Reynolds' scheme, because he insists on a certain number of educational centres, as I do to London, as the "school for all the country," and which others hold to be the right state of things. The evils of one school apply to a dozen, or any fixed number of schools, though in a less degree. My proposal leaves the whole onus on each individual member of our Society. If they, on such a scheme being adopted, fail to establish schools suited to meet their special case, their own money will be undisturbed, and the blame will rest on the proper shoulders.

I fear Mr. Schacht's scheme of paying for results will fail, for two reasons:—First, because it asks me to put my hands in my pocket for the *whole* sum to be expended during the entire educational period, and to trust for repayment of a portion of this outlay to the passing of the proposed new test examinations with honours; second, and largely, because of its putting one more hedge in the way of of our future druggists attaining to the position now enjoyed by so many, without having had to pass through any such test. At present there are three examinations to be gone through, and paid for, before any new entrants can attain to the position of pharmaceutical chemist. If Mr. Schacht's proposals be adopted, as he wishes they should, all new entrants will have four examinations to pass. Now, I believe that the fear of these examinations having to be faced, even where there is ample qualifications, deters and hinders many from entering into our ranks.

In closing these most hasty notes, I must be candid, and say that in principle I agree with Mr. Mackay, that there is no inherent obligation resting on our Society to provide education for our apprentices or assistants. No other body does; and the time will by-and-by come when, I hope, we shall be able to cease doing so also. But still I advocate the most liberal use of our funds for this end now, because the position of our assistants at this time is altogether anomalous. We have suddenly and greatly raised the standard of qualifications required in our young men, and have made it a costly process. Our young men have not the means, financially or otherwise, of qualifying themselves without some extraneous help, and hitherto we, the masters, have not afforded them these means. It is high time that we should at least put it in their power to acquire the education necessary to get them out of their present position of comparative helplessness.—I am, yours very truly,

Daniel Frazer.

Professor Attfield.

Dresden, Staffordshire, August 12th, 1872.

Sir,—Having formerly had some experience in the subject, as Secretary of the Liverpool Chemists' Association, and still feeling a warm interest in anything which tends to the elevation of pharmacy, by the extension of sound pharmaceutical education, I venture to express my appreciation of the views you have so ably enounced. I cannot find words to express my utter detestation of the wide-spread system of cramming, which I believe is doing more than anything else to counteract the good effect of compulsory examination. All over the country advertisements are found in the newspapers of crammers for the Preliminary, and your remarks on the same system in the further stages are not at all too strong. From what I see and hear in this neighbourhood, and no doubt it is the same elsewhere, the examinations are looked upon as "a great bore," "a nuisance," etc., both by the young men and their employers. No idea of acquiring scientific knowledge for its own sake, or for the purpose of enabling the young man to discharge his duties with credit to himself and advantage to the public, ever seems to enter the head of either employer or employed. The great concern is how to "do" the Minor, and a very simple plan is offered. I cannot help thinking that the success of the plan must be largely owing to some defect in the examinations, or to some default of the examiners; but let that be as it may, the question is, how to check or stop it. I am free to admit that I do not like the idea of compulsory attendance at lectures being required before being admitted to examination. I should prefer a system of free-trade in this as in other things. No question asked as to where, how, or when the candidate acquired his knowledge, provided it can be ascertained beyond reasonable doubt that he really possesses it. Further, there are many young men who are willing to learn, and employers willing and able to teach all that is required, without compulsory attendance at lectures. It is rather unjust to deprive these parties of the credit due to them.

Still it is better that this comparatively small number should be compelled to make use of other means (which they would in most cases, be the first to do voluntarily) than that things should remain as they are; it is quite notorious that numbers of young men utterly unqualified, are sent out from the examination room, with the stamp of qualification upon them, to the injury of their employers, the public, and themselves (for having "done" the Minor, they fancy they must be very clever fellows, and "a little learning is a dangerous thing"). All attempts at voluntary education in which I have taken part, heard, or read of, have been failures. Young men will not attend lectures, or avail themselves of other means of education. They are, as a body, utterly apathetic and indifferent, the certainty of "getting through" is all they care about. "Bother qualification, if somebody gets me through," a young man said to me a short time since. On the whole, then, I see no other way out of the difficulty than by the plan you propose: requiring certificates of having undergone a defined course of pharmaceutical training under properly qualified teachers as a *sine quâ non* to being admitted to examination, will effectually crush cram, stir up a generous feeling of rivalry amongst the centres of education, and shut out from the circle of pharmacy all who are unable or unwilling to qualify themselves for a place there.

My great fear is that the Council does not possess, and could not, in the face of such an opposition as would be raised, obtain powers to carry out your proposal, but I hope and trust it will be done.

Yours very truly,

J. Attfield, Esq., Ph.D. Thos. D. Walker.

Examination Fees.

Sir,—The statements which I made in a letter addressed to you, August 27, and published on page 180, upon the desirableness of making such alterations in the present Examination Fees as might tend to the strengthening of our Society, which at present threatens to decrease rather than to increase in numerical and therefore political power, have called forth a counter statement from my friend Mr. Carteighe, to which I would ask your permission at once to reply. I exceedingly regret that Mr. Carteighe's explanations are not of so convincing a character as to allow me to retract what I have stated; had they been so, I would most gladly have admitted my error in judgment, and rejoiced in the prosperity of the Society; but facts are stubborn things, and the facts I desire now to lay before your readers, culled from "official documents," are such as will, I think, prove to demonstration that my statements were not "founded on fallacies," nor were my arguments based upon "a series of mistakes."

Figures speak volumes, and at once convey facts and ideas to the mind with a clearness which the most talented writer fails to accomplish by mere verbal explanation. I have, therefore, extracted from the published annual statements those items referring to the question in hand for the past eleven years, thus obviating the erroneous conclusions which are unintentionally conveyed in Mr. Carteighe's letter, by having based all his arguments upon the statistics of the last two years alone, omitting altogether the peculiar circumstances which surrounded those and the previous year, by which a harvest was unquestionably reaped, but the very relation of which, when viewed as a whole, proves the fallacy of relying upon the continuance of such harvest days.

	Members, Pharmaceutical Chemists.	Associates.	Apprentices.	Members, Chemists and Druggists.	Associates in Business.	Major Examinations.	Minor Examinations.
1861	1843	120	51			45	57
1862	1809	89	44			30	34
1863	1781	93	66			36	44
1864	1770	104	113			65	58
1865	1779	104	161			50	67
1866	1786	124	198			66	86
1867	1755	158	229			53	82
1868	1739	280	177			82	112
1869	1782	310	499	403	22	105	187
1870	1802	458	564	582	82	63	199
1871	1797	566	613	669	161	50	234

In the first place, exception is taken to my statement, that "*but a small proportion of those who pass the Major examination, think it desirable to join the Society as members.*" Do facts support Mr. Carteighe's objection upon this point? By the above table we see the statistics proving, beyond dispute, that on December 31st, 1871, the number of pharmaceutical chemists who were members of the Society was 46 less than on December 31st, 1861; so that, notwithstanding all the nominal increase, by "166 pharmaceutical chemists elected to membership," the supply entirely failed to keep up even the aggregate number. If again we turn with hope towards the large number of associates in 1871 (apprentices we cannot possibly take into account) they also will be found to fail us in supplying any large number of pharmaceutical chemists, for on inquiry I have received the following analysis of that number:—

Associates of 1842, and before the Pharmacy Act				25
„ Major	„	„	„	67
„ Minor	„	„	„	262
„ Modified	„	„	„	212
				566

Showing that at present only 92 are eligible for election from that source as members; and when we bear in mind the fact that the greater number of those who pass the Major do so within a few months of the Minor, I fear we cannot depend upon a very large proportion of the 262 qualifying themselves for membership.

Again, it is questioned whether "*our numerical strength as a Society is yearly decreasing, whilst that of outsiders is increasing.*" I sincerely wish Mr. Carteighe were right and I in error, but unfortunately it is not so, he having allowed himself to be drawn into reliance upon a source of strength on which not the slightest dependence can be placed for recruiting our number, so long as the present rule regarding the admission of chemists and druggists is retained. Here again statistics confront us, and but too plainly tell that the supply from that source, which for a moment seemed to meet our need, was purely accidental, and is now rapidly failing; the admissions falling from 403 the first year, to 87 the third; to rely upon such a source of strength is, I fear, to trust to a broken reed.

On the other hand, as regards the *numerical increase of outsiders;* we have no authentic records on which to base our calculation upon this point beyond that afforded by the number passing the Minor examination as given above, but if we refer to the data given by Professor Attfield in the paper read before the British Pharmaceutical Conference last month (page 155), given by him on the authority of the Secretary of the Pharmaceutical Society (no mean authority), we find him stating as his opinion "that in the course of a few years 1000 youths will pass the Preliminary examination annually; that 750 apprentices will annually present themselves as candidates for the title of chemist and druggist, and 600 gentlemen will annually start in business" (aside—a lamentable contemplation!). If this calculation be anything near an approach to the reality as regards the future, under the existing ordeal of examinations, at what rate may we fairly calculate the body of chemists and druggists to have been increasing during the past eleven years? I leave it to the judgment of your readers to decide which body is most rapidly increasing in numerical strength.

One word upon the probable *increase in the number of pharmaceutical chemists apart from membership.* A glance at the above table again tells a sad tale, by no means favourable to any probable large increase in this higher class of chemists. In 1861, out of 57 who passed the Minor, 45 passed the Major, continuing about the same average up to 1866, in which year the Pharmacy Bill began to assume shape; from that time to the present the distance has been widening each succeeding year until last year, when out of 234 who passed the Minor, only 50 passed the Major, becoming thereby pharmaceutical chemists.

Upon the amount of Fees, and the probable appreciation by students of the alteration I have proposed, it is unnecessary for me again to enter, further than that I still hold to the principle, although not wedded to the exact sums. I believe such a change would be fair to the student, and advantageous to the Society; giving to the former his legitimate position as a qualified man; and at once securing to the latter the direct support and influence of every gentleman passing the Major examination.

The free issue of the Journal I by no means desire to abolish; the suggestion was made to meet a difficulty which I believed to exist, but which Mr. Carteighe assures us is far otherwise.

Such, then, are the exact facts of the case so far as I can judge. I put them forth in no cavilling spirit, or with any desire to depreciate the position of the Society, and I would emphatically add, with no other feeling than that of high personal esteem for your correspondent, my only motive being to substantiate the statements of my former letter, with the hope that when thus brought face to face with stern realities, it may be thought advisable to consider whether something cannot be done to render the higher examination more attractive, and membership with the Society to flow directly from such qualification.

EDWIN B. VIZER.

63, *Lupus Street, Belgravia, South,*
September 24*th*, 1872.

Mrs. Stockman and Family.—The following further contributions have been received:—A 2*s.* 6*d.* subscription by F. M. M'Cullock, Esq., per J. Wavell, Local Secretary, Ryde, £12. 12*s.* 6*d.*; Mr. J. W. Euston, 5*s.*; Mr. T. Hughes, Llandilo, 10*s.* 6*d.*; Amicus, 1*s.*; Pharmacist, 10*s.*; Nemo, £2. 2*s.* Collected by Mr. J. Robins: Lieut. Skipton, 19th Regt., 6*s.* 6*d.*; Dr. Haire, £2. 2*s.*; Mr. Frazer, 10*s.* 6*d.*; Mr. J. Robins, 5*s.*; smaller sums, 13*s.*; in all, £3. 17*s*; "Conatum," £1. 1*s.*; A. F. C., £1. 1*s.* Contributions will be gratefully acknowledged by G. Perfect, Havelock Park, Southsea, or Charles Mumby, Pharmaceutical Chemist, Gosport, Trustees.

A. P. S. (St. Austell.)—Dr. Smith's 'Smaller Latin-English Dictionary' (Murray) would perhaps answer your purpose.

S. K. B.—Apply to the Secretary for a copy of a pamphlet entitled 'Hints to Students.'

S. W. W.—We believe you could not claim more than about ten shillings per day and some allowance for travelling expenses, unless there was a special agreement.

G. J. Cutcliff.—We agree with you, but do not think that giving publicity to such cases would be of any benefit.

W. H. Cotterell.—See an answer upon the subject in the PHARM. JOURN. of December 30th last, p. 540.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. G. Mee, Mr. F. M. Rimmington, Mr. Ellwood, Mr. Brewis, Mr. G. H. Proctor, Mr. Rich, Mr. W. Wilkinson, Mr. Jeffrey, Mr. A. P. Baker, "Jacobus," "One of the Laity," "Ranunculus," "Minor."

In consequence of the unusual length of the official proceedings, several answers to correspondents and communications are unavoidably postponed.

QUINOA.

(*Chenopodium Quinoa.*)

BY M. C. COOKE, M.A.

It is not long since that the seeds of this plant were procured from Peru, and sent to India in order to secure its introduction as a food plant into the Himalayan region. It is in Peru and Chili that the plant is chiefly cultivated, although Humboldt remarks that in Mexico it ranks in utility with the potato, maize and wheat. Meyen says that for those countries in which it is grown, it is, next to the potato, the best gift which nature has bestowed on man. Over all the plateau of Southern Peru, above the height at which rye and barley still ripen, the quinoa is the principal object of agriculture, and on the plateau of Chuguito are vast fields quite covered with this plant, which, however, do not give the landscape the charm of our own beautiful cornfields. On good soil this plant attains the height of three or four feet, and bears an immense quantity of seeds, which, unfortunately, for a long time feed an innumerable flock of birds, like sparrows, for this plant has the disadvantage that all its seeds do not ripen at the same time. The quinoa is still cultivated in Southern Chili, but before the introduction of cereals it was doubtless a more general food. The variety which according to Molina is called Daline by the Indians of Chili, and which has ash-grey leaves and white seeds, is the one commonly cultivated around the lake of Titicaca.

In 1834 it was first known in this country, and in 1838 was described and figured in Curtis's 'Botanical Magazine.'

The *Chenopodium Quinoa*, Willd., is a herbaceous annual, with a stout erect angular stem of from three to four, or even five feet in height in a good soil; it branches considerably, with short erect branches. The lower leaves are as large as the human hand, and of somewhat triangular shape on long foot-stalks, and of a pale rather glaucous hue. Small green inconspicuous flowers, and afterwards the fruit, are produced on numerous panicles, both axillary and terminal. The whole habit of the plant closely resembles the goosefoot and spinach. The peculiar hue is caused by the myriads of glandular hairs, with subglobose iridescent heads, with which the plant is studded, and which are exceedingly beautiful under the microscope.

It is said that any light argillaceous soil is suitable for its cultivation. The ground appropriated to it is ploughed or well broken up, and the seeds sown in furrows a yard apart. Or the seeds may be sown in beds and afterwards transplanted. The seed time is in the spring, and the harvest about seven months after.

When quite ripe, the seeds, which are about the size of white mustard seed, but flatter, are easily reduced to a whitish meal. It is not tenacious when mixed with water, as is the case with wheaten flour, but more resembles oatmeal, and is therefore scarcely fit for making bread.

The starch granules are exceedingly minute, and constitute nearly 40 per. cent. of the grain in its natural state. According to analysis it contains upwards of five per cent. of sugar, seven and a half per cent. of casein, and upwards of eleven per cent. of albumen, and other protein compounds. This large amount of protein is unusual in farinaceous seeds, and indicates considerable nutritive value.

The varieties cultivated in Arequipa are called "Colorada," "Amarilla," "Blanca," "Real," "Ccosccossa," "Uchacachi," "Ccancolla," Ccoyto," and the bitter seeded variety "Amarga."

In Lima two methods are employed in the preparation of quinoa. In one case it is boiled in water like oatmeal, and a kind of gruel is the result, in which the seeds float, or at least the remains of them; this is seasoned with pimento. The other method is a favourite with the ladies of Lima. The grains are slightly toasted like coffee, and boiled in water, yielding a brown coloured soup, which is seasoned with spices, and is of a taste so peculiar that few strangers like it.

The red quinoa "amarga" is chiefly cultivated in small quantities in gardens. The seeds bruised and boiled in water are said to form a bitter decoction, which, mixed with sugar, is employed as a vulnerary for sores and bruises. Cataplasms are also made of it. The bitter quality is said to be removed by soaking in water. From other sources we learn that this variety is employed internally as an emetic, and also as a substitute for quinine in cases of ague, and externally as a poultice for cancer, gangrene, contusions, etc.

The leaves of the quinoa are commonly eaten as a vegetable, and much resemble those of other species of *Chenopodium*, as, for instance, the *Chenopodium bonus-Henricus*, and its ally the spinach.

It still seems to be uncertain what is the medicinal value of the red quinoa, and to what its bitterness is to be attributed. Whatever it may be, the bitterness seems to be confined to the husk or testa of the seed, and may be removed by digesting the seed in a dilute solution of carbonate of soda, and afterwards washing. It was this seed which was analysed by Dr. Voelcker with the following results:—

	Natural state.	Calculated dry.
Water	16·01	——
Starch	38·72	46.10
Sugar and Extractive	5·12	6·10
Gum	3·94	4·60
Oil	4·81	5·74
Casein and a little soluble albumen.	7·47	8·91
Insoluble albumen and other protein compounds	11·71	13·96
Vegetable fibre	7·99	9·53
Inorganic matters	4·23	5·06
	100·00	100·00

A somewhat similar plant, or perhaps two or three species, has long been cultivated in India for its farinaceous seeds, which are very much smaller than those of the Quinoa. Under the names of *Amarantus gangeticus*, *Amarantus frumentaceus* and *Amarantus anardana*, plants are referred to by different authorities as yielding seeds resembling small millet, which are employed in a similar manner and for a like purpose.

THE MICROSCOPE IN PHARMACY.

BY HENRY POCKLINGTON.

(*Continued from p.* 181.)

SCILLA.—The "sliced and dried bulb of *Urginea Scilla*" does not present features of special interest. Its structure is that of most bulbs, and consists of parenchyma, with vascular bundles, enclosed within two external layers of semi-compressed cells, or false cuticles. The cells of the parenchyma are of irregular shape, thin walled, and not pitted or porous. The vascular vessels are composed of pitted and spiral vessels, neither the bundles nor vessels being of large size or otherwise remarkable. The only interesting point is the presence of great numbers of raphides and prisms, probably of phosphate of lime. Gum and uncrystallizable sugar form the other cell contents. The powder should contain 6 to 10 per cent. of the raphides and prisms. The other structures are of course easily recognizable. The only probable adulterants are flour and starches, the presence of which will easily be detected.

Serpentariæ Radix.—This is very much more difficult to deal with than most of the roots of the Pharmacopœia, on account of its aberrant character. As is probably well known to most of my readers, the following natural orders present very remarkable instances of departure from the usual type of stem and root structure. Specimens of many of them may be found on the quays and lying about the warehouses of Manchester, Liverpool and other places where Brazilian cotton is stored. The bales in which this cotton arrives are commonly secured with "natural ropes," formed of the Llanos, or climbing plants of the region where the cotton is exported. Amongst these aberrant stems, those of Sapindaceæ, Malpighiaceæ, Bignoniaceæ, Bauhiniaceæ and Aristolochiaceæ are perhaps the most interesting. In the first two, part of the vascular bundles remain separate, and become secondary cylinders of wood, the whole being surrounded generally by a common bark. Frequently in Sapindaceæ the compound stem is triangular, and the wood cylinders thoroughly individualized, giving the cursory observer the impression that it is a natural graft of three stems. But this, as Schleiden has shown, would be an erroneous conclusion. In Bignoniaceæ the wood in certain portions of the stem ceases to grow, and its place is occupied by cortical substance which is easily removed, and leaves the wood cylinder with four to seven deep indentations. This is a common kind amongst the cotton bale Llanos. In Bauhinia the whole structure is often very confused, the medullary rays run in radiating curves, and with the exception of a medulla and vascular central cylinder, the "wood" is chiefly parenchymatous. But the Aristolochiaceæ carry off the palm for their departures from the normal type, and for their variations amongst themselves. Some one or other member of the family is to be found in the collection of most microscopists, they being favourite objects when viewed either by polarized light or dark ground illumination. The Serpentaria of the B. P. is not so pretty, nor perhaps so interesting an object as most of the Aristolochiæ, but I think it "sports" more. This renders it difficult to draw up a description that shall be generally applicable. The rhizome and rootlets will require separate notice.

The structure of the rootlet is generally this. A central cylinder is surrounded by a largely developed cortical substance. The central cylinder in the smaller rootlets consists of little else than large, well pitted vessels and wood cells. The cells of the outer substance are large, thick-walled, polygonal in cross section, and contain great quantities of starch. The larger rootlets agree pretty much with the rhizome, where we find the aberrant structures common to the order. The central cylinder is surrounded by cells containing a dark fluid.

Medulla.—Present, well developed, and composed of large cells with thick walls, circular or hexagonal in cross-section, sometimes thin-walled and irregularly shaped; their contents are great quantities of starch. The medullary rays are remarkably large, but not invariably so, and vary in number (in the same sized root or rhizome), from 6 to 40 or 50. They are usually wedge-shaped, the broad end of the wedge being towards the circumference of the stem, and composed of oblong, oval, or cubical cells, excepting where given off from the medulla, with which their connection is very evident, where they are, of course, approximated to the medulla cells. The wood wedges consist of large-sized vascular vessels, very much pitted. The wood cells vary widely. Near the medulla they are much thickened, and their central cavity is barely visible in cross-section. In the centre and near the cortical substance they are but little thickened, and are of irregular size and shape.

The cortical layers are chiefly remarkable for their liber bundles and laticiferous canals containing a yellowish-brown matter.

The starch granules are either aggregate and consisting of three or four granules, or separate granules, with an indistinct punctate hilum, and give the usual black cross with polarized light.

In examining the rhizome, sections should be cut between the points where the rootlets are given off and also at those points, the structure being subject to important modification in all cases where a rootlet or other bud is given off. In older rhizomes the cortical and medulla cells have much thickened walls, and are frequently stained brown, apparently by transfusion from the vessels.

Zingiber.—The rhizome of *Zingiber officinale* consists of four classes of structure. The outer, cortical, structure (removed from the finer kinds) consists of angular cells of a more or less yellowish-brown colour; thin-walled and containing a substance which becomes semi-mucilaginous on immersion in water.

The structures below this are large, thin-walled, variously shaped parenchyma cells, dotted vessels, and very minutely pitted long wood cells with square or fusiform ends; and specialised cells containing a rich yellow coloured substance. The parenchyma cells contain great quantities of starch in the form of flat oval discs composed of somewhat distinct separate layers, and not very energetically doubly refractive. In shape they resemble the granules of East India arrowroot somewhat closely, but have not so distinct a hilum and are somewhat smaller.

The vessels are barred, thin-walled, and enclosed, in ones or twos, in bundles of long woody fibres, which are slightly pitted and are probably to be regarded as *vasa propria.* In ground ginger of good quality there should be but few of the angular, cubic, or compressed cells of the epidermis. The cells of the parenchyma will be found much broken, and the starch will have escaped from them. The wood fibres of ginger form a small proportion to the other structures, are considerably longer than other fibres likely to be used as adulterants, and the starch granules are very distinct from those of wheat, rice, potato, or maize, the common adulterants. The yellow cells resemble those of turmeric rather closely, but form only a small proportion of the total cells. Cayenne pepper and mustard husks are said to be used as adulterants, but I have not myself found them. The only common adulterant is farina of various kinds added to the powder of a low-priced unbleached ginger. Detection of any adulterant (except turmeric) very easy; the latter not difficult to one familiar with its structure.

(*To be continued.*)

LIEBIG'S EXTRACT OF MEAT.

The following letter upon the subject of Extract of Meat has been addressed to the editor of the 'Times' by Baron Liebig:—

Sir,—In a paper read by Dr. Edward Smith, in Brighton, before Section F of the British Association, respecting the alimentation of the population of Great Britain, on "Preserved Food and Extract of Meat," of which an abstract appeared in the 'Times' of the 20th of August, Dr. Smith expresses opinions which are incompatible with the present state of science.

Having directed my special attention to this subject, and the leading ideas upon nutrition and food being the same which have been made known by me 25 years ago, I trust I may be considered entitled to elucidate and correct in your widely circulating paper the injurious and erroneous inference of Dr. Edward Smith.

Dr. Edward Smith attaches great importance to the preparation of food; the economy of nutrition, however, depends essentially on the right proportion in the nourishment consumed of the nitrogenous substances (meat, fish, eggs, etc.), and those free from nitrogen (starch, butter, sugar, etc.).

An excess of meat in the diet is waste, and the exclusive consumption of potatoes is likewise waste. The chemical composition of meat and of potatoes (as well as of all other articles of food) is perfectly well known, and it is therefore easy to calculate the proportion in which they must be mixed in order to obtain the *maximum* of nutritive value for every individual at every stage of life.

The alimentation of a population can only be judged by means of a knowledge of their wants, and of the above-mentioned proportions. The great economical successes in the production of meat and milk by agriculturists who are acquainted with the relative nutritive value of the various sorts of food are well known, and as long as Dr. Edward Smith does not specify what weight per head "the small morsel of meat" and the potatoes or rice should have in order "to form a highly nutritious diet," and as long as he does not explain why the small morsel of meat should be fat meat and not lean, which "the poor, in their fastidiousness, prefer," so long Dr. Edward Smith must allow us to consider his assertions that the English were worse fed than the Irish or Scotch as a mere fancy.

In the selection of food, which is influenced by necessity or want, the instinct and the experience of the million are infallible, and a far better guide than the theoretic speculations of men who have remained ignorant of the composition of food, as well as of even the simplest laws of nutrition.

"Fish," says Dr. Edward Smith, "is sometimes suggested as a substitute for meat; but fish is rather a relish than food, and contains little more nutriment than water."

From Payen's investigations it is well known, however, that the flesh of fish on the average does not contain more water than fresh beef, and as much solid substance as the latter. For instance, the flesh of salmon contains 75·70 per cent. water and 24·296 per cent. solid substances, while beef (muscle) contains 75·88 per cent. water and 24·12 per cent. solid substances. The flesh of herring contains still less water than salmon, and even flat fish, such as soles, are as rich in nitrogenous substances as the best wheaten flour weight for weight.

The assertion of Dr. Edward Smith that the flesh of fish contains little more nutriment than water is, as may easily be perceived, in direct opposition to well ascertained facts.

Truly comical are Dr. Edward Smith's views respecting tea and extract of meat. "He laments the amount of money which is, as he holds, wasted, and worse than wasted upon tea, the amount of nutriment contained in an ounce of tea being infinitesimal."

Dr. Edward Smith cannot seriously imagine that tea is taken by certain ignorant and stupid people because they believe it to be a nutriment, which tea indeed is not. The capability of swallowing not one single camel, but an entire troop is, however, required in order to believe that if an individual a short time after having retired from a well-supplied table, satisfies the longing for a cup of tea, he does so for no other reason than to add to the food and wine consumed in abundance an infinitesimal fraction of carbon and nitrogen, the two chief elements of nutrition.

Tea is no nutriment in the ordinary sense. The individual who takes tea after his meal feels, without being able to define it, that tea has a favourable effect upon certain highly important functions in his body, that digestion is accelerated and facilitated, and that his brain-work is benefited thereby; and if a poor factory workman imposes on himself privations in his food and other necessaries of life in order to spare a few pence for tea, there must be a deeper cause for this than mere custom.

Neither tea nor extract of meat is nutriment in the ordinary sense; they possess a far higher importance by certain medical properties of a peculiar kind. The physician does not employ them as specific remedies. They serve the healthy man for the preservation of his health. Taken in proper proportion, they strengthen the internal resistance of the body to the most various external injurious influences which combine to disturb the general vital processes, and they adjust these latter.

Health is nothing but resistance to injurious influences, and its degree in different individuals depends upon the force of this resistance. The object of every intelligent physician will be directed in the cure of an illness towards strengthening the internal resistance to local disturbances, and to restore the normal functions by his remedies, which in this case are called medicines; and he knows therefore to assign the proper place to the beef tea or meat juice which he prescribes to his patients and convalescents.

It is surely a grave offence against all laws of physiology to compare tea, coffee, and extract of meat to the more common articles of food, and because they are not that, to draw the inference, as Dr. Edward Smith has done, that they are nothing at all. This is certainly not scientific reasoning.

As regards coffee, Julius Froebel, in his work 'Seven Years in Central America,' says:—

"For the men accompanying the great mercantile caravans in Central America coffee is an indispensable necessity. Brandy is taken as medicine, but coffee is quite a necessary article, and is drunk twice a day. The refreshing effects of this beverage in heat and cold, in rain and dry weather, are extraordinary."

Of the composition and the value of extract of meat Dr. Edward Smith holds the most singular opinions. He says, "This is sold as a very thick liquid, in jars, and 1 lb. is said to represent 32 lb. of flesh."

It has, however, never been asserted that 1 lb. of extract of meat represents 32 lb. of flesh; this is simply an invention of Dr. Edward Smith. The truth is that 1 lb. of extract contains the substances soluble in hot water of 32 lb. flesh.

Dr. Edward Smith proceeds to say:—

"The composition is water (if you will completely dry a pot of the extract you will see how large is the proportion of water), the salts of meat and the phosphates, extractive matters of a soluble kind, the peculiar flavour of roasted meat and common salt, which are added to it."

It is utterly impossible to suppose that Dr. Edward Smith intends to make us believe by this sentence that extract of meat is water, to which are added common salt, the phosphates of meat, the flavour of roasted meat and soluble extractive matters. It is rather to be assumed that Dr. Edward Smith would have expressed himself quite differently and more correctly respecting the composition of extract of meat if he were possessed of even a faint notion of the science of chemistry.

As regards the proportion of water contained in extract of meat, it is well known, through innumerable analysis, that it amounts on the average to 19 per cent. (*maximum* 22 per cent., *minimum* 16 per cent.) Extract of meat is beef tea made from fresh beef—not roasted—in the purest state, condensed to the consistency of a thick honey, to which nothing whatever is added by the manufacturer. The assertion that common salt is added to the extract is an unjustifiable invention. The juice of the muscles contains, as a never absent component part, a small quantity of chloride of potassium, but no chloride of sodium (common salt).

The eminent African traveller, Dr. Schweinfurth, dwells on the extract of meat as follows:—

"Those only are probably fully able to appreciate the value of extract of meat who, like myself, were compelled for weeks together to live upon purely vegetable food. Such a diet engenders a peculiar state of weakness, and lowers the mental and bodily energy, which is raised again through the use of meat. I can state from my own experience that in the absence of meat, the addition of extract of meat to vegetable food produces the same good effect on the body as fresh meat, and that under such circumstances it is the only means of supplying the lack of meat. When my American extract of meat was consumed I prepared some myself from the flesh of antelopes which did excellent service."

With regard to the considerable saving effected by the use of extract of meat we are indebted to Dr. von Schneider (Chief of the Chemical Department of the Imperial Mint in St. Petersburg) for the following highly interesting communications ('Norddeutsche Allgemeine Zeitung, No. 12, 1872, Sonntagsblatt):—

"In order to ascertain the economical value of extract of meat, all soups consumed during the months of November and December, 1871, and January, 1872, in my small household, consisting of three persons, were prepared from remnants of bone, fat, and vegetables, with addition of extract of meat, and all the meat (mutton, pork, beef, veal, poultry, and game) was roasted.

"In the month of October, 1871, on the other hand, the beef was used for the preparation of the *pot au feu* (with the addition of rice, semolina, maccaroni, potatoes, etc., exactly as in the other three months), consequently without any extract of meat, and all the meat was consumed as boiled meat.

"It was proved at the end of these experiments that in the month of October 40 per cent. more money was spent for meat than on the average in any of the other three months—viz., the consumption in the month of October of boiled meat amounted to 120 lb., in any of the other three months on the average, 80 lb.; of roast meat, therefore, 40 lb. less. We used daily 6 grammes extract of meat, in 83 days 1 lb."

These facts prove incontrovertibly, in my opinion, the physiological effect of extract of meat. The necessity for the consumption of meat is considerably lessened when extract of meat is added to the vegetable food; in addition to the nutritive value which vegetables possess in themselves, they acquire in the soluble component parts of meat those substances which give to a meat diet its peculiar effect. In view of the present high price of meat Dr. von Schneider's observations are deserving the most careful attention. The trial is easily made, and it is in everybody's power to make it.

ARTIFICIAL BUTTER.

In an extract from the 'Revue Hebdomadaire de Chimie,' given in the 'Chemical News,' it appears that Monsieur Mége-Mouriez, some years ago, was requested by the Victualling Department of the French Navy to try to find a wholesome substitute for butter, which would not become rancid by keeping. Experiments made with cows submitted to a very severe and scanty diet, led to the discovery that these animals continued to give milk, although in very much smaller quantity, and that this milk always contained butter; the author surmised that this butter was due to the absorption of the fat contained in the animal tissues, which was converted into butter under the influence of the milk-secreting glands. This led to experiments on the splitting up of animal fats, and, further, to the following process for making butter artificially. Best fresh beef-suet is first mechanically cut up, by means of circular saws fitted to a cylinder, and is next placed in a vessel containing water, carbonate of potassa, and fresh sheep's stomachs previously cut up into small fragments; the temperature of this mixture having been raised to 45°, the joint influence of the pepsine of the stomachs and heat causes the fat to be separated from the cellular tissue; the fatty matter floating on the top is decanted, and after cooling submitted to very powerful hydraulic pressure; the stearine is used in candle-making, and the semi-fluid oleomargarine is used for making the artificial butter in the following manner:—Fifty kilos. of the fat are poured along with 25 litres of milk and 20 litres of water into a churn, while there is added 100 grms. of the soluble matter obtained, by soaking for some hours in milk, from cows' udders and milk glands; a small quantity of annatto is also added, and the operation of churning then proceeded with. The butter thus obtained is well washed with cold water, and, if required to be kept for a long time, melted by a gentle heat, to eliminate all the water. According to reports of sanitary committees, as well as of the authorities of the Victualling Department of the French Navy, this artificial butter is really an excellent substitute for genuine butter, and can be exposed for sale if the vessels are marked to distinguished the artificial from the genuine butter.—*Journ. Soc. Arts.*

RECENT PROGRESS OF THERAPEUTICAL SCIENCE.*

The properties of cicutine and atropine (from hemlock and belladonna respectively) have of late been carefully investigated. MM. Martin Damourette and Pelvet, in their study of the former, have been able to verify, through experiment, some of the historical details in the death of Socrates. Atropine has opened a new way of treatment for diseases of the eye, from its curious property of causing that organ to dilate when applied to it; and its effects on the whole nervous system, now better known, also throw light on accounts, in ancient authors, of poisoning by belladonna.

The properties of the alkaloid contained in the Calabar bean (first separated by M. Vée in 1865) are the opposite of those of atropine; it causes rapid contraction of the pupil of the eye. The pupillary constriction reaches its maximum about an hour after ingestion of the substance, and continues at this for about three hours; thereafter gradually disappearing. This antagonistic quality is being utilized by ophthalmologists.

It is found that each alkaloid, independently of its general action on the system, has a special action on

* Abstract of part of a paper by M. Papillon in the 'Revue des Deux Mondes.'

a particular organ or part of the system. Thus digitalis is a poison or a remedy for the heart. It was at one time hardly used except as a diuretic. But recently M. Traube of Berlin, and M. Hirtz of Strasburg, have shown the importance of its action on the circulation and animal heat. From its retarding effect on the movements of the heart, it is found valuable especially in diseases of a febrile character. It is only quite recently that the active principle of digitalis has been properly isolated, by M. Nativelle. The digitaline prepared by the new process is so active, that a dose of even a quarter of a milligramme will affect the heart's movements, while five milligrammes will cause death. Its effect is also so characteristic and sure, that when it exists in a mixture in so small a quantity as to escape being detected by chemical reaction, an infallible method of recognizing it is to examine the action of the mixture on the heart of a frog. Another substance which acts energetically on the muscular fibres, especially those of the heart, is *veratrine*, which has been found of great service in cases of internal inflammation.

The *eucalyptus*, imported some years ago from Australia to the South of Europe, where it has been easily acclimatized, is a large tree of the family of Myrtaceæ. Its leaves and bark contain a volatile oil which promises to be most useful in therapeutics. It deadens the reflex sensibility of the spinal cord, and relieves the oppression and tendency to cough, in pulmonary diseases. It is a valuable anti-catarrhal agent. The tree, further, contains a bitter principle very efficacious against intermittent diseases, especially marsh fevers. In South America, Spain, Corsica, Algeria, and other countries, the infusion of eucalyptus is becoming largely used as a febrifuge, and it has been found effective in cases in which quinine failed. The balsamic emanations from the tree perfume and purify the air. In marshy districts, it acts against fever, not only thus, but by drying the soil, and preventing the growth of miasma-forming vegetation.

One substance of mineral nature, viz., *bromide of potassium*, has of late years taken an important place in treatment of nervous diseases, especially epilepsy. Administered in a dose of several grammes daily, it has a remarkable sedative action; if not completely curing the disease, at least prolonging the interval between the attacks, and abating the violence of these. *Arsenious acid*, another mineral medicine is shown by M. Magitot to be of value to the dentist, as it has the property of causing the renewal of ivory.

Is there a relation discernible between the chemical nature of substances, and the degree of their toxical and therapeutical value? Attention had for some time been given to this point, and it was known that the salts of heavy metals are more active than those of light metals; that the salts of lead and mercury had poisonous properties, while those of soda and magnesia were relatively harmless. The comparison, however, was not rigorous; and M. Rabuteau has been able to formulate the general relation between physiological energy of mineral compounds and their chemical nature. The energy of soluble metallic salts is in direct ratio of the atomic weight of the metal contained in the salt. The atomic weights of metals being in inverse ratio of their specific heats, M. Rabuteau's law may be given in this form:—The metals are more active in proportion as their specific heat is smaller. The law is the same for the metalloids of the oxygen group; but it is reversed in the case of those which are congeners of chlorine, and for those of the class of arsenic. The practical value of these results is obvious; as a medical man can tell the respective activities of various salts, and thus determine the dose proper to be given, from consulting a table of atomic weights. A physiologist, wishing to ascertain the action of a metallic compound, could predict its relative intensity, and regulate his experiments accordingly. Some years ago, when salts of the new metal thallium were being examined in their influence on animals, surprise was excited by their strong toxical qualities, seeing they otherwise resembled so closely the salts of sodium or potassium; but the atomic weight of thallium is very high, and its poisonous properties are quite in accord with M. Rabuteau's law.

The perfecting of the medical art is thus connected most intimately with the progress of knowledge as to the real action of toxical and medicinal substances. The study of such effects is one of much delicacy, and it is necessary that those who engage in it should acquire a practical acquaintance with the principles and instruments of physics, of chemistry, and of physiology.

LENTIL-MEAL.

At a time when cheap and efficient substitutes for animal food and for bread are being much sought, we shall render a service in directing attention once more to the highly valuable qualities of lentil-meal, properly prepared and ground to a fine powder, and mixed with some other impalpable nitrogenous meal, such as rye-meal. The value of this combination has been recently tested anew by Dr. F. W. Beneke, of Marburg, who is led very earnestly to recommend its use as a substitute for animal food for poor people, in convalescence from sickness, for invalids generally, and for many forms of indigestion. For the latter purposes, sold at a most scandalous price as "revalenta," and accompanied by flaming testimonials, it has long enjoyed a considerable reputation amongst wealthy dyspeptics, and Dr. Beneke records his gratitude for the saving of the life of one of his children by its use.

His observations as to the best mode of preparing it for general use are very interesting. He points out that the Leguminosæ contain nitrogenous and non-nitrogenous substances in the proportion of nearly 1: 2·0—2·2; they contain a sufficient amount of phosphates, and a small quantity of fatty matter, part of which resembles the fat contained in yolk of egg, and part is cholesterine. Such a meal is quite capable of replacing animal food, apart from its kreatinin; and with this view he experimented upon these meals, but found that, as ordinarily prepared, they were much too coarse to be easily digested. At last, however, he found a lentil-meal and also a rye-meal both equally carefully prepared, which, when mixed together in equal proportions, produced a most admirable nutriment for convalescents from acute disorders, for those labouring under certain gastric ailments, and as a substitute for animal food for poor people. A healthy adult uses nitrogenous and non-nitrogenous elements, the latter reckoned as starch, in the proportion of 1 : 5. Human milk contains the same ingredients in the proportion of 1: 3·8–4. Lentil-meal contains them as 1 : 2, and rye-meal as 1 : 5·7, while a mixture of the two in equal quantities contains those components in the proportion of 1 : 4, a proportion which may, of course, be varied according to desire, or the needs of the case. These impalpable meals Dr. Beneke has been in the habit of procuring from W. J. von Coppenaal, 556, Reguliers-Breeskaat, Amsterdam, at 40 cents. per kilogramme for the rye-meal, and 60 cents. per kilogramme for the lentil-meal (about 8*d.* for the one and 1*s.* for the other $2\frac{1}{4}$ lbs., the price of the same quantity of revalenta being 6*s.*). These meals, from containing little water, have four times the nutrient power of beef, weight for weight, so that their relative values as articles of diet may be readily calculated. The digestibility of these meals, and the consequent absence of flatulence during the process, depends primarily upon the impalpability of the powder to which they are reduced; and, secondly, on the mode of preparation. The meal should have a little salt added, then be mixed with cold water, and boiled for half an hour or an hour. The addition of a little extract of beef makes the preparation tasty, without adding greatly to its expense.—*Brit. Med. Journ.*

PHARMACY ACT, 1868.

RECTIFICATION OF THE REGISTERS OF PHARMACEUTICAL CHEMISTS AND CHEMISTS AND DRUGGISTS.

We are requested by the Registrar to publish the following List of persons whose names will be erased from the Register unless they communicate with him on or before 30th December next.

*Those marked * are Pharmaceutical Chemists.*

Abel, William	Brownhills, Staffordshire.
Acton, Aubrey	122, Stobcross Street, Anderston, Glasgow, N.B.
Acton, Samuel Frederick	Compton Road, Wolverhampton.
Adams, William John	Cheltenham.
Aldridge, William	Sewardstone, Essex.
Alexander William	Glasgow, N.B.
Allard, George	Liverpool.
Allen, Benjamin	Birmingham.
Allen, Frederick	High Street, Hereford.
Allen, William	68, Spring St, Landport, Hants.
Allingham, George Samuel	London.
Allman, John Dowling	London.
Allwork, Frederick	Redhill, Surrey.
Anderson, Charles William	Southampton.
*Anderson, David Kennedy	Rothesay, N.B.
Anderson, James	7, New Road, Newcastle-on-Tyne.
Andrewes, Henry Manning	3, Acre Lane, West Brixton, Surrey.
Angus, Henry	Gateshead-on-Tyne.
Annette, Alfred George	Cheltenham.
Appleby, Thomas	88, Meanwood Road, Leeds.
Ariell, William Whittaker	38, King Street, Snow Hill, London, E.C.
Aris, Augustus	3, Mount Street, New Road, London, E.
Armstrong, Benjamin	Plymouth Iron Works, near Merthyr, Glamorgan.
Ashby, William	Nottingham.
Ashton, Thomas Gray	London.
Aspinall, George James	Brunswick Square, Westminster Road, Kirkdale, Lancs.
Aston, Thomas	Newcastle-on-Tyne.
Attwell, Arthur	London.
Aymer, David	Fore Street, Hexham, Northumberland.
Ayre, Henry Mills	Coventry.
Bailey, Henry	Bexley Heath.
Baker, Frederick	London.
Baker, Henry Rutler	34, Hambrook Street, Southsea, Hants.
Baker, John Thomas	London.
Baker, Oswald	London.
Baker, Thomas	Blandford, Dorset.
Baker, William Ritchie	Hounslow, Middlesex.
Ballard, Phillis	39, St. Paul's Road, London, N.
Bamber, Henry Kelway	Exeter.
Bamford, James	218, Mill Street, Liverpool.
*Banks, Alfred Joseph H.	Bedford.
Banks, Frederick	London.
Bardsley, William	216, St. Paul's Road, London, N.
*Bannister, Edward	London.
Barker, Edwin	34, Marybone, Liverpool.
*Barker, William	Stockton-on-Tees.
*Barker, William Baylis	Liverpool.
Barkway, Walter Frederick	St. John Street Rd., London, E.C.
Barlow, George Edward	Liverpool.
Barnitt, John	Leeds.
Barrow, Edward	3, Essex Terrace, Church Road, Leyton, Essex.
Barrow, Eliza	Levenshulme, Lancs.
Barrow, James Horsfield	Pendleton, Lancs.
*Barrs, John Adcock	Grantham.
*Bartlett, James	Bath.
Bartlett, William Hugh	1, Linton Villas, Linton Street, New North Road, London, N.
*Bartley, Thomas Nicholas	Cheltenham.
Bartliff, George	Teddington, Middlesex.
Baxter, Robert	3, St. James' Square, Edinburgh.
Bayly, Henry	16, Cropley Street, Hoxton, London, N.
*Bearcroft, Richard James	Cheltenham.
Beard, Thomas William	London.
Beer, James Henry Elias	London.
Bell, John	Brighton.
Bemrose, William	London.
Bennet, John Dryborough	26, St. James' Square, Edinburgh, N.B.
Bennett, John	272, City Road, London, E.C.
Benson, Alfred	Chasetown, Staffordshire.
Berry, James	Liverpool.
Best, James	Leicester.
Beveredge, James Martin	Woolwich, Kent.
Bew, John	Edinburgh, N.B.
Bibby, Henry	Ulverstone Road, Dalton-in-Furness, Lancs.
*Bilney, Joseph Thomas	London.
Bilsborrow, John France	Lea Green, Sutton, Lancs.
Binstead, Arthur	273, Camberwell New Rd., Surrey.
Bisson, Philip Nicholas	Hawkhurst.
Black, James Hall	Glasgow, N.B.
Blackburn, Henry Carter	Whetstone, Middlesex.
Blair, John	Edinburgh, N.B.
Blanchflower, John Coleman	Canterbury.
Blenkin, Peter Smith	Wilberforce Terrace, Anlaby Road, Hull.
Blyth, Utton	London.
Boor, Frederick	London.
Boor, William	Birmingham.
*Booth, Alfred	Warrington.
Borman, John Henrie	5, De Laune Street, Kennington Park, Surrey.
Boulter, George	Haymarket, London, S.W.
Boulton, Joe Seels	Brentwood, Essex.
*Boulton, John George	Edinburgh, N.B.
Bourne, William Kemsey	Coventry.
Bowe, Oswald Routh	25, Cleveland Street, Middlesborough-on-Tees, Yorks.
Bowen, James	Deptford.
Bower, Albert Hunter	41, Warrior Road, Camberwell, Surrey.
Bower, William	Broadstones, Bradford, Yorks.
Bowles, Edward Henry	Fisherton Anger, Salisbury.
Bowles, William James	London.
Boyle, Alfred	14, Cardigan Rd., Bow, Middlesex.
Bracegirdle, John	24, Half Street, Manchester.
Braddock, James	Manchester.
Bradley, John	Leeds.
Brandreth, Elizabeth	96, Moor Lane, Preston, Lancs.
Brereton, Matthew Bayfield	Putney, Surrey.
Brereton, Thomas Arthur	New Swindon, Wilts.
*Brewer, John Wm. Northway T.	Okehampton, Devon.
Briggs, George	21, High Street, Bath.
Brigstocke, James	London.
Brinsmead, Thomas James	London.
Briscoe, John	16, Grafton Street, Leeds.
Britten, John	Bromley, Kent.
*Brocklesby, David Hyde	London.
Bromley, Edward	London.
Brooker, John Bedford	89, Lake Road, Landport, Hants.
Brookes, James	105, West Graham Street, Glasgow, N.B.
*Brown, Allen McLaren	Brighton.
*Brown, Archibald	Glasgow, N.B.
Brown, John	London.
Brown, John	Newcastle-on-Tyne.
Brown, Thomas Scrafton	134, Beaufort Street, Toxteth Park, Liverpool.
Browne, James	Rugby, Warwickshire.
Browne, Thomas Llewellyn	Chester.
Broxholm, Charles	4, Heath Street, Barking, Essex.
Bryan, John Nicholas	552, Kingsland Road, London, E.
Bryant, John	33, Horsferry Road, Westminster, Middlesex.
Bryars, William Hudson	Goole, Yorks.
Brydon, Thomas T.	Edinburgh, N.B.
Bullock, Alfred Hugh	Manchester.
*Bulmer, Thomas Fitzgerald	Preston, Lancs.
Burks, Benjamin	95, Mare Street, Hackney, Middlesex.
Burleigh, William	1, Tredegar Road, Bow, Middlesex.
Burman, William R.	London.
Burnett, Joseph	4, Moreton Street, Strangeways, Manchester.
Burrows, Robert	94, Gibson Street, Hyde Road, Manchester.
Burt, Frederick George	Clifton Place, Plymouth.
Butler, Alfred Bulteel	Maidstone.
*Butler, John Symes	Frome, Somerset.
Byerlee, John	92, Opie Street, Liverpool.
Callaway, James	London.
*Calvert, John	Durham.
Cameron, Alexander Forbes	27, Clyde Street, Edinburgh, N.B
Cameron, William Alexander	Egremont, Cheshire.
Campbell, Alfred	Hounslow, Middlesex.
Campbell, William	Glasgow, N.B.
Cannell, George Arthur	127, Hinde Street, Scotswood Rd., Newcastle-on-Tyne.
Canning, Philip Stoneham	Coventry.
Canning, William	101, Borough Road, Southwark, Surrey.
Carr, Henry	Tunbridge Wells.
Carroll, Denis	London.
Carter, Thomas Wright	St. Alban's.
Cartwright, John Horncastle	Leeds.
Castell, Thomas Barford	4, Theresa Terace,, Wood Green, Middlesex.
Cave, Alfred	London.

Challener, Theophilus	Harbury, near Leamington, Warwickshire.
Challice, Swann	London.
Chalmers, David	Manchester.
Chambers, George	22, Great Garden Street, Leeds.
Chapman, James	4, Lower Bland Street, Great Dover St., Southwark, Surrey.
Charlesworth, Wm. George	Miles Platting, Manchester.
Cherrington, Barchell	Taunton.
Chirm, John	2, Providence Place, George Street, Lozells, Birmingham.
Christmas, Samuel George	78, Borough Road, Southwark, Surrey.
Clapham, Edward	Leeds.
Clark, Andrew	Edinburgh, N.B.
Clark, Shadrach	3, Crofton Terrace. Hammersmith, Middlesex.
Clarke, William	Newcastle-on-Tyne.
Clarke, Joseph James	Keswick, Cumberland.
*Clarke, Thomas	Oxford.
Clarke, Thomas Watson	London.
Clarke, William	3, Duke Street, Bury, Lancs.
Clarke, William Lang	London.
*Clarkson, James	Hull.
Clayton, William	London.
Cliffe, William	Mushroom St., New Town, Leeds.
*Clifford, John Richard Shepherd	London.
Coates, Joseph	Newcastle-on-Tyne.
Cochran, Robert	Forfar, N.B.
Cole, George William	High Street, Chepstow, Mon.
Collins, William Alfred	63, Collier Street, Pentonville Road, London, N.
Compton, Samuel	24, Hatcham Park Road, New Cross, Surrey.
Constable, Edwin	Hunter's Vale, Birmingham.
*Cook, Thomas	Glasgow, N.B.
*Cook, William	Grantham.
Cooke, William Marcus	Kidderminster.
Cookson, George	Hall Street, Dudley.
Cooper, William	Neville Street, Ulverstone, Lancs.
*Copeland, John	Woolwich, Kent.
*Copney, William	London.
Corbett, William	Edinburgh, N.B.
Corbett, William	Worcester.
Corner, Thomas Brodrick	London.
Corps, Charles	London.
Corrin, William	London.
Cort, John	Portland Place, Doddington St., Regent Road, Salford, Lancs.
*Cotton, Charles N.	Plymouth.
Coulding, John James	19, King Street, Salford, Lancs.
Cox, Henry James Wilson	Brighton.
Cox, Oliver	London.
*Cracknell, Benjamin	Halesworth.
Craigie, James	57, High Street, Tillicoultry, Clackmannanshire.
Crawford, George	Edinburgh, N.B.
Crisp, Owen William	1, Ormond Row, Smith Street, Chelsea, Middlesex.
Crocker, George	Weston-super-Mare.
Croskell, James	London.
Cross, Thomas	Batley, Yorks.
*Cuddeford, John	Edinburgh, N.B.
Curry, George John Symons	St. Leonard's-on-Sea.
Dain, Leopold	40, Dane Street, Nottingham.
Dakin, John	Chester.
Dale, Alfred	20, Bittern Street, Liverpool.
Dale, George	York.
Dalton, Charles	88, Lee Bank Road, Birmingham.
Dalziel, Hugh	New Ferry, Cheshire.
*Davidson, James	Newcastle-on-Tyne.
Davies, Hopkin Jones	Ferry Side, Carmarthenshire.
Davies, John Richards	Worcester.
Davies, Rees	Colchester, Essex.
Davies, Richard	99, Morton Street, Manchester.
Davies, Richard Goodman	72, Great Howard Street, Liverpool.
Davies, Samuel	Rowley Hill, Staffordshire.
Davis, John Poole	20, Fore Street, Taunton.
Davis, Richard	184, Old Kent Road, Surrey.
Davis, Thomas	7, Bruce Road, West Bromley, Middlesex.
Dawson, Cautley	Stockport, Cheshire.
Dawson, Robert	Manchester.
*Day, Charles Wm. Henry	London.
Day, John	24, Shumac Street, Scotswood Road, Newcastle-on-Tyne.
Deane, Alfred	Brighton.
Denby, Walter Phillipson	Highworth, Wilts.
Dewhurst, William	135, Attercliffe Road, Sheffield.
Dibble, John William	Bristol.
Dickins, Benjamin	Stratford-on-Avon.
Dickins, Joseph	Leeds.
Dixon, Joseph	37, Orient Street, Everton, Liverpool.
Dixon, Robert	51, Bold Street, Northwood, near Hanley, Staffordshire.

Dods, John Thomas	Portobello, N.B.
Donald, John Hardy	Edinburgh, N.B.
Dooks, Richard Boulby	33, Castle Gate, Huddersfield.
Doughty, Richard	Bushey Heath, Herts.
Douglas, James Palliser	Charles Street, Goswell Road, London, E.C.
Douglas, Joseph Stringer	69, Tower Street, Westminster Bridge Road, Surrey.
*D'Oyle, John	Chelsea, Middlesex.
Draper, James Henry	Trowbridge, Wilts.
Draper, Richard	Newark-on-Trent.
Draper, Thomas	48, McAslam Street, Glasgow, N.B.
Drury, Morris Hayward	26, Oxford Street, London, W.
Dry, William Henry, jun	36, High Street, Poplar, Middlesex.
*Duchesne, Richard	Cambridge.
Duck, William Masterman	Stokesley, Yorks.
Duncalfe, William Picken	Kinver, Staffordshire.
Duncanson, Andrew	Edinburgh, N.B.
Dutton, John	Eastbourne.
Dyer, Alfred Knyaston	London.
Dyer, William George	3, Union Road, Clapham, Surrey.
Dymond, John	5, South Square, Gray's Inn, London, W.C.
Easson, Robert	Glasgow, N.B.
Eastes, Charles	Gravesend, Kent.
Edward, William Wales	Aberdeen, N.B.
Edwards, John Morgan	67, Union Street, Southwark, Surrey.
Edwards, William James	107, Hampstead Rd., London, N.W.
Edwardson, Joseph	Liverpool.
Elkington, Jacob	21, Broadway, Deptford, Kent.
Ellidge, John Wesley	Southampton.
Ellis, Charles Samuel	Fordham, Cambs.
Embleton, Bradley	235, Strand, London, W.C.
Emerson, Edward Gerard Wetherall	6, Holland Road, Notting Hill, Middlesex.
Evans, Henry	Lloyd Street, Whitmoreans, Staffordshire.
Evans, Henry William	156, Walton Road, Kirkdale, Liverpool.
Evans, John	156, Walton Road, Kirkdale, Liverpool.
Evans, Roger Jones	30, Priory St., Everton, Liverpool.
Evans, William	3, Lodge Lane, Liverpool.
Eveleigh, Francis William	24, Suffolk Road, Dalston, London, E.
Eyre, Henry Reynolds	Ipswich.
*Fairbarn, George	15, Windermere Street, Everton Liverpool.
*Farrer, John Downing	Great Yarmouth.
Faulconbridge, Alfred	155, Dale Street, Liverpool.
Fawcett, Christopher	Linthorpe, Middlesborough-on-Tees.
*Featherston, John Peter	London.
Feltwell, John	London.
Fenner, Edwin	Brighton.
*Fidell, Albert James	Oxford.
Fields, Cotnam	Birmingham.
Filmer, George Alfred	1, Bromley Road, Notting Hill, Middlesex.
Fish, Lawrence	Fielden Street, Blackburn, Lancs.
*Fisher, Glengarry	Edinburgh, N.B.
*Fisher, William Henry	Liverpool.
Fisher, William Raymond	Leytonstone Road, Stratford, Essex.
Fitzgerald, Henry	Bath.
Flanagan, William James	7, Rugg Street, Limehouse, Middlesex.
Flann, Joseph	Rotherhithe, Surrey.
Fletcher, George	Sneinton, Notts.
Floyd, John	Liverpool.
Forbes, Alexander	Lochee, Forfarshire.
Ford, William Henry	53, Kensington Park Road, London, W.
Foster, Henry	Manchester.
*Foster, Henry James	London.
Foster, James	61, Scotch Street, Carlisle.
Fowke, Robert Main	Worcester.
Fowler, Charles Henry	London.
Fox, Robert George	15, Cirencester Place, Portland Road, Middlesex.
Foy, Edwin	1, Lion Street, Norwich.
*Francis, Robert Dolbey	Bishop's Castle, Salop.
Francis, Thomas Brook Turnor	1, St. George's Square, Worcester
Franklyn, Thomas	London.
Fraser, Donald Halliday	Easton Street, High Wycombe, Bucks.
Frayne, William Richard	46, Hospital Street, Birmingham.
*Freeman, William	Devizes.
Frith, John Bruff	Ipswich.
Fryar, Robert	Edinburgh, N.B.
Fuller, Ira Thomas	Beccles.
Furley, John	13, Boston Terrace, Bradmor Park, Hammersmith, Middlesex

Furze, Leader	47, Hughes Street, West Derby Road, Liverpool.
*Fyfe, John Lawrence	Brighton.
Gambier, Gerald Garth Colliton	Bowmont Lodge, Queen's Road Richmond, Surrey.
Garlick, George Pope	174, Sherlock St., Birmingham.
Garry, George	34, Shamrock Street, Glasgow, N.B.
Gavin, John	Leith, N.B.
Gee, Isaac	4, Robert Street, Hampstead Road, London, N.W.
Gerard, Gaston	27, Paradise Street, Liverpool.
Germain, Thomas	6, Lower Bridge Street, Chester.
Gibb, Adam	18, Rosebank Cottages, Edinburgh, N.B.
Gibbings, Henry William	15, Garlick Hill, London, E.C.
*Gibbs, Nathaniel B.	London.
Gibbs, Paul Taylor	London.
Gibson, Charles Alfred	14, Penny Street, Leeds Road, Bradford, Yorks.
Gibson, John	Strickland Place, Kendal, Westmoreland.
Gibson, Robert Hart	42, St. Andrew Square, Edinburgh, N.B.
Gill, Thomas	5, Nile Street, Leeds.
Gilliatt, William	96, Albany Street, London, N.W.
Gillman, Rufus	Sherston Magna, Wilts.
Glaister, Chambers	King Street, Wigton, Cumberland.
Glover, John	Queen Street, Earlstown, Lancs.
Goadsby, Francis	53, Park Hill Road, Liverpool.
Gollop, Robert	Tetbury, Gloucestershire.
Goodale, John Wallett	Leicester.
Goodison, Thomas	Chesterfield.
Goodlad, John Jonathan	Birmingham.
*Goodwin, Felix	Yeovil, Somerset.
Gordon, Richard	44, Adelaide Street, Liverpool.
*Gover, Robert Mundy	Spalding.
*Gowing, James John W.	Great Yarmouth.
*Gowland, William	48, High Street, Sheffield.
Goy, Robert	Hull.
Grant, John	34, Eglinton St., Glasgow, N.B.
Grant, John Smith	Edinburgh, N.B.
Gray, Alfred	172, White Horse Street, Stepney, Middlesex.
*Gray, Frederick	London.
Gray, John Frederick	Shrewsbury.
*Gray, Thomas Scott	Melton Mowbray.
*Green, Conrad Samuel	Stratford-on-Avon.
*Green, Joseph	York.
*Green, Thomas	Leamington, Warwickshire.
Green, William Gunthorpe	Northgate Street, Ipswich.
Greeves, John Williams	13, Mabledon Place, Burton Crescent, London, W.C.
Greeves, Robert Taylor	13, Mabledon Place, Burton Crescent, London, W.C.
Gregory, John Thomas	London.
Grey, Daniel	154, Sauchiehall Street, Glasgow, N.B.
Gribble, George William	41, Park Street, Upper Street, Islington, London, N.
Griffiths, Griffith	Merthyr Tydvil.
Griffiths, Henry William	Pen-y-Graig, Carnarvonshire.
*Grimsdale, James	Chelsea, Middlesex.
*Grosvenor, Frederick	Hanley, Staffordshire.
*Guesdon, Victor	London.
*Guy, George Henry	Bristol.
Hall, Henry	Holme Cottage, Kirkstall, Leeds.
Hall, John	Mitchell Dean.
*Hall, John William	Birmingham.
Hamilton, Archibald	7, India Place, Stockbridge, Edinburgh, N.B.
Hammond, Benjamin	2, Liongate Rd., Landport, Hants.
Hands, George William	Smethwick, Staffordshire.
Harden, Charles	Bristol.
Hardwich, James	Exeter.
Harker, James	68, Corporation St. Halifax, Yorks.
*Harnett, Alfred	Kingston.
Harrington, Philip John	Clifton.
Harris, Edmund	78, Borough Road, Southwark, Surrey.
Harris, Robert	Northampton.
Harris, William Edmund	261, Kingsland Road, London, E.
Harrison, Frederick	Vaughton St. South, Birmingham.
Harrison, John	100, Duke Street, Liverpool.
Harrison, John Cope	90, Bristol Street, Birmingham.
Harrison, John Mather	33, Mount Pleasant, Liverpool.
Harrison, William	168, Hinde Street, Newcastle-on-Tyne.
Hart, George Francis	2, Tarvit St., Edinburgh, N.B.
Hartley, Charles Henry	23, Burley Road, Leeds.
Hawkes, James	Birmingham.
Hawksworth, John Lewis	Nafferton, Yorks.
Hayles, William Wheeler	109, Commercial Road, Southampton.
Haylock, Frederick	177, Green Street, Bethnal Green Road, London, E.
Hayward, Henry Thomas	215, Vauxhall Road, Liverpool.
Heath, Thomas	3, Victoria Terrace, Addiscombe Road, Croydon, Surrey.
Heathcoat, Thomas	79, St. James' Road, Holloway, Middlesex.
Heathorn, Alfred	Reading.
*Heathorn, William	Maidstone.
Hebb, Thomas	Craven Terrace, Sale, Cheshire.
Henderson, Mary Jane	51, Bridge Street, Glasgow, N.B.
Hendry, Alexander Massie	Bridge House, Woodside, Aberdeenshire.
*Hepple, Henry	Bideford.
*Herring, George	Doncaster.
Herron, William Kilburn	2, Garden Street, Wakefield.
Hick, Henry	7, Frederick Place, Caledonian Road, London, N.
Higman, Richard	89, Union Road, Southwark, Surrey.
Hill, Alexander Scott	103, Hospital St, Glasgow, N.B.
*Hill, Charles William	Hull.
Hill, Francis	Leeds.
Hill, Samuel	Norman Road, Greenwich, Kent.
*Hill, Thomas	Selhurst Road, South Norwood, Surrey.
Hinksman, John	Edinburgh, N.B.
Hire, George Frederick	56, Manor Road, Bermondsey, Surrey.
Hobson, Joshua	39, Lloyd Street, Kirkstall Road, Leeds.
Hockenhull, Thomas	Park Road, Congleton, Cheshire.
Hoffmann, Adolphus	55, New Bridge Street, Claremont Terrace, Manchester.
Hogarth, Thomas	206, Walton Road, Liverpool.
Hogg, George	18, Narrowgate Street, Alnwick, Northumberland.
Hogg, Joseph Fawcett	Middlesborough-on-Tees.
Holloway, Charles	29, Long Street, Birmingham.
*Holmes, Jasper Clement	Southampton.
Holmes, John	Batley, Yorks.
Holmes, William C.	London.
Holt, Thomas	22, Queen's Road, Nottingham.
Holtham, Charles	High Street, Chepstow, Mon.
*Hood, William	Edinburgh, N.B.
Hope, John, jun.	4, Grove Lane, Camberwell, Surrey.
Hopkins, James	103, All Saints' Street, Hastings.
Hora, William Travers	11, Merrick Square, Southwark, Surrey.
Hornsby, Thomas	6, Frederick Place, Mile End, Middlesex.
*Hornsey, William	Edinburgh, N.B.
Horton, Thomas	Green Lane, Stoneycroft, Liverpool.
Horton, Walter Charles	71, East Street, Brighton.
Howard, John	Swaffham, Norfolk.
Howard, Thomas	4, Deacon Street, Liverpool.
Howarth, William	168, Stretford Road, Hulme, Manchester.
Howson, Thomas B.	Eynsham, Oxon.
Hoyle, George Radcliffe	Walksend, Hoghton, Lancs.
Hoyle, John William	Hawkhurst.
Hudson, Charles	New Malton, Yorks.
Hudson, Walter	5, Hope Street, Leeds.
Hudson, William	2, Newbold Road, Asylum Road, Peckham, Surrey.
Huggins, William Henry	26, North Portland Street, Glasgow, N.B.
Hughes, Joshua	Crickhowell, Brecknockshire.
Hughes, Richard David	Henley-on-Thames.
Hughes, Thomas	Denbigh.
Humphreys, Henry	Pimlico, London, S.W.
Hunter, Archibald	2, Park Place, Regent's Park, London, N.W.
Hunter, Charles Miller	21, Great Ormond Street, Jarrow-on-Tyne.
*Hunter, David	Edinburgh, N.B.
Huntsman, Charles	41, Upper Street, Phillips Road, Sheffield.
Hutchinson, George Bassett	Brighton.
Inger, George	3, Thornhill Crescent, Barnsbury, London, N.
Ingham, Grace	57 and 59, Limekiln Lane, Liverpool.
*Inglis, Hugh	Glasgow, N.B.
Inglis, William	Edinburgh, N.B.
Innes, George William Rundle	Penzance.
Ismay, John George Vipond	Bristol.
Jacklin, Timothy John	193, East Street, Walworth, Surrey.
Jackson, Charles	52, Kentish Town Road, London, N.W.
Jackson, Charles Frederick	Clifton.
Jackson, Edward	43, Lower Rosoman Street, London, E.C.
Jackson, John	8, Princes Street, Barbican, London, E.C.

Jackson, John West ... 41, Ironmonger Row, London, E.C.
Jackson, Leonard ... Manchester.
Jackson, Richard Gill ... Market Place, Melbourne, Derbyshire.
Jackson, Warwick ... Colchester.
James, Henry ... Ross, Herefordshire.
James, Henry ... Sheffield.
James, William ... Northampton.
Jeffery, John Augustus ... Clifton.
Jeffrey, Edwin Bassett ... Tunbridge Wells.
Jenkins, Howell ... 15, Nicholl Square, London, E.C.
Jepson, William ... 38, De Beauvoir Crescent, London, N.
Johnson, Benjamin ... Cinder Hill, Staffordshire.
Johnson, Edward ... 3, Sidney Place, Sherbourne Road, Birmingham.
Johnson, Edward William ... 16, Christie Road, South Hackney, Middlesex.
*Johnson, Joseph ... London.
Johnson, Michael ... Prescot, Lancs.
Johnson, Richard ... 216, Park Road, Liverpool.
Johnson, Robert Dodds ... 3, Fowler Street, South Shields.
*Johnson, William ... London.
Johnson, William ... London.
*Johnson, William G. ... Jersey.
Johnstone, William Boyd ... Garston, Lancs.
Jolliffe, John ... 204, Hackney Road, London, E.
Jones, Edward James ... Horton Crescent, Rugby.
Jones, Frank ... 8, Kerferd Street, Liverpool.
Jones, Hugh Lloyd ... 14, Mountjoy Street, Everton, Liverpool.
Jones, John Whitley ... Regent Street, Llangollen, Denbighshire.
Jones, Robert ... High Street, Maidenhead.
Jones, Robert Morris ... 43, Stonewall Street, Everton, Liverpool.
*Jones, Robert William ... High Street, Poplar, Middlesex.
*Jones, Rowland Pritchard ... Llanrwst, Denbighshire.
Jones, Thomas ... 13, Newcastle Street, Strand, London, W.C.
Jones, Thomas Philip ... Haverfordwest.
Jones, William Henry ... 153, Derby Road, Bootle, near Liverpool.
Jones, William Robert ... 12, Parliament Street, Liverpool.
Jopling, Mark ... 43, Crossgate, Durham.
Joyce, John Barrington ... Coleford, Gloucestershire.

Keates, John Francis ... Great Hampton Street, Birmingham.
Keeling, Edmund ... 10, Holloway Head, Birmingham.
Kelly, Thomas ... 14, Wellington Place, Northampton.
Kenyon, Septimus ... 34, Meek Street, Maidstone.
King, Alfred ... 108, Blackman Street, Southwark, Surrey.
King, Frances ... Bridgegate, Irvine, Ayrshire.
King, James ... Bristol.
King, James ... 6, Store Street, London, W.C.
*King, Thomas ... Wendover.
Kirby, Samuel Amos ... Gosport, Hants.
Kitchen, William Pointon ... Edge Lane, West Derby, Liverpool.
Knibb, Thomas ... 43, Mount Street, Birmingham.
Kupitz, Ferdinand Kilian ... 35, Duke Street, Aldgate, London, E.C.

*Lacey, Henry ... Edinburgh, N.B.
Lambert, Thomas ... Whittington Moor, Derbyshire.
Lambton, John George ... Sunderland.
Lambton, Robert ... 22, Mount Stewart Square, Cardiff.
Laming, Welberry ... Market Rasen.
Lamplough, Henry Thomas ... Knightsbridge, London, S.W.
Lasham, John ... Culver House, Shanklin, Isle of Wight.
Latter, Leonard ... 73, Camden Road, London, N.W.
Lawrance, John Wilcox ... 64, Rotherfield Street, Islington, London, N.
*Lawrence, Wm. Pierpoint ... Macclesfield.
*Lawson, William ... Bury, Lancs.
Lea, Leonard ... 4, Upper Falkner St., Gloucester.
Leake, Edward Leach ... 90, Rockingham Street, Union Road, Southwark, Surrey.
Lean, William ... 25, John Street, Pentonville, London, N.
Lee, John Edwin ... 188, Kennington Road, Surrey.
*Lee, John William ... Liverpool.
Lee, Richard William ... Castle Forgate, Shrewsbury.
Leighton, Thomas ... Edinburgh, N.B.
*Lenton, William Henry ... 141, Hemingford Rd., London, N.
*Lever, William ... London.
Levie, Alexander Mair ... Edinburgh, N.B.
Lewis, Charles William ... London.
Lewis, Nathaniel James ... Market Street, Haverfordwest.
Lewis, Richard ... Towyn, Merionethshire.
Lilwall, Thomas Edward ... Hockley Hill, Birmingham.
*Lingwood, James Grace ... Great Yarmouth.
Lister, Thomas William ... Liverpool.
Livingstone, John ... 4, St. Cuthbert Street, Edinburgh, N.B.
Locke, Charles George ... 107, Great Jackson Street, Hyde Road, West Gorton, Lancs.
Lockerbie, James ... 27, West Clyde Street, Helensburgh, N.B.
Lofts, Richard, P. B. ... London.
*Logan, Richard ... Edinburgh, N.B.
*Long, George ... 15, Gladstone Street, Battersea Park, Surrey.
Longhurst, James Sidney ... London.
Lovatt, John Hammond ... Willenhall, Staffordshire.
*Love, John ... Sandgate, Kent.
Lowe, Archibald ... 15, Warburton Street, Liverpool.
Lowe, John ... 185, Church Street, Bethnal Green, London, E.
Lucas, Frederick Charles ... 52, Charlotte Terrace, Blackfriars Road, Surrey.
Lynch, Edwin ... 15, Primrose Hill, Erskine Street, Hulme, Manchester.
Lyon, James ... Ipswich.

McCree, William ... Whitby.
McDonagh, Michael ... 27, St. Andrew Street, Glasgow, N.B.
Macdonald, Robert ... 1, Houldsworth St., Glasgow, N.B.
Macdonnell, Daniel ... 27, Hall Craig St., Airdrie, N.B.
McDonnell, James Randall Wm. 14, Bank Street, Ashford, Kent.
McDougall, Patrick ... 35, Myddelton Street, St. John Street Road, London, E.C.
Macewan, Andrew ... 40, McIntosh Street, Glasgow, N.B.
Macewan, William Morrison ... 172, New Bond Street, London, W.
Macfarland, David Lindsay ... Leslie, Fifeshire.
McGillivray, George ... 49, Cowgate, Dundee, N.B.
McGregor, Donald ... 77, Shamrock Street, Glasgow, N.B.
McKane, George Oliphant ... Gateshead-on-Tyne.
Mackay, Allan George ... Edinburgh, N.B.
Mackay, Kenneth ... Edinburgh, N.B.
MacLaughlin, James ... 77, South Wellington, Glasgow, N.B.
McLean, George ... 188, High Street, Poplar, Middlesex.
McLeavy, James J. ... 78, Gloucester Street, Glasgow, N.B.
McMillan, James Laker ... Glasgow, N.B.
Macnaughton, Alexander ... Edinburgh, N.B
Macneill, Lachlen ... 100, Torriano Avenue, London, N.W.
McOwan, John Townsend ... London.
*MacRae, James Ross ... Edinburgh, N.B.
MacVea, Anthony ... Glasgow, N.B.
McWilliams, William Kirk ... Doncaster.
Madgwick, Rufus ... Stratford-on-Avon.
Manson, John ... 15, South College Street, Edinburgh, N.B.
Margetts, George Bryan ... 213, Ladywood Lane, Birmingham.
Mark, James ... 232, Whitechapel High Street, London, E.
*Marks, Benjamin ... Plymouth.
Marriott, Frederick T. ... Rugby.
Marsh, Edward ... 36, Park St., St. Helen's, Lancs.
Marshall, Eli ... London.
*Marshall, John ... Stepney, Middlesex.
Martin, Alfred Joseph ... Bay Cottage, Chobham Road, Stratford, Essex.
Martin, James ... Plymouth.
Martin, James ... Southampton.
Masterman, George ... London.
Mather, William ... Lamberhead Green, Pemberton, Lancs.
Matthews, John James ... 15, Salem Place, Exeter.
Mattison, William ... Saville Street, North Shields.
Maudsley, William ... Preston, Lancs.
Meager, Richard George ... 35, Bull Street, Birmingham.
Meikle, Robert Reed Greig ... Castle Eden, Durham.
Melhuish, John ... 78, High Street, Hastings.
Menetrey, Charles ... 1, West Ferry Road, Poplar, Middlesex.
Mercer, Arthur Bosworth ... 152, Spencer St., Liverpool.
Mercer, George Thomas ... Longton, Staffordshire.
Merrick, Charles James ... Manchester.
Middleton, John ... 52, Charlotte Terrace, Blackfriars Road, Surrey.
Miles, Frederick George ... Buttermarket, Thame, Oxon.
Miles, Frederick John ... Newcastle-under-Lyne.
*Millar, Thomas ... Dunfermline, N.B.
Miller, Cockburn Scott ... 36, Guthrie Port, Arbroath, N.B.
Miller, John Ernest ... Randall Street, Highfield, Sheffield.
Miller, Thomas Lanseer ... Blandford, Dorset.
Miller, William John Jeptha ... Saffron Walden, Essex.
Millington, Edward ... 32, Marine Parade, Brighton.
Milns, John Coupland Scott ... Alford, Lincolnshire.
Milton, Emily ... Beulah Road, Walthamstow, Essex.
Mitchell, Charles Edward ... Tunbridge Wells.

Mitchell, John	28, Emma Street, Hendon, Sunderland.
Mitchell, Richard Hall	3, Myddleton Terrace, Bridge Road, Battersea, Surrey.
Mitchell, Thomas	Doncaster.
Moir, James Charles	146, Scotland Road, Liverpool.
Monger, Hamilton Stacey	Stroud, Gloucestershire.
Monkhouse, Edward Hewer	18, Gower Place, Euston Square, London, W.C.
Moore, Charles Edward	High Street, Aston New Town, Birmingham.
Moore, Richard Henry	37, Stepney Causeway, London, E.
Moore, Thomas	Back Adelphi Street, Kirkstall Road, Leeds.
Moorhouse, Stephen	Stoke-on-Trent.
Morgan, Charles	Stamford, Lincolnshire.
Morgan, William	42, Castle Street East, London, W
Morgans, John Bowen	Milford.
Morris, Alfred	45, Warden Road, Kentish Town, London, N.W.
Morris, Charles	145, Sidney Street, Bolton, Lancs.
Morrison, William	25, Muese Lane, Cowcaddens, Glasgow, N.B.
Mort, Alfred Manks	1, Alexandria Place, St. Vincent Street, Birmingham.
Mortiboy, John	Stafford.
Morton, James Thomas	190, St. Vincent Street, Birmingham.
Moss, George	62, Gee Street, Goswell Road, London, E.C.
Moss, William Amphlett	Worcester.
Moulton, James Ebenezer	Northampton.
Moysey, William	84, Adelphia Street, Preston, Lancs.
Murch, Edward	29, Higher Union Street, Torquay.
Mussell, George	3, Milner Terrace, Moss Side, Manchester.
Musto, Alfred George	Churchingford, Devon.
Mutlow, Henry	23, Tintern Street, Walton Road, Liverpool.
*Mylius, Charles	London.
Nest, Henry	138, Malden Road, Haverstock Hill, London, N.W.
Newington, Henry Plaisted	12, Nelson Terrace, Morning Lane, Homerton, Middlesex.
Newman, Joshua Booth	Wolverhampton.
Newman, Samuel Charles	2, Somerset Square, Cathay, Bristol.
Newsom, Thomas	15, College Street, Belvedere Rd., Lambeth, Surrey.
Nicholas, William	47, Bedford Street, Strand, London, W.C.
Nicholas, William Richard	1, Amhurst Road East, Hackney, Middlesex.
Nichols, Samuel	Derwent Terrace, Matlock Bath.
Nicol, William	42, Howe Street, Edinburgh, N.B.
Nock, Thomas Francis	Newcastle-under-Lyne.
Nooten, Ernest Van	Edinburgh, N.B.
Norman, James Remington	34, Copperas Hill, Liverpool.
Norminton, Charles Andrew	Chad Street, New Town, Leeds.
Nutter, John	Westminster, Middlesex.
Oakes, George	63, Great Russell Street, W.C.
Offer, Charles Cadbury	6, Springfield Place, Cassland Rd., South Hackney, Middlesex.
Ogden, Henry	32, Hanover Street, Leeds.
*Oliver, John Hamer	Shrewsbury.
*Oliver, William	Coggeshall, Essex.
Ombler, Henry William	Upper Mary Street, Balsall Heath, Worcestershire.
Onions, Henry	Penkridge, Staffordshire.
*Orton, Richard John Wm.	Brighton.
Ostler, Charles	Galashiels, N.B.
Overbury, Frederick	87, Burbury Street, Birmingham.
Owen, Charles Richard	198, High Holborn, London, W.C.
Paine, Frederick	50, High Street, Islington, London, N.
Palethorpe, Samuel	Carrington Street Bridge, Nottingham.
Palmer, John Main	4, Arthur Terrace, Forest Road, Dalston, London, E.
Pape, James	1, Clarendon Road, Notting Hill, Middlesex.
Paris, Thomas	Salisbury.
Parker, John	51, St. James' Street, Burnley, Lancs.
Parker, Robert	Botesdale, Suffolk.
Parkes, Thomas	Knutsford.
*Parrott, John Smyth	Birmingham.
Patman, George	Berkhampstead.
Pattison, Matthew Lee	36, Dove Street, Liverpool.
*Payne, John	Leighton.
Peach, William	Sutterton, Lincolnshire.
Peacock, Joseph	North Shields.

Peacock, William Spencer	33, Lower Craven Place, Highgate Road, Middlesex.
Peede, Arthur	20, Argyle Square, London, W.C.
Pemberton, Thomas	380, Park Road, Soho, Birmingham.
*Penney, David	Edinburgh, N.B.
*Penton, Charles William	Maidstone.
Pepper, Adolphus	London.
Peters, John	Birmingham.
*Peters, John	Edinburgh, N.B.
Phillips, John Philip	Oxford.
Picciotto, Samuel	London.
Pigon, Francis	London.
Pitman, Edward J. F.	Birmingham.
Pitt, Charles	63, Broad Quay, Bristol.
Platt, William	216, Breck Road, Everton, Liverpool.
Pollard, William	Leeds.
Pooley, Charles Edwin	13, Chapel Street, Sheffield.
Porter, Augustus F.	Piccadilly, London, W.
Potbury, Benjamin Charles	Box's Buildings, Hick Street, Highgate, Birmingham.
Powell, Edward James	4, Burlington Place, Bath.
Powis, William	16, Broadgate, Lincoln.
Price, Benjamin	2, Church Street, Wrexham.
Price, Edwin	Ystrad, Glamorganshire.
Price, John	175, Richmond Row, Liverpool.
Price, Thomas	Pembroke Dock.
Price, William	Salisbury.
Priddin, John	Odd Rode, Astbury.
Priestman, William	174, Lever Street, Bath Street, London, E.C.
Pritchard, Urban	London.
Proctor, William Boston	London.
*Prowse, Charles	Bristol.
Pugh, Woodford Henry	13, Duke Street, Westminster Road, Surrey.
Purves, Samuel	Edinburgh, N.B.
Ramm, Thomas Edward	Market Square, Hitchin, Herts.
Ramsey, Emma	Great Grimsby, Lincolnshire.
Ratteray, Alexander	12, Murray Gate, Dundee.
Rawlinson, Ralph	London.
Raworth, Harrison Walker	Bristol.
Rayner, Hessey	Terminus Road, Eastbourne.
Read, Charles	4, Napier Road, Kensington, Middlesex.
Read, Frederick	Birmingham.
Read, Henry	New Ferry, Cheshire.
Read, Robert	Devizes.
Redford, Edward A.	Edinburgh, N.B.
Redford, Joseph	Windsor.
Rees, George Louis	127, Gt. College St., London, N.W.
Reeve, George	26, Alma Terrace, Hammersmith, Middlesex.
Reilly, Maurice Shelton	Wood Street, Barnet, Herts.
Remmington, Arthur	London.
Renwick, Thomas Kerr	47, South Bridge, Edinburgh, N.B.
Richards, James	London.
Richards, Thomas Lewis	Chester.
Richards, William Bevan	46, Market Street Manchester.
Richardson, Edward	Alexandria, Dumbartonshire.
Richardson, Frederick Austin	1, Clyde Terrace, Park Lane, Tottenham, Middlesex.
Richardson, James	London.
*Richardson, Robert	Ipswich.
Riddall, John	88, North Hanover Street, Edinburgh, N.B.
Ridding, Witham	London.
Rider, Frederick	London.
Ridge, Jesse	238, Oldham Road, Manchester.
Riley, Susan	1, Abbey Street, Nuneaton.
*Ringrose, Blanshard	Leeds.
Roberton, James	Higher Broughton, Manchester.
Roberts, George Wootton	204, Hackney Road, London, E.
Roberts, Hugh	41, Paradise Street, Liverpool.
Roberts, Owen	Pwllheli, Carnarvonshire.
Robertson, Andrew Graham	2, Kerr Street, Edinburgh, N.B.
Robertson, George	London.
Robinson, Charles	16, Rose Hill, Liverpool.
Robinson, John	40, Darley Street, Bradford, Yorks.
*Robson, Joshua Hutchinson	Norwich.
Rochford, Percy	34, Warwick Street, Douglas Street, New Cross.
Rodway, Edwin Augustus	62, Kirk Street, Calton, Glasgow, N.B.
Rogers, William James	10, Bartholomew Street, Exeter.
Rogerson, Jonathan Lowndes	77, Clarendon Street, Hulme, Manchester.
Roney, James	Leigh, Lancs.
Roper, John	Nailsea, Somerset.
Rose, Charles	2, West Street, Upper St. Martin's Lane, London, W.C.
Rose, Charles	Upper Lewisham Road, New Cross, Kent.
Ross, Charles	136, Hadden Street, Woodside, near Aberdeen, N.B.

Ross, Robert Campbell	138, Hadden Street, Woodside, near Aberdeen, N.B.
Routledge, Henry	London.
*Row, Frederick	Yarmouth.
*Rowell, Charles Frederick	Uppingham, Rutland.
Rowley, John Broadfield	91, Walworth Road, Surrey.
Rowse, George	1, Queen Street, Barnsley.
Rubbra, Edmund	256, King Street West, Hammersmith, Middlesex.
Sadgrove, Arthur Augustus	2, Queen's Road, Norland Square, Notting Hill, Middlesex.
Sanders, Richard	15, Mulberry Street, Liverpool.
*Sang, John Grant	Grantham.
Sansom, Henry Perry	Willenhall, Staffordshire.
Saunders, Henry Britton	28, Albany Street, London, N.W.
Say, Edmond Hugh	St. Leonard's-on-Sea.
Scanlan, Charles	59, Rochdale Road, Manchester.
*Scott, George	Birmingham.
Scott, Henry Thomas	Blandford, Dorset.
Scott, James	Edinburgh, N.B.
Scott, Joseph Robinson	Sheffield.
Seager, Walter	118, Great Dover Street, Newington, Surrey.
Seath, George	Chesterfield.
Seymour, George	Oldbury.
Seymour, William White Collins	Stockton-on-Tees.
*Sharland, William Henry	Barnet, Herts.
Sharp, William Henry	Victoria Road, Seacombe, Cheshire.
Sheldrake, George	High Street, Heckmondwike, Yorks.
Shelmerdine, Henry	New Brighton.
*Shepherd, Thomas	Wakefield.
Sherratt, James	41, Whit Lane, Pendleton, Lancs.
Shields, Thomas	22, Lambs Conduit Street, London, W.C.
Shirley, William	Prescot Road, Old Swan, Liverpool.
Shirran, James M.	Royal Infirmary, Glasgow, N.B.
Sibthorp, Stephen Jas. Kenneth	Sauchiehall Street, Glasgow, N.B.
Simons, John	53, Elizabeth Street, Liverpool.
Simpson, Edwin	63, Collier Street, King's Cross, London, N.
Simpson, George	Hull.
Sims, Francis M. B.	Colchester.
Sinclair, George	40, Jamaica Street, Edinburgh, N.B.
*Skrimshire, Thomas	London.
Skryme, Nathaniel Rowland	Pontlottyn, Glamorganshire.
Smith, Alexander	6, Suffolk Street, Glasgow, N.B.
Smith, Alfred	London.
Smith, Charles	Great Coggeshall, Essex.
Smith, David	Oxford.
Smith, Henry	Ipswich.
Smith, John	58, Bold Street, Liverpool.
*Smith, John	Portsmouth.
*Smith, Joseph	Birmingham.
Smith, Joseph Wheeler	Birmingham.
Smith, Robert Scarborow	17, Boundary Road, London, N.W.
Smith, Sidney	Nuneaton, Warwickshire.
Smith, Thomas	34, Armstrong Street, Scotswood Road, Newcastle-on-Tyne.
Smith, William	1, Lockwood Road, Bermondsey, Surrey.
Smith, William	2, Orchardfield, Leith Walk, Edinburgh, N.B.
Smith, William	43, Portland Road, Notting Hill, Middlesex.
*Smyth, George Frederick	London.
Snook, David Mead	18, High Street, Exeter.
Snowdon, George Wrangham	1, Oakfield Terrace, St. James Road, Croydon.
Somerville, Archibald	Moffat, Dumfriesshire.
Spence, John Robinson	Edinburgh, N.B.
Spence, Thomas Baird	2, High School Yards, Edinburgh, N.B.
Spicer, Charles	3, Milton Court Road, New Cross, Kent.
Spindelow, Richard William	135, Chatsworth Street, Liverpool.
Spurin, Victor Albert	7, Charles Street, Knightsbridge, London, S.W.
Spurin, Roscoe Charles	St. Blazey, Cornwall.
Staines, John Francis	48, High Street, Strood, Kent.
Stanley, Alfred George	168, Queen's Road, Bayswater, London, W.
Stanley, Frederick Albert	Winchester.
Stebbing, Walter	Letton, Herefordshire.
Steed, Robert Owen	54, Union Street, Southwark, Surrey.
Stenhouse, Robert	Alloa, N.B.
Stephens, Josiah	Tregaron, Cardiganshire.
Stevens, John Ashley	187, Parrock Street, Gravesend.
Steward, Augustus	68, Fulham Road, London, S.W.
Steward, James	Edinburgh, N.B.
Steward, John Alfred	Reading.
Stewart, William Finnie	29, Clarence Street, Edinburgh, N.B.
Stickler, Francis Miles	13, Hereford Road, Bayswater, London, W.
Strickland, George William	Lancaster.
Stuart, William Knox	4, Radnor Terrace, Dumbarton Road, Glasgow, N.B.
Stubbs, Arthur Houghton	28, Stanley Street, Bedminster, Bristol.
Sturton, Thomas	625, Old Kent Road, Surrey.
*Stutchbury, Joseph	London.
Surtees, William	Barton-on-Humber.
Sutcliff, John	Halford Street, Smethwick, Staffordshire.
Sutcliffe, Enoch	Bacup, Lancs.
Sutherland, James	Glasgow, N.B.
Sutton, Charles	8, Whitmore Road, Hoxton, London, N.
Sutton, Walter Robert	76, Radcliffe Street, Everton, Liverpool.
*Sutton, William	Swaffham, Norfolk.
Swain, John	Tunstall, Staffordshire.
Swindell, James Turner	16, Coleman Street, London, E.C.
Symes, Henry Tanner	London.
*Symons, John Crane	Dudley, Worcestershire.
Tanner, Benjamin	Liverpool.
Taplin, George	Bath.
Tayler, Joseph Walter	1, Wellington Terrace, Penzance.
*Taylor, Charles	Birmingham.
Taylor, Frederick Cottle	London.
Taylor, George	366, Regent Road, Salford, Lancs.
Taylor, George Edwin	Dublin.
*Taylor, Herbert Dawson	Manchester.
Taylor, John Charles	55, Manor Place, Walworth, Surrey.
Taylor, John James Salmon	London.
Taylor, Richard	81, Hill Street, Peckham, Surrey.
Taylor, Sam	Facit, near Rochdale, Lancs.
Taylor, Stewart	Edinburgh, N.B.
Tebbs, Richard	Leicester.
Teeling, Philip Walter George	18, Goldsmith Street, Liverpool.
Tempest, Arthur	17, Stock's Hill, Holbeck, near Leeds.
*Thomas, James John	Croydon, Surrey.
Thomas, Llewellyn	Pontypool.
Thomas, Rees Henry	Broad Street, Ross, Herefordshire.
Thompson, John	Orford Road, Walthamstow.
Thompson, Richard	London.
*Thompson, William Austin	Carlisle.
Thomson, George William	9, Lennox Road, Holloway, Middlesex.
Thomson, John	Edinburgh, N.B.
*Thurston, Frederick	Ipswich.
*Tims, Thomas Lamb	Leamington, Warwickshire.
Todd, Thomas	Edinburgh, N.B.
Tomsett, George Thomas	Brighton.
Towle, Francis Seamark	7, Carrington Street, Nottingham.
Townend, George Frederick	23, Cleveland Road, Islington, London, N.
Townend, Joseph Henry	82, Graham Road, Dalston, London, E.
Townend, William Potter	82, Graham Road, Dalston, London, E.
Troughton, James	115, Rishton Street, Everton, Liverpool.
Trouncer, John Henry	London.
*Tucker, Henry	Henley-on-Thames.
Tune, George Martin	53, Caroline Place, Hull.
*Turnbull, James	Jedburgh, N.B.
Turner, Charles	95, Euston Road, London, N.W.
*Tyler, Henry Wing	Leicester.
Tyrer, Joseph	Neston, Cheshire.
Varness, Frederick	London.
Vaughan, William George	11, Soho Square, London, W.
Venman, John Ebenezer	12, Durham Villas, Kensington, Middlesex.
Vian, William Henry	11, North Street, Exeter.
*Videon, Charles	London.
*Wadsworth, Richard	Preston, Lancs.
Wakefield, Henry	London.
Wales, Edward George	Sunderland.
Walker, George	21, Mackworth Street, Manchester.
Walker, John	30, Dunbar Street, Edinburgh, N.B.
Walker, John Henry	191, Marsh Lane, Leeds.
Walker, William	Belgrave Street, Darlington.
*Walker, William	Northampton.
Wallace, Thomas	116, Central Street, London, E.C.
Walley, Thomas	West Derby, Liverpool.
Ward, Joseph	Leek, Staffordshire.

*Ward, Philip Daniel	Halifax, Yorks.
Waterworth, William	Southport, Lancs.
Watford, Charles Harry	79, St. Paul's Churchyard, London, E.C.
Watson, Frederick	Fakenham.
Watson, James	Barking, Essex.
Watson, Joseph	7, Cedars Row, Lavender Hill, Surrey.
*Watson, Walker	Nuneaton.
Watson, William	7, Cedars Row, Lavender Hill, Surrey.
*Watts, Henry Thomas	London.
Watts, John	Market Place, Hexham, Northumberland.
Watts, John Newton	Great Yarmouth.
Watts, John Thomas	Wakenham Terrace, Portland, Dorset.
Wawn, George	153, Essex Road, London, N.
Wells, Alfred	Saltney, Flints.
*West, Robert Gibson	Liverpool.
Weston, Charles	Stockton-on-Tees.
Westwood, Henry John	Box, Wilts.
Wetherell, Henry Frank	179, Westminster Bridge Road, Surrey.
Wetherington, George	Coventry.
Whalley, Jonathan	77, Hannah Street, Manchester.
*Wheldon, Henry William	London.
Whelpton, John	Brighton.
Whitby, John	Stratford-on-Avon.
White, William	43, Kingsgate Street, London, W.C.
Whitehead, James	71½, Percy Street, Newcastle-on-Tyne.
Whiteland, Richard	Long Sutton.
Whittaker, James	126, Hoxton Street, London, N.
Whitton, Joseph	27, Thames Street, Liverpool.
Wilkes, John	151, Nelson Street, West Birmingham.
Wilkinson, Charles	28, Lower Ford Street, Coventry.
Wilkinson, Thomas	Sheffield.
Wilkinson, William	Blandford, Dorset.
*Williams, David Martin	Truro.
Williams, Evan David	3, Tonsley Terrace, Wandsworth, Surrey.
Williams, Hugh R.	Penygroes, Carnarvonshire.
Williams, John	15, Harman Street, Kingsland Road, London, N.
Williams, Morgan Edward	Cardiff.
Williams, Thomas	Carmarthan.
Williams, Thomas John	162, Copenhagen Street, London, N.
Williams, Thomas Nash	Victoria Street, Dowlais, Glamorganshire.
Williams, William	13, Gibson Street, Liverpool.
Williams, William Roderick	Maesteg, Glamorganshire.
*Williamson, David	Brighton.
Williamson, James	Edinburgh, N.B.
Willison, Alfred Augustus	Bath.
Wills, Charles	277, Oxford Street, London, W.
Wills, Joseph	Carlisle.
Wilson, Alexander	Southampton.
Wilson, Henry Digby	34, Devonshire Street, Brighton.
Wilson, John Edward	Somersham, Hunts.
Wilson, Thomas Davison	Sunderland.
Wilson, Walter William	Birmingham.
Winter, John Richard	Edinburgh, N.B.
Wisken, Robert	226, Hyde Road, Manchester.
Witchellow, William	2, Market, Bow Common Lane, London, E.
*Witt, Henry Matthew	London.
Witte, William Henry	5A, Victoria Cottages, Albert Road, Stepney, Middlesex.
Wood, George Edward	Dorchester.
*Wood, George Emilius	London.
*Wood, William Chancellor	Maidstone.
Woodcock, Alfred	184, Marsh Lane, Leeds.
Woolley, George Hagan	Maidstone.
Wright, Charles	6, Great Barr Street, Birmingham.
Wright, John	Preston, Lancs.
Wright, Robert	51, Long Lane, Bermondsey, Surrey.
Wright, Thomas Newton	92, City Road, Hulme, Manchester.
Wright, Thomas Williams	26, Brassey Street, Toxteth Park, Liverpool.
Wright, William	Blackpool, Lancs.
Wyatt, Alfred	London.
Yates, George	29, Newington, Liverpool.
*Yates, William	Bridgnorth, Salop.
Yeatman, Alfred	10, Albion Road, Hackney, Middlesex.
Young, James Frederick	Ipswich.
*Young, John	Musselburgh, N.B.
Younger, Robert Edward	Northampton.

THE TESTIMONIAL TO DR. TILDEN.

We have been requested by the Secretary of the "Tilden Testimonial Fund" to give insertion to the following letter received by him from Dr. Tilden:—

"*College Gate, Clifton College, Bristol,*
"*7th October*, 1872.

"My dear Shenstone,

"I have just received your letter and the magnificent balance, for which I hope you and your fellow-students will accept my warmest thanks. My first feeling with regard to this is naturally one of pleasure at receiving so handsome a present, and gratification that I should have been successful in gaining the esteem of those under my charge. But I am obliged, in the midst of my gratification, to remind myself that in so far as I have succeeded in doing my duty, I have done no more than my predecessor did, or than those who come after me will do. And I feel that it must be placed to the credit of the students as much as of myself, that so good an understanding has always been maintained between us.

"I accept your gift, therefore, in nowise in the sense of a reward, but as a memorial of old times, and of the good fellows with whom it was my privilege to work at Bloomsbury Square. It will also remind me that I am not to forget "pharmacy," though I believe there is little chance of my doing that.

"I hope you will not think it inopportune if I take this occasion to remind you of the claims which the School of Pharmacy, in which we all received instruction, has upon our interest and support. A College of this kind should not be regarded as made up of so many individuals, but as one whole, with work to do and a reputation to be maintained, and to sustain which every student past or present should strive to the utmost of his ability.

"I hope in the course of time to hear great things of its increasing importance and usefulness. This, however, can only be brought about by the co-operation of every one interested in the advancement of pharmaceutical education. When you have an opportunity, therefore, do not forget to say a good word for the old place, and when you all become full-fledged members of the Society, give it all the encouragement you can, by showing an interest in the work that goes on, and sympathy with the efforts of those engaged in it.

"I have now only to add, with my reiterated thanks for your kindly feeling towards me, my best wishes for the prosperity and happiness of all of you.

"Believe me to be, my dear Shenstone,
"Yours very sincerely,
"WILLIAM A. TILDEN.

"W. A. Shenstone, Esq."

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION.

On Friday, October 4th, at the close of the annual meeting thirty members and friends of this association sat down to supper at the Blackfriar's Hotel; Mr. W. S. Brown occupied the chair, and Mr. W. Wilkinson was vice. The usual loyal toasts having been drunk with musical honours, Mr. Hermann Woolley proposed "The Pharmaceutical Society of Great Britain," alluding in his remarks to the pleasant recollections he had of time spent in the school at Bloomsbury Square.

Mr. W. S. Brown, Vice-President, responded. Mr. W. Wilkinson, Local Secretary, also replied to the toast.

Mr. Bostock then proposed "The British Pharmaceutical Conference," and Mr. Benger responded.

"The Medical Profession," proposed by Mr. J. T. Slugg, was ably responded to by Dr. Downs, of Stockport, who expressed the great pleasure it gave him to be present and witness the cordiality and good feeling which existed amongst the Manchester chemists. "The Manchester Chemists and Druggists' Association" by Mr. Linay. "The Chemists' Assistants' Association," and other toasts followed.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 12, 1872.

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

THE NEW ADULTERATION ACT.

WE are glad to inform our readers that the question raised by our correspondent "Pharmaceutist," in the Journal for September 28, has now been decisively answered. The question was essentially a legal one; and though there might at first sight appear to be some reason for supposing that the word "medical" in the Act would render the Pharmaceutical Chemist or the Chemist and Druggist ineligible for the appointment of analyst, it is satisfactory to find that the interpretation of this term, not only by the Society's solicitor, but also by the highest legal authorities, has, as a matter of law, resulted in sustaining that view of the case which we have already enunciated as regards the qualifications necessary for the office of Public Analyst, and the fitness of pharmacists to perform its duties.

In accordance with the advice of Messrs. FLUX a case was submitted to the ATTORNEY-GENERAL, the SOLICITOR-GENERAL, and Mr. LANGLEY, with a most satisfactory result, as will appear from the following:—

"3, *East India Avenue, Leadenhall Street, London, E.C.*
October 8th, 1872.

"To the President of the Pharmaceutical Society of Great Britain.

"Dear Sir,

"*As to the Appointment of Analysts under the* 35 *and* 36 *Vict. cap.* 74.

"An opinion of the Attorney-General, the Solicitor-General and Mr. Langley has been obtained by us upon a case framed to raise the points lately suggested regarding the eligibility of Pharmaceutical Chemists and Chemists and Druggists for the office of Analyst.

"The case referred to the Statutes of the present reign, 15 and 16 cap. 56; 21 and 22 cap. 90; 23 and 24 cap. 84; 31 and 32 cap. 121; and 35 and 36 cap. 74.

"Of the question submitted and of the opinion a copy is annexed.

"The authority of the opinion must set at rest all doubts,—it must be considered clear that Medical Practitioners are not in any favoured position with regard to the appointment, and that any Pharmaceutical Chemist or Chemist and Druggist, or other person who in the opinion of the appointors possesses 'competent medical, chemical and microscopical knowledge,' may lawfully be appointed to the office of Analyst.

"We are, Dear Sir,
"Yours truly,
"FLUX and Co."

Question.

"Whether the words medical, chemical and microscopical knowledge in the Act 35 and 36 Vict. cap. 74 must be read and construed to limit the choice of analysts so that only duly qualified Medical Practitioners can be appointed, or whether the question whether the elected person does possess competent medical, chemical and microscopical knowledge is not one of fact to be considered by the appointors (subject to the approval of the Secretary of State) without reference to any register of Medical Practitioners or Pharmaceutical Chemists or Chemists and Druggists or the roll of membership of any body of Microscopists.

Opinion.

"We have considered this case and the Acts of Parliament referred to in it, and we are of opinion that the words "medical, chemical and microscopical knowledge" in the 5th section of the 35 and 36 Vict. cap. 74 are not to be construed so as to limit the choice of Analysts within that section to duly qualified Medical Practitioners only. We are further of opinion that the second branch of the question submitted to us must be answered in the affirmative.

"J. D. COLERIDGE,
"G. JESSEL,
"A. G. LANGLEY.

"*7th October*, 1872."

We think the thanks of the pharmaceutical body are due to our correspondent for having distinctly stated the doubt that had suggested itself to him, inasmuch as it might, if passed unnoticed, have practically resulted in the prevention of the appointment of pharmacists to the office of analyst under the new Adulteration Act.

We may mention, as a fact within our knowledge, that the possibility of the term "medical" being interpreted as restricting the appointment to medical practitioners had been recognized in other quarters, and for that reason gave rise to remonstrances while the Bill was before the House.

THE RECTIFICATION OF THE REGISTER.

THE important notice given by the Registrar in this week's Journal, is one to which we would call our reader's special attention, for it offers points of interest not only to those persons who are warned that their names will in a short time be struck off the Register of Chemists and Druggists unless they communicate with the Registrar, but also to every person who has a claim to be upon that Register. As this is the first time that it has been thought desirable to publish a List of those names which would require to be struck off the Register in compliance with the provisions of the Pharmacy Act, 1868, it may be well to recapitulate the steps that have led up to the present result. About two years ago, the Registrar was instructed by the Council of the Pharmaceutical Society to issue a circular in reference to certain details in the working of the Pharmacy Act, 1868, to every person whose name appeared on the Register. A large number of these circulars, although addressed correctly according to the Register as it then stood, were returned through the Dead Letter Office. Shortly afterwards, and on more than one occasion, attention was called in these columns to this imperfect state of the Register with some slight effect, as the Registrar received information respecting a few persons, but the proportion of these to the whole number was so small that he determined to put in force the provision of the Act of Parliament for enabling him to keep the Register correct. As a preliminary proceeding, a circular was sent to every Chemist and Druggist whose name appeared on the Register, except only those connected with the Pharmaceutical Society, and with whom he is therefore in communication weekly in the transmission of this Journal. Of these circulars, about 1200 were returned through the Post-Office. The "first registered letter" referred to in the tenth section of the Pharmacy Act, 1868, was then (in March last) addressed to the persons whom these circulars had failed to reach; and in September,—after the specified interval of six months,—the "second registered letter" was sent. About 150 of these letters reached the persons for whom they were intended, and their addresses have been corrected. There still remain, however, as will be seen by the List published at page 286, 1040 persons whose whereabouts are not known.

One of the principal causes from which this state of affairs arises is the fact that many young men who pass the Society's examinations are registered at a time when not being in business they have no fixed address, and they never afterwards communicate with the proper authorities. Another cause, which we have repeatedly pointed out, is the number of unreported deaths. It does not appear to be generally known by Registrars of Deaths throughout the country that it is their duty to report the death of any Chemist and Druggist occurring in their districts to the Registrar of the Pharmaceutical Society, inasmuch as that duty is seldom performed, although it entitles them to a fee. All of our readers, and more especially the Local Secretaries of the Society, might assist in obviating this by ensuring, as opportunity may occur, that the Registrar of Deaths in the district in which they reside is acquainted with this "Instruction."

The Registrar has now performed all the duties prescribed by the Act of Parliament in endeavouring to find the persons named in the List. It now only remains to wait until three months shall have elapsed since the issue of the second registered letter, dated 30th September last, and on the 30th December next he will be authorized to erase the names of all those in this List who have not up to that time communicated with him. The names of all such persons will, therefore, be omitted from the Register of 1873.

LADY PHARMACISTS.

It may interest some of our readers to know that, as the result of the decision of the Council at their last meeting to allow the attendance of ladies at the professors' lectures, there has already been one entry for the present course. In alluding to this subject, we may mention that we have received a letter from a correspondent who is of opinion that "the new dodge" of allowing ladies to pass the examinations and become chemists and druggists is "one of the most disgusting acts the Board of Examiners has allowed since he joined the Society in 1844." Probably this fresh decision of the Council will be still more obnoxious to this gentleman; and doubtless there are those who, without endorsing his rather coarse language, may agree with him in opinion as to its policy.

With respect to the first point, however, we apprehend that the Examiners had no legal power to refuse a person who is not excluded by the terms of the Act. As to the second, there is little doubt that, considering the present state of public opinion on the general question, the Council acted wisely in judging that they had no moral right to object to ladies availing themselves of the School of Pharmacy to a certain extent, in order to fit themselves for a position allowed them by law.

As illustrating the general tendency of public opinion on this subject, we may point to the address of the Rev. Canon Kingsley, delivered at the Birmingham and Midland Institute on Monday last. In it he said that he had for twenty years past, and should as long as he lived, advocated the training of ladies to the medical profession. And now he was seeing the common sense of England, and indeed of every civilized nation, coming round to that which seemed to him when he first conceived of it a dream too chimerical to be cherished save in secret; and he trusted soon to see a supply of lady doctors sufficient to establish in every town health classes for young women.

The question has been carried to a further stage in the profession of medicine, in which an attendance at a recognized source of instruction is compulsory; but it must be remembered that in pharmacy there is no limitation as to where or how the education has been obtained, so long as the candidate is able to pass the examination. Therefore, should intending lady pharmacists be nearly so numerous as fear suggests in some quarters, according to the known law of supply and demand, there would not be much difficulty in their obtaining the education they require. But these fears, like those that suggest the time when the strictness of the Examiners shall have rendered the supply of pharmacists insufficient, are probably very wide of this mark.

UNIVERSAL EXHIBITION AT VIENNA.

Vienna, which in 1869 was the seat of the third and latest meeting of the International Pharmaceutical Congress, is next year to become the head quarters of an International Exhibition that will probably, revive the interest in such gatherings which frequent occurrence and consequent familiarity have allowed somewhat to flag. For besides being the capital of an empire with immense resources comparatively undeveloped, Vienna will form the nearest point of contact with International Exhibitions yet furnished to Eastern Europe and Western Asia, and especially to the millions of semi-civilized people living in European Turkey, including the Danubian Principalities.

For the purpose of representing this country and in pursuance of an invitation received from the Austrian Government, Her MAJESTY has been pleased to nominate a Commission, at the head of which is H. R. H. the PRINCE OF WALES, and this Commission has established its offices at 41, Parliament Street, S.W., where Mr. PHILIP CUNLIFFE OWEN, the secretary, will receive applications for space and give every information as to the forwarding, exhibiting, and returning of the objects of exhibition.

The Exhibition will be opened on the 1st of May, 1873, and closed on the 31st October the same year. British exhibitors can communicate with the Austrian authorities solely through the above-mentioned Royal Commission by whom detailed plans showing the space allotted and the objects to be exhibited must be sent to the Director-General, Baron SCHWARZ, before the 31st of January, 1873.

In the official classification of objects, "Plants for Food and Physic" forms section (*a*) of Group 2 (Agriculture, Horticulture and Forestry). Group 3, relating to chemical industry, is divided as follows:—

(*a*.) Chemical products for technical and pharmaceutical purposes (acids, salts, chemical preparations of all sorts).
(*b*.) Raw substances and products of pharmacy, mineral waters, etc.
(*c*.) Fats and their products (stearine, oil acids, glycerine, soaps, candles, and tapers, etc.).
(*d*.) Products of dry distillation (as refined petroleum, slate oil, paraffin, phenylic acid, benzoïne, anilin, etc.).
(*e*.) Ethereal oils and perfumeries.
(*f*.) Matches, etc.
(*g*.) Dye-stuffs, mineral and organic.
(*h*.) Resins (washed, dyed, or bleached), sealing-wax, varnish, albumen, isinglass, glue, starches, dextrin, etc.
(*i*.) Contrivances and processes used in chemical production.
(*k*.) Statistics of production.

We are authorized to state the greatest possible facilities will be given to the exhibition of objects in Section (*b*), but immediate application for the required space should be made at the office in Parliament Street.

We may also mention in connection with this subject that Mr. P. L. SIMMONDS, who has already devoted considerable attention to the utilization of waste and residues from manufactures, and has published a popular work on the subject, has been requested by the Austrian Commission to form for the Exhibition as complete a collection as possible, to illustrate what has been done in this direction since 1851. To assist him in attaining this object, Mr. SIMMONDS would be glad to receive specimens of waste and their resulting products at 29, Cheapside, E.C.

Provincial Transactions.

TYNESIDE CHEMISTS' ASSISTANTS' ASSOCIATION.

A Meeting of the above Society was held on Thursday evening, the 26th ult.; the President (Mr. Alfred Brady) in the chair.

The minutes of the last meeting having been read and adopted, the President announced that the Committee had arranged with one of the masters at the Royal Grammar School to conduct a Latin class in connection with the Society on two evenings in each week; the fee is to be regulated by the number of pupils who join the class, which will commence on Tuesday, the 1st of October.

A Sub-Committee, which had been appointed to draw up a plan for the fitting and ultimate working of a laboratory in connection with the society, had presented a report to the Committee, which had been passed with a few alterations, and now stands as follows:—

"The Sub-Committee are of opinion that the present smoke-room shall be made into a laboratory, as it possesses ample space for eight good working benches, viz.:—

"*Four* on the window side of the room "*Three* opposite the fire-place "*One* opposite side to the windows	*Eight.*

"In order to commence on a small scale and with as little expense as possible, simple benches $2\frac{1}{2}$ feet wide will be affixed to the wall, each with a drawer on the under side. Shelves in front of the student may be afterwards added as funds allow.

"Each separate bench should have the following apparatus:—1 spirit lamp; 1 tripod and sheet of metal for sand bath; 1 retort stand; 1 test-tube stand; 6 glass rods; distilled water. Each student to supply his own towels, duster, and reagents. The water may be brought into the room in carboys or stone jars with taps as most convenient; the waste water to be run into a similar vessel, kept for the purpose, and emptied at intervals by the person cleaning the rooms. Suggestions for any apparatus to be made to the General Committee for approval.

"Rules for the regulation and systematic working of the laboratory students to be drawn up by the General Committee.

ESTIMATE.

	£.	s.	d.
"For benches and drawers about	2	16	0
Apparatus, as specified . . .	2	4	0
Sundries	1	0	0
	£6	0	0

"Each student entering for a bench in the laboratory to pay five shillings per half-year. Should this not prove sufficient, means will be taken to add to the amount in the treasurer's hands."

The President said thanks were due to the Sub-Committee for the pains they had taken in drawing up their report, which contained all that was required for a commencement, but he hoped that as the funds increased all the apparatus required for a systematic course of chemistry would be supplied to the students free of expense.

Mr. R. D. Spence, in acknowledging on behalf of the Sub-Committee a vote of thanks that was passed, said he hoped that now the question of their having a laboratory was settled, all the members would take an interest in it and keep it afloat.

Mr. B. S. Proctor then addressed the meeting on pharmaceutical education. He said he thought that a small amount of chemistry and botany should be introduced into the Preliminary examination, as well as some knowledge of at least one of the following subjects, viz., Greek, German or French. As to book-keeping, which had been proposed by some who had written on the subject, he did not think it needful, as every day the pupil is in business he is to a certain extent using the books, and the keeping of them in order is a mere matter of practice. Mr. Proctor then spoke of the "Minor" and "Major" examinations, which he considered answered their purpose very well, and need not be much altered; he said that any student who wished to prepare to pass them could do so by a systematic course of study in from three to nine months, there being nothing difficult in either of them to those who work for the sake of learning. He concluded by saying that those who, looking upon the examinations as a hardship to be got over as soon as possible, and go through a course of cramming to enable them to do so, deserve to be "plucked."

Mr. Welch advised all who had not passed their Preliminary examination to do so at once, as there was no doubt but that it would be a great deal more difficult this time twelvemonths than it is at present. He also proposed a vote of thanks to Mr. B. S. Proctor for his very able address.

Mr. R. D. Spence seconded the motion, which was carried unanimously.

The President then presented the association with a framed photograph of the members of the Pharmaceutical Conference.

The President announced that Mr. Shaw had presented his resignation to the Committee at their last meeting, he being about to leave this country for India. Mr. Shaw was one of the founders of the society, and one of its hardest workers.

Mr. Shaw returned thanks for the kind way that he had been spoken of, and said he should always remember with pleasure the association which had gained him so many friends.

BRADFORD CHEMISTS' ASSOCIATION.

At a Meeting of this Society on the 27th ult., a discussion arose on the merits of the scheme for aiding provincial education suggested to the Council of the Pharmaceutical Society in the 'Chemist and Druggist.' The general opinion of the meeting was favourable to it as containing in it more that is practical and better suited to the present exigency than any scheme yet proposed. The meeting was not insensible to the difficulty of making even so simple a plan as this, and it was proposed that the following resolution should be forwarded to the Council:—

"That the suggestion made in the 'Chemist and Druggist' (August 15th) to the Council of the Pharmaceutical Society deserves the attention of the Council, and that it be respectfully requested to give it full consideration."

NORWICH CHEMISTS' ASSISTANTS' ASSOCIATION.

The Annual Meeting of the above Association was held at the rooms, September 30th; the President, Mr. Alfred Hill, in the chair.

After briefly alluding to the past session, the President called upon the Treasurer, Mr. W. J. G. Butler, to read the financial report, which showed an income of £36. 10*s.* 0*d.*, and an expenditure of £35. 9*s.* 3*d.*, leaving a balance in hand of £4. 10*s.* 11*d.* against one of £3. 10*s.* 2*d.* last year.

The Secretary, Mr. G. C. Fox, read the reports of class teachers. The Materia Medica Class had met seven times; average attendance, ten. The Chemistry Class met twenty-three times; average attendance, ten. The Botany Class met eight times; average attendance, nine. On one occasion the class was not held, owing to the fact that five members only were present. The progress of the pupils in the above classes was reported to be on the whole good. The class preparing for Preliminary examination was attended by six pupils. On the whole the attendance was regular. Finding the work at first done very unsatisfactory, owing perhaps to the long interval of time between the lessons, the teacher gave an additional lesson per fortnight, which had the effect of increasing the amount done. Of the number, only two were able to go over the whole work prescribed for examination, for which they presented themselves in July, one of whom passed.

Mr. Fox then continued—The council is desirous of drawing attention to the small attendance at these classes, which has been even less than that of the preceding year, but at the same time it is gratifying that the small number who did attend acquitted themselves with great diligence and success, as was shown by the reports of the various examiners. They had also to consider a new feature in regard to the Latin Class, viz., all the fees of the tutor had been paid by the association, without any pecuniary demand upon the students; but it was a matter of considerable regret that the members generally failed to avail themselves of the great advantage of having a tutor gratis in a subject of so vast importance, and allowed him to attend at the rooms with only the few members of the Preliminary Class present. The prizes during the present year, the council believed had, to a limited extent, accomplished thedesired result, of a closer attendance to study on the part of those who really endeavoured to improve themselves; but they regretted exceedingly that all the students at the class did not compete. The council were disposed to recommend that the experiment be repeated in the approaching session.

The lectures during the present year had been a decided failure, as owing to the sparse attendance on such occasions, it had been found difficult to induce any gentlemen to undertake the task, and the council recommended that lectures in the summer should be discontinued, and a practical chemistry class substituted.

Lectures had been delivered on Nitrogen by Mr. F. Sutton, on Botany by Mr. O. Corder, on Coal Gas and on Water Analysis by Mr. Mason, and on Volumetric Analysis by Mr. E. Nuthall. The Library Report was highly satisfactory, both on account of the additions made during the present year, and a decided increase in circulation. During the year large additions had been made to the museum by the liberality of various London firms. The council greatly regretted that so few have attempted the Pharmaceutical examinations of the present year (two only having passed the Minor and three the Preliminary), the more so as they felt assured that several other gentlemen could have easily overcome the Minor examination, and until they did so, it would be impracticable to extend the teaching to the higher branches required for the Major. Two members had succeeded in passing the Science and Art Examination in Chemistry in a most satisfactory manner.

The officers and council for the ensuing year were elected as follows:—President, Mr. Alfred Hill; Vice-President, Mr. E. Nuthall; Financial Secretary and Treasurer, Mr. W. J. Gooch Butler; Secretary, Mr. George C. Fox; Council, Messrs. Boultbee, C. E. Canham, N. Lincoln, P. H. Mason, and G. S. Tooke; Librarian, Mr. N. Lincoln; Assistant Librarians, Messrs. Woolnough and King.

Mr. Nuthall proposed that a note should be appended to one of their laws for the purpose of reversing the definition of the word "pharmacy," which had been given at the outset of the association. Then it had been defined as embracing all subjects connected with the trade, either Preliminary or otherwise, but he now thought the time had come when they should discontinue subsidizing the class of teaching required for the Preliminary, on the ground that all that knowledge should be acquired before entering the trade. He did not wish it to be thought that heretofore he had been assisting in a scheme to which he objected; on the contrary, he thought that up to the present they had been justified in assisting the Preliminary students, but now a sufficient time had elapsed since the passing of the Pharmacy Act, he thought they should discontinue to do so. Just now, pharmaceutical education was an all-absorbing topic, and its discussion had brought forward many different schemes, but in nearly all of these there was one point upon which unanimity seemed to prevail, viz., that to advance the best interests of the trade it was necessary to insist upon passing the Preliminary examination before a youth should be apprenticed, and he now asked them to endorse this principle. Mr. Nuthall then proceeded to say that with this association the Preliminary Class had always proved a dead weight. In their first year not only had it been an expense to them, but an unfortunate misunderstanding led to great unpleasantness, and in the present year the results of the teaching had been almost nothing. This was not the fault of the teacher, for he was most suited for the task and had had great experience, but it was that of the students who, he was sorry to say, had been represented to him as most negligent.

Mr. Tooke, in seconding this resolution, said he felt very strongly on this subject, and was glad that it had been brought so prominently before the meeting. He thoroughly agreed with what Mr. Nuthall had said.

Mr. Lincoln, although admitting the force of Mr. Nuthall's remarks, hoped the society would not act rashly upon so important a subject. He would remind them that those of their members who had not yet passed, as well as some who might be about to join, were entitled to some consideration.

Mr. Fox thought by passing the resolution before them, they would do great injustice to some of their members, and would also deter others from joining. He thought it would be better to continue the Preliminary Class during the ensuing session, and discontinue it in the year following. Meanwhile, the discussion that night would show the apprentices what to expect, and act as a warning to them not to look for further help. He would propose as an amendment that the Preliminary Class be continued during the ensuing session.

Mr. Butler seconded the amendment for although he agreed in many respects with what Mr. Nuthall had advanced, he thought they would be thinning their ranks were they to adopt his proposition, and further they would lose the support of some of the honorary members, as he thought several employers regarded the Preliminary Class as an important part of the business of the association.

Mr. Mason said, while agreeing thoroughly with the theories enunciated by Mr. Nuthall, he thought it would be better to wait a year, and then enforce the principle by declining to admit to membership any who had not passed the Preliminary examination.

After some further remarks, Mr. Nuthall stated in reply that he quite expected that some apprentices would not join when they saw that Preliminary subjects were omitted from their curriculum; but he thought that would be better than carrying out what they omitted to be wrong in principle, and he much questioned whether the association would be a loser by this, for more than these subscriptions would be absorbed by the tutor's fee. With regard to those who were already members, and had not yet passed, he thought no injustice would be done, as they all had the benefit of one session's classes, and some had actually attended them for two years. Further, it was open to them to withdraw from the association, if they thought it failed to give them the help they required. Allowing another year to pass before adopting the course he proposed he thought would be useless, as at the end of that year they would in all probability have members who had failed to pass, and again the cry of injustice would be raised. In reply to Mr. Mason's remarks, he thought it would not be advisable to refuse to admit those who had not passed the Preliminary.

A division resulted in the amendment being carried by a majority of 3, several not voting.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION AND SCHOOL OF PHARMACY.

The fourth Annual Meeting of the above association was held in their new rooms, 37, Blackfriars Street, on Friday evening, October 4th; Mr. W. S. Brown, President, in the chair.

The following report was read by the Secretary, Mr. F. B. Benger, and the statement of accounts by the Treasurer, Mr. G. S. Woolley:—

FOURTH ANNUAL REPORT.

In again laying before you an annual report, your council are compelled to express some disappointment. Great hopes had been entertained that the association would receive the hearty support of the whole trade of the district; but the number of enrolled members and associates is slightly less than last year. It was felt that the objects aimed at by this association were such as should arouse the interest, and claim the sympathy and cordial assistance of every chemist and druggist; and, inasmuch as every effort has been made to bring these objects under the notice of all, it has been somewhat disheartening to those who do the work of the association, that no more ready response has been made; at the same time, the council have been cheered by the fact, that so large a number of old members continue warmly interested in the work which the association has set itself to accomplish; and that so many assistants and apprentices, who have come to Manchester during the year, have availed themselves of the privileges offered, and obtained great benefit from the use of the library and museum. It is encouraging to note, that the list of associates almost equals that of the members.

Five ordinary monthly meetings were held during the session, and the following lectures and papers given:—

1st.—"On some of the difficulties of Dispensing." By Mr. W. Wilkinson.

2nd.—"On the Natural History of the Mineral Substances used in Medicine." By Professor W. C. Williamson, F.R.S.

3rd.—"On Pharmaceutical Education in its relation to Pharmaceutical Examinations." By Mr. Louis Siebold.

4th.—"On Dispensing." By Mr. W. Lane.

5th.—"On the Pharmacy and Materia Medica of the Bible." By Mr. J. T. Slugg, F.R.S.

These meetings were all held at eight o'clock in the evening, and tea was provided; but some members having complained that they are unable to attend at this hour, it is proposed to return to the original plan of holding the monthly meetings, alternately, in the afternoon and evening.

The reading-room has been opened three evenings a week during the winter months; and on a fourth, it has been placed at the service of the "Chemists' Assistants' Association,"—a society consisting of your own associates,—who met weekly for mutual improvement. Students have been admitted at any other time by applying to the secretary.

It was a subject of deep regret to your council that the lecture courses, established in connection with Owens College were suspended last session, because the minimum number of students required by the college authorities failed to present themselves. Nevertheless, as you have all been made aware by a recent circular, a very complete course of pharmaceutical instruction has been again organized.

Two large and convenient rooms at 37, Blackfriars Street, within a few minutes' walk of either of the railway stations, have been taken and furnished. One to contain the library and materia medica specimens belonging to the association; the other as a lecture and class room, and the lectures on chemistry, materia medica, botany, and Latin, about to be commenced by Mr. Louis Siebold and Mr. J. J. Smith, B.A., will be delivered there.

As will be seen from the treasurer's statement of accounts, the funds of the association have been heavily drawn on to provide this accommodation, and the annual cost of maintaining it can only be met by the subscriptions of an increased list of members.

The lecture fees have been fixed so low as to call forth some adverse criticism from the pharmaceutical press; but in making these arrangements your council have been influenced by a desire to place the lectures within reach of every apprentice in Manchester and district; and by the hope that the united fees of large classes would render them self-supporting. Moreover, the example of the very successful evening class department at Owens College has been followed.

In response to an appeal from the pharmacists of Chicago for aid in replacing their library and museum destroyed by fire, your president and secretary, assisted by a committee of members of the association, canvassed the district, and the sum of £52. 2*s.* 6*d.* was collected from 163 subscribers, and forwarded through Professor Attfield.

The following donations to the library have been received:—'The PHARMACEUTICAL JOURNAL,' weekly from the Society; 'The Year Book of Pharmacy for 1871,' from the British Pharmaceutical Conference; and occasional copies of the 'Chicago Pharmacist,' from the editors. 'The Lancet,' 'Chemical News,' and 'The Chemist and Druggist' have been subscribed for and placed in the reading-room as published.

Members and associates are reminded that subscriptions become due on the 1st of October. The association may be saved considerable expense, and the secretary some labour by these being forwarded at the earliest opportunity.

The balance-sheet showed an income of £56. 1*s.* 5*d.*, and an expenditure of £88. 2*s.* 10½*d.*, leaving a balance in hand of £41. 5*s.* 5*d.*, against one of £73. 6*s.* 10½*d.* from last year.

The Chairman, on moving the adoption of the report and treasurer's statement, said he could not help expressing a feeling of regret that a much larger number of students had not presented themselves to partake of the advantages which the institution afforded. The object of the association was mainly educational, and it was formed almost exclusively with a view to interest young men, who by the passing of the Pharmacy Act of 1868 were called upon to pass an examination before they were permitted to commence business as chemists. It was to be regretted that the society had failed to connect itself with Owens College, but he looked forward to the time when that end would be accomplished. The association numbered at present 92 members and 71 associates, and he believed it still retained its position as the largest association of the kind in the kingdom; but taking into consideration the number of chemists in Manchester and the surrounding district, from whom they should draw a large number of members, he did not think the strength of the association was quite satisfactory, and they might fairly look forward to an increase to double that number. The society had never sought extraneous aid, and he hoped it would always be self-supporting.

Votes of thanks were then passed to the officers and members of council, and these gentlemen were all re-elected for the ensuing year:—viz., Mr. W. S. Brown, President; Mr. J. T. Slugg, F.R.A.S., and Mr. W. Wilkinson, Vice-Presidents; Mr. G. S. Woolley, Treasurer; Mr. F. Baden Benger, Hon. Secretary; and Messrs. Barnaby, Blain, Bostock, Halliday, Hughes, Kay, Robinson, Mumbray, Hermann Woolley, J. Waterhouse and Hall, members of council; and Messrs. Johnstone and Paine, auditors.

Mr. W. Lane, President of the Manchester Chemists' Assistants' Association, thanked the council for the use of the room for the meetings of that association.

The names of one member and sixteen associates were then read, and these having been elected, the Chairman announced that the next meeting would be held on the first Friday in November, due notice of which would be forwarded to every one connected with the association. The classes would be commenced, and the rooms opened every evening but Saturday, according to the prospectus, and that the Chemists' Assistants' Association would have the full use of the new rooms, as of the old, free from charge. The meeting then terminated.

LIVERPOOL CHEMISTS' ASSOCIATION.

The Annual Meeting of the Liverpool Chemists' Association was held, October 4, at the Royal Institution, Colquitt Street; the President, Mr. E. Davies, F.C.S., in the chair.

Messrs. Thomas Johnson, John Fidler and D. T. Toppin were elected members, and Mr. James Loadanam was elected associate of the association.

The council of the association, in their twenty-third annual report, which was read by Mr. J. Hallawell, the secretary, stated that nine members and an equal number of associates had been elected during the present session, while twelve members and associates had resigned, leaving the number of members at present enrolled at 133, an increase of six on the list as compared with last year. The President reported that seven students had attended the course of lectures on chemistry, and three more the course of practical chemistry in the laboratory. The botany class, conducted by Dr. Carter, had been attended by twelve pupils, eight of whom were pharmaceutical students, and the attendance was regular and well kept up to the end of the series. A series of papers had been read during the session, some of a very useful and scientific character, attracting considerable attention by their importance, and all the papers had been of an instructive and interesting nature. The library had been enriched by several additions, and the librarian reported that there had been more than an average number of applications for books by the members, the number of books lent being 350. The treasurer, Mr. Shaw, read the balance-sheet, which showed that at the beginning of the year there was a credit balance of £9. 4*s.* 10*d.*; and the expenditure left a balance in hand at the close of the year of £11. 4*s.* 7*d.* Mr. Summer, in moving, and Mr. Armstrong, in seconding the adoption of the printing of the report and transactions, lamented the fact that though there were such a large number of chemists in Liverpool, the society numbered so few members and associates. Mr. Taylor suggested, as a reason for that state of things, the late hours at which shops were closed. The President hoped something would be done to introduce a system of early closing among chemists and druggists. The Secretary remarked that several complaints had been made by students that the session had not been of a character to interest or instruct them, the proceedings being either too advanced or of no practical use to them. Whether anything would be done during the coming session to meet those complaints, he did not yet know.

BRISTOL PHARMACEUTICAL ASSOCIATION.

The council have the pleasure to announce that they have made arrangements by which they are enabled to offer to their fellow members and associates the following complete course of instruction in chemistry, botany and materia medica:—

Chemistry.—A course of thirty lectures by Mr. Coomber, F.C.S., on "Inorganic Chemistry," every Tuesday, at 8 P.M., commencing October 15th. A course of thirty lectures by Mr. Coomber, F.C.S., on "Organic Chemistry," every Thursday, at 8 P.M., commencing October 17th.

Botany.—A course of six lectures by Mr. Leipner, on "Botany, Physiological, Economic and Systematic," every Monday, at 7.30 P.M., commencing October 14th.

At the conclusion of this series, that is in May next, an examination will be held in each subject, at which every student is required to present himself.

Tickets for either of the two subjects, that is, for Chemistry or for Botany, will be five shillings for members and associates, provided the holder complies with the condition of presenting himself for examination, and shall have attended not less than 25 lectures in each course, in accordance with the regulations of the classes; if not, the fee will be ten shillings. Students are earnestly advised to abstain from entering for more courses than they can reasonably expect to follow up.

By the renewed consent of Mr. Stoddart, the Council is also able to announce a series of lessons on materia medica, adapted to the requirements of those associates of the society who are preparing for the examinations at Bloomsbury Square. Mr. Stoddart declines to accept any payment for his labours, but agrees with the rest of the council in the propriety of charging a fee of £1. 1*s.* for attendance at these lessons, the proceeds being arranged to go to the augmentation of the fund to meet the expenses of a pharmaceutical museum.

The lessons will be on Friday evenings at 9 o'clock, commencing October 18th.

Tickets for this course to be obtained only at Mr. Stoddart's, North Street.

Mr. Coomber is also prepared to offer a course of practical laboratory instruction on Friday evenings at the laboratory in Nelson Street.

The fee for this instruction is £1. 1*s.* per quarter, and the tickets are to be obtained of Mr. Coomber only.

Arrangements are also in the course of completion for the renewal of the monthly evening meetings that appeared to give general satisfaction in previous sessions.

The first of the series is announced for Friday, the 11th, when the President, Mr. Townsend, will deliver an address and introduce for discussion the subject of Pharmaceutical Education.

Proceedings of Scientific Societies.

ALUMNI ASSOCIATION OF THE PHILADELPHIA COLLEGE OF PHARMACY.

Edward Parrish.

An adjourned meeting of the Alumni Association and graduates generally of the Philadelphia College of Pharmacy was held in the hall of the college; Mr. C. L. Eberle occupied the chair.

The committee appointed on the 17th September to draft resolutions reported as follows:—

"At a meeting of the Alumni Association and graduates of the Philadelphia College of Pharmacy, held September 17th, 1872, the following memorial, expressive of our sad bereavement in the death of Professor Edward Parrish, was directed to be presented to the family of our beloved friend and teacher, towards whom our hearts are drawn in tender sympathy, who have been so suddenly bereft of their life-long companion and friend, and are stricken with a grief too full for utterance and almost overwhelming. We feel that there is not one here in this meeting, of those who have been privileged to sit under his instruction, who can but bear testimony to the great and almost irreparable loss which the profession and general community have sustained, and to the personal sense of a vacancy in the circle of our truest and dearest friends.

"To this community in which he has so long laboured, and maintained an untarnished reputation, where indelibly are written the marks of his earnestness, integrity, philanthropy and public spirit, his memory will long be green.

"The graduates and students of the College will sorely miss their genial, warm-hearted and fatherly teacher, who was so approachable, and so readily entered into sympathy with them in the difficulties that beset their paths.

"The profession over this broad land will acknowledge and deplore his loss, and wherever his professional merit has been recognized, or his name introduced, all must unite in regretting the dispensation that has removed him thus early from the field of his usefulness.

"But while we thus express our feeling of a common sorrow, we have the great consolation of all Christian hearts to know that he was calmly prepared for and anticipated the sad event, that he was surrounded by those who, while strangers, ministered tenderly to the necessities of his last illness, and, that soothed and sustained by an unfaltering trust, he approached his God "like one that draws the drapery of his couch about him, and lies down to pleasant dreams."

The above paper was unanimously adopted.

Parliamentary and Law Proceedings.

The New Licensing Act.

At the Royton Petty Sessions, Edward Whittaker, druggist, Shaw Lane, near Oldham, obtained a licence to sell liquors and sweet made wines. Subsequently Mr. Whittaker asked if he could keep his shop open for the sale of drugs during hours in which the sale of liquors was prohibited, as his was the only druggist's shop in the neighbourhood. The Bench refused to give him permission to do so.—*Manchester Guardian.*

Death from an Overdose of "Infants' Cordial."

An inquest has been held at the St. Stephen's Tavern, St. Stephen's Street, Salford, by Mr. F. Price, on the body of Samuel Riley, a child six weeks old, the son of Mary and Richard Riley, living at 26, King Street, Salford. On Wednesday afternoon the mother of deceased sent another daughter, about six years of age, to the shop of Mr. O'Brien, chemist, 1, Gravel Lane, to purchase a pennyworth of "infants' cordial." With the mixture printed directions were given, but, in consequence of the mother being unable to read, she did not know what was the proper quantity to give the child. About half-past three o'clock she gave the deceased, who had been a "cross" child from its birth, a teaspoonful of the cordial. At half-past seven o'clock the mother and child went to bed, and the mother soon afterward fell asleep. She awoke at one o'clock the next morning, and the child was lying dead by her side in bed.

The coroner asked Mr. O'Brien whether there was any recommendation by the Pharmaceutical Society with reference to medicine being supplied to children.

Mr. O'Brien said that he was not aware that there had been such a recommendation.

In summing up the evidence, the Coroner said that the mother of the deceased was evidently an ignorant woman. It was for the jury to say whether they believed that the child had died from an overdose of cordial. The deceased had had a teaspoonful of the cordial, while the directions said that a child of its age should only have from five to ten drops. If the jury were not satisfied that that had been the cause of death, he would adjourn the inquest in order that a *post-mortem* examination might be made. He might, however, say it was very difficult for traces of laudanum to be found in the body, so that the jury would perhaps not be in any better position were that to be done.

Several of the jury condemned the practice of chemists and druggists supplying medicine of a dangerous character to children without giving them verbal instructions, and were of opinion that such practice ought to be discontinued.

The jury, in returing a verdict that the deceased died from the effects of taking an overdose of "infants' cordial," recommended that chemists and druggists generally ought not to sell medicines of a dangerous character to children who are not old enough to carry a proper message to their parents.—*Manchester Courier.*

Obituary.

RICHARD STURTON.

The death of Mr. Richard Sturton, of Peterborough, Local Secretary of the Pharmaceutical Society, took place, after a short illness, on Sunday, September 29th, in his 39th year. The sudden and premature close of his life was a source of the most poignant grief to a large circle of relatives, by whom he was dearly beloved, while the high regard in which he was held by all who had the pleasure of his acquaintance caused a very deep feeling of regret when it was known that his career of usefulness had been ended.

He was in every respect a Christian gentleman, a thorough man of business, and an excellent pharmaceutist. He became a member of the Pharmaceutical Society in 1855, having previously studied in the laboratory at Bloomsbury Square, and passed the Major examination with honours. During the funeral, most of the houses of business in Peterborough were partially closed.

THOMAS ELLIS HOOKER.

It is with deep regret that we have to announce the decease of Mr. Thomas Ellis Hooker, for twenty years a member of the Pharmaceutical Society. He died at his residence at Sidcup, on the 28th ult., at the early age of 48. His knowledge of business was acquired in the establishment of Messrs. Randall and Son, of Southampton, and Messrs. Lea and Perrins, of Worcester.

Whilst living in the country he studied for the Minor and Major examinations, and passed them successfully without the assistance of teachers or classes.

From 1851 to 1867 he was in business at Wellington, Somerset. From his earliest years, however, science presented great attractions to him. To electricity especially he devoted much time and thought, and in the West of England he was well known as a lecturer on voltaic and frictional electricity, the induction coil, thunder and lightning, etc. His lectures were always highly appreciated, owing mainly to the large number of interesting facts he brought forward, and the illustration of almost every fact by an experiment, in the preparation of which he spared no cost or trouble. He invariably performed his experiments at home first, and thus ensured their success on the lecture-table. Where there was the slightest probability of a failure in any of them, he would repeat them before the lecture commenced, so anxious was he that not a single illustration should be wanting. Some few years since he relinquished the business for pursuits more directly connected with his scientific attainments, but subsequently returned to it, and for the last three and half years he held the position of manager in the dispensing department at Messrs. Allen and Hanbury's. In this responsible position he gained the sincere esteem and respect of all who were brought in contact with him.

Correspondence.

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

PHARMACEUTICAL EXAMINATIONS.

Sir,—In reading the letter of Mr. Frederick Andrews, upon the subject of Pharmaceutical Examination, printed in the Journal of the 14th ult., my attention was arrested by the statements that "it is sufficiently notorious that many incompetent men do manage to pass the Minor examination," and that the vigilance of our examiners is "being constantly and systematically evaded. I wish to ask Mr. Andrews whether he has well considered the meaning of these words and all which they imply. If so, I hope he will think with me that it is high time we had something more than such mere general statements to do duty as evidence. Since speaking with you on this subject the other day, I find another correspondent in your last number repeating, at p. 279, the statement of Mr. Andrews, and with the same vague generality. As strangely inconsistent with these statements, I may point to another which I remember to have been made less than twelve months since by Mr. Louis Siebold, of Manchester, to the effect that "nobody can bring himself to believe in the real unfitness of so great a number of men as are annually turned back;" and I for one, in the absence of some statement of facts to assist me, am unable to judge with which of these conflicting statements the truth lies, or whether both are wrong. Until such evidence is produced, perhaps it will be fairest to the examiners to give them credit for knowing their business.

QUÆRENS.

Errata.—In last number, p. 266, at foot of col. 2, Messrs. Flux's address should be, "3, East India Avenue, E.C.," instead of "3, East India Avenue Road." Page 278, col. 2, l. 1 from bottom, *for* "money lost" *read* "money cost; page 279, col. 1, l. 34, *for* "their own money" *read* "our own money."

"*Spofforth.*"—Want of care in preparing diluted hydrocyanic acid, will cause it to become coloured as you mention. Pereira states, "I have seen prussian blue formed and deposited after the hydrocyanic acid has been carefully distilled three times." We think that this is rarely the case with that found in the market at the present time. Aqueous hydrocyanic acid undergoes decomposition spontaneously by being converted into formiate of ammonia,

$$CNH + 2H^2O = CH(NH_4)O_2.$$

A little diluted hydrochloric or sulphuric acid is generally added to the medicinal acid by the manufacturers to prevent this.

J. A.—Iodide of potassium decomposes on exposure to the air, especially if the latter contain any mixture of nitrous acid or chlorine gases, as is frequently the case in dispensing establishments. The colorization is due to a little iodine being set free. Ozone produces a like effect. It is much more liable to decomposition if the iodide contain more than traces of iodate of potash as an impurity, which it often does.

G. L. (*Brixton Hill*).—Dissolve the bromide in half the water; having slightly powdered the quinine, add the remaining water to it, and mix with the bromide solution and add the spirit. If the bromide contain much free ammonia, some pure quinine will be precipitated and adhere like a resinous substance to the sides of the bottle.

"*One of the Unfortunates*" who, having been born too late to be registered for the "Modified," writes lamenting the grievance of having to pass the ordeal of the Preliminary examination before being admissible to the Minor, fails to excite our sympathy, or to convince us that the "peculiar hardship" under which he supposes himself and "numbers of others" to suffer, is one worthy of discussion in the Journal.

H. (Trowbridge).—The drug you allude to is probably *Guarana*, a sort of paste made of the seeds of *Paullinia sorbilis*, and remarkable for containing thëine. See a paper by Stenhouse in PHARM. JOURN., vol. XVI. (1857) p. 212.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. W. F. Barrett, Mr. G. H. Snell, Mr. H. E. Godfrey, Mr. P. Vincent, Professor Tuson, Mr. Rimmington, Mr. Abbott, G. C., T. H., A. P. S., J. R. C., "Elector," "A Chemist," "An Associate."

THE BOTANICAL ORIGIN AND CHARACTERS OF THE OFFICINAL RHUBARBS.

By the courtesy of Dr. J. Léon Soubeiran we have been favoured with the following extracts from a communication made by Professor Baillon, in the recent session of the French Society for the Advancement of Science, held at Bordeaux.

The fine officinal rhubarbs which are known by the names of Russian and Chinese rhubarbs, appear to be the product of a single botanical species, growing in Thibet, about the 40th degree of latitude, in deserts, which have usually been looked upon as vast plateaux of sand, but which are really inaccessible citadels, formed of superposed stages of perpendicular rocks, the craggy buttresses of which have been but seldom, and then with difficulty, scaled by Europeans. It was thence that about the year 1868 M. Dabry procured some stalks of the true officinal rhubarb. How he procured these plants is not known, but probably they were carried off by a Chinese workman from land devoted to the lamaseries, from which the common people are scared by terrible imprecations.

Boerhaave and Pallas, like the explorers of the Meikong in our own time, appear not to have known the true rhubarb except from the accounts of the dealers who transported it from Thibet, either to Kiatcha, the principal mart for it in Russia, or to China. Linnæus, however, was pretty near the mark when he wrote that the Asiatic rhubarb grew "*ad murum Chinæ*," although the real locality is doubtless further east. But it has long been known that the plant is furnished with palminerved or digitinerved leaves, which are deeply incised on the margin. This has induced authors to think that the finest quality of the Asiatic drug is produced by a species in the same group as *Rheum hybridum*, probably by *R. palmatum*. Guibourt also arrived at this opinion after having cultivated and studied in Paris all the species of *Rheum* which he could obtain. But M. G. Planchon has shown that the roots of *R. palmatum*, as they are found in Guibourt's collection, do not present the histological characters of the Chinese or Russian rhubarbs of commerce.

Hitherto but little attention has been paid to what is said respecting the rhubarb plant by the authors of the Chinese "Pun-tsaou," namely, that the leaves are "green during the first month, and that when well developed they are as large as a fan, and resemble those of the *Ricinus communis*;" also, that the stem is very large, one to two feet long, covered with a black bark, soft, humid, and containing a yellow sap-wood. These characters are very perceptible in a plant sent by M. Dabry to M. Soubeiran, in the putrified mass of which some shoots were found still intact by M. L. Neumann. These shoots carefully cultivated have produced some plants, one of which has flowered with M. Giraudeau, in the valley of Montmorency, and another is cultivated in the Garden of the Faculty of Medicine at Paris. It has there produced leaves of about a metre and a half in length, and of which the limb, a little broader than long, is orbicular, deeply five-lobed, and incised, cordate at the base, pale green, glabrous above, densely covered underneath by a fine white down, which does not alter the green tint. In the inflorescence, the bracts of about two metres in length, ramified, foliate, and bare at the summit, are surmounted by numerous cymes of whitish flowers, remarkable for the depth of their concave receptacles and the green colour of their disks. The aerial portion of the axis of this plant, for which the name of *Rheum officinale* is proposed, is a thick, short, ramified stem, whilst the subterranean portions are cylindrical, of small size,—therefore of little practical use,—and easily destroyed, from which cause it is rarely, and in but small quantity, imported into Europe. This is the reverse of what is found in the European rhubarbs, of which the fuller developed root is the part usually employed, together with a small portion of the stem. But in the Thibet rhubarb the part principally employed is the aerial stem or branches. Hence the peculiar characters of this drug as it is generally met with in commerce. It is characterized by its colour, smell and taste—found in the living plant from Thibet—and by the numerous starred spots which are observed in sections of certain portions. The pretended black bark which is removed in cleaning this rhubarb is nothing but a mass of leaf bases and of ochreas which cling to the surface of the stem. As the stems of *Rheum* which have been planted in France comport themselves as true sympods, on the surface of which there are not only leaves, but also axillary buds, it is not astonishing that these buds, separated from the mother-plant, readily develope adventitious roots, allowing of their easy reproduction. Thus the future is assured of a large number of stalks of this plant, handsome in an ornamental point of view, and susceptible of being successfully cultivated in France in the open air, where it has already supported a winter of 20°.

The radiated spots in rhubarb are really transverse sections, more or less oblique, of adventitious roots, which penetrate from the base of the root into the parenchymatous mass of the stem, where they appear as a pith of medullary rays, with triangular portions of parenchyma and wood interposed. This makes it practically possible always to distinguish the rhubarbs met with in commerce consisting of the cauline portions of the plant from those consisting of the root.

THE MICROSCOPE IN PHARMACY.

BY HENRY POCKLINGTON.

(*Continued from p.* 283.)

Turmeric.—This is a convenient place in which to notice the structure of turmeric so far as is sufficient to enable us to detect its presence in the form of powder in such articles as mustard, where it is a tolerably common adulterant. The general structure of the turmeric tuber is reticulate in cross section, with a few isolated vascular bundles of one to three barred vessels and enveloping wood fibres. The walls of the parenchymatous cells are thinner than those of ginger, the wood fibres are not so long, and apparently unpitted. The chief characteristic is the great quantity of the colouring matter contained within the cells of the parenchyma. This colouring matter appears to be dissolved in the nitrogenous cell contents from which it can readily be removed by maceration in water and glycerine, leaving the other cell contents pretty nearly uncoloured and withdrawn from the bounding walls of the cell. A more intensely yellow colouring matter is contained within special receptacula, large parenchymatous cells, and unpitted vessels. The starch granules can only be seen when the colouring matter has been wholly, or partially removed, and they resemble those of curcuma arrowroot rather closely.

Hassall says ('Adulterations Detected') that "on the application of iodine, the cells of turmeric become of a deep blue, and with potash, of a reddish colour." With iodine the *cell contents* become blue, this being in no way peculiar to turmeric, but the cells themselves certainly do not without the help of sulphuric acid. Potash also affects the colouring matter only. The action of sulphuric and sulphochromic acids is perhaps more interesting than that of iodine and potash. Immediately on the application of these reagents, the colouring matter changes to a rose pink of a rather unusual shade; a reaction which is not without its use in the examination of mustard.

Arnicæ Radix.—I shall describe the structure of the rhizome only.

Medulla.—Largely developed, and consists of parenchyma of the loose spongy type, its cells being either globose or hexagonal (in cross section) and very thin-walled. Starch in small quantities in minute ovate or globular granules is contained in a few of such of the medulla cells as are not filled with a dark brown, when dry almost black, colouring matter which rapidly dissolves in potash, and is of deep turmeric yellow in solution. The medulla is encircled by vascular bundles, oval in cross section, and consisting of liber tubes enclosed within pitted or barred vessels. Immediately outside this incomplete medullary sheath are well devoloped canaliculi, or secretory ducts of unusual size, and frequently in twos. The structure of these ducts is similar to that of the oil receptacula in the rind of an orange, figured in Balfour's 'Outlines' and many other books on botany. They are cavities bounded by a layer of somewhat compressed cells, and then by the ordinary cellular tissue of the cortical substance. The direction of the canals is not directly perpendicular to the cross section of the rhizome, but somewhat oblique. These vessels contain a dark yellow colouring matter, and are best seen in a thick section mounted as an opaque object. Their structure must of course be studied in the ordinary way. The structure of the cortical layers is not distinguished by any special features.

The minute structure of the barred vessels of the vascular system is rather interesting on account of their varied cohesion, and the distinctly present annuloid thickening of the vessels where the septa have been absorbed.

Valerianæ Radix.—The structure of the rootlets of valerian is simple. A largely developed cortical structure, consisting of large-sized angular cells, encloses a cylinder composed of barred vessels and wood fibres, none of which present any characteristic features. The cortical cells contain great quantities of starch granules, separate or in twos, rarely more, doubly refractive and with a distinct radiate hilum. The structure of the rhizome is much modified by the rootlets. Its cells are smaller than those of the rootlets, and are deeply stained by a dark yellow (or brown) fluid which is contained in the long liber tubes surrounding the abortive vascular sheath of the medulla. The plant is so easily obtained in a fresh state and readily examined that a further description here is unnecessary.

Iris Florentinum.—Orris root is occasionally used as an adulterant; a brief notice of it may, therefore, be useful here. The readiest way of preparing specimens for examination is to cut thin slices, and allow them to macerate in water for a few hours, when the starch-containing cells may be readily isolated. The root may also be reduced to fine powder, and thus examined in glycerine and in balsam. Examination of cross section of the entire root will be of little use for detective purposes, as it consists of little else than a very largely developed central parenchyma encircled with a single ring of vascular vessels, around which are the cortical layers. The cells of the parenchyma are large, irregularly shaped, and contain great quantities of starch granules. The vascular vessels are entirely of the common type and few in number. The same remark will apply to the wood fibres. Very large prismatic crystals are found in connection with the vessels, and are brilliantly doubly refractive.

The starch granules are the only components of the root with which it is necessary to become familiar. They are large, of tolerably uniform size, but rather varied in shape. The hilum is usually a longitudinal furrow, rarely radiate, and very rarely punctate. The general shape of the granules is oval, sometimes they are mussel-shaped, triangular and, when small, circular. The largest granules are flattened and somewhat concave. All of them give a cross, varied in character with the shape of the granule, when viewed by polarized light. A slide prepared by the rough and ready method of scraping a piece of root, and mounting the powder so obtained in Canada balsam forms a lovely polariscope object, from the presence of portions of the crystals just mentioned and wood fibre, all of which are doubly refractive, but differently. The crystals give good "rings." Amongst the illicit uses of orris root, Hassall mentions the adulteration of marmalade and snuff. I have not myself detected its presence in either.

CINCHONA PLANTATIONS IN BRITISH SIKKIM.

Tenth Annual Report by George King, Esq., M.B., *Superintendent, Botanical Garden, and in charge of Cinchona Cultivation in Bengal.*

I received charge of the cinchona cultivation in Sikkim from my predecessor, Mr. C. B. Clarke, on the 10th July, 1871. Since doing so I have had an opportunity of visiting the Government cinchona plantations both on the Nilgiris and in Ceylon, and, by the courtesy of the proprietors, many of the private plantations as well.

2. *Natural features of the Rungbee Valley.*—As none of the reports of my predecessors contain a description of the natural features of the Rungbee Valley, where the cinchona cultivation is conducted, it may be of advantage to the better understanding of what is to follow if I begin this report by giving a short sketch of these.

3. The Rungbee Valley* runs almost due west and east. At its western end it is shut in by a ridge of mountain more than 6000 feet high, in which the Rungjo stream has its origin. By its eastern extremity, which opens into the valley of the Teesta, the Rungjo stream escapes to join its waters with those of that river. Compared to its length, which is only about sixteen miles, it

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* The valley ought properly to have been named after the Rungjo, which is its chief stream; the Rungbee is but a small tributary of the Rungjo. The smaller stream has, however, been allowed to give its name to the valley, and it is too late now to alter the arrangement.

is a wide valley, measuring from crest to crest probably little less than four miles, but contracting towards its mouth. The southern side of the valley is formed in its upper (western) half by a high range continuous with Sinchul and not much inferior to it in height,* the slopes of which above the zone of cultivation are covered with a dense virgin forest of most luxuriant growth. About halfway down the valley, at a point called Mungoot, this high range curves away to the south-east, throwing out a low ridge called the Mungpoo spur, which running in an easterly direction forms the southern side of the Rungbee Valley along its lower (eastern) half. In the valley intervening between this Mungpoo spur and the main ridge, runs the Ryang stream. The ridge along the north of the Rungbee Valley is, on the other hand, low and pretty nearly clear of forest. Its western part is indeed occupied by the plantation of the Pomong Cinchona Association, which is separated from that of Government by the Rungjo stream. The Government plantation forms an irregular belt at the bottom of the valley and along its southern side, and has therefore a northern exposure. This belt extends from the margin of the Rungjo stream upwards along the slopes to a height above the sea of about 3500 feet. Cinchona cultivation was first begun by Government at the western end of the valley, on the piece of ground known as Rungbee Proper, and has gradually been extended eastward or down the valley. The eastern portion covers the ground locally known as Rishap, and, as will be subsequently explained, the extensions now being made are still eastward of Rishap.

4. The climate of the Rungbee Valley is peculiar. Being so completely shut in upon all sides, it is protected in a striking degree from wind, and up to the higher limits of the cinchona belt the air is rarely stirred by even the gentlest breeze—a state of things in striking contrast to that obtaining in the Nilgiris, where in exposed places great and permanent injury is done to the cinchona plants by the high winds. At the lower levels frost is completely unknown, and the climate is indeed subtropical; while on the higher southern and western slopes frost, and even snow, are the order of the day during the cold season. Occasionally heavy hail-storms pass over the valley, tearing to pieces the thin broad leaves of the red-bark trees. The mischief thus done is, however, rapidly recovered from. The rainfall is heavy, but not equally so in all parts of the valley. The warm, vapour-laden air passing up from the plains has its moisture condensed into clouds by the cool, high, forest-clad ridges that form the northern and western boundary of the valley, and for a great port of the year the higher parts of these are enveloped in a drizzling fog. Even at the driest season one is struck by the amount of mist which, condensed at the higher elevations, almost every evening creeps well down their slopes, while the whole of the opposite side and of the lower part of the valley continue quite clear. During the monsoon the rainfall on these high southern ridges must be very great. Some idea of its extent may be formed from the fact that at a bungalow standing in the south-western corner of the valley, at an elevation of only 5000 feet, and thus far below the crest, the rainfall for the year averages about 200 inches. At lower levels in the valley the rainfall is very much less, and no part of the Government cinchona cultivation is exposed to such a downpour. For example, at the Rishap plantation hut (2000 feet above the sea), where a rain-gauge has been kept for some years, the average is shown to be about 120 inches, and as the mouth of the valley and the Teesta are approached, the climate becomes very much drier. The northern side of the valley being itself comparatively low and cleared of forest, and being, besides, beyond the influence of the high ranges, shares in the drier climate.

* The highest peak of Sinchul rises to 8600 f. above the sea.

5. Now the greater part of the Government plantation lies under the high southern ridge just described, the drainage water of which consequently passes through it on its way to join the Rungjo. This drainage is carried off by numberless streams, most of which originate a good way up the slopes, but much of it also passes underground for a great part of its course, and comes to the surface only a short way above the Rungjo. Moreover, on becoming superficial a great deal of this water, scorning to be confined in channels, spreads itself over a considerable extent of ground and forms swamps. It is needless to say that in such places cinchona will not grow. The most disagreeable peculiarity about these swamps, however, is that they are sometimes unexpectedly formed at places which previously appeared quite dry. This is probably due to the extreme irregularity of the surface, to the inequality of the soil and sub-soil, and to the frequency of the enormous boulders, both superficial and underground, which have been rolled down the mountain-side by the action of the weather. But whatever the cause may be, the effect is that wherever one of these swamps is formed, any cinchona that may have been planted there dies out rapidly. Further down the valley, and below the point where the higher range bends away to the south-east and throws out the low Mungpoo spur as its eastern continuation and as the southern side of the Rungbee Valley, these conditions do not occur. The lower slopes there have not only a much lighter rainfall, but they have only their own drainings to get rid of, and are not required to transmit also that of a high forest-clad mountain extending several thousand feet above them. It is in these drier parts that the extension of the plantation made during the past year has been carried on.

6. *Condition of the plantation.*—The trees of red-bark cinchona (*C. succirubra*), of which the plantation mainly consists, are in my opinion in a state of health which on the whole may be considered as satisfactory. Many of the older trees are indeed extremely healthy and vigorous. Originally placed six feet apart, alternate lines of these have in some places been thinned out, and yet, standing at a distance, one is unable to detect where the thinning has taken place, so completely do the leafy heads of the trees hide the soil. Experience has shown that for the first year or two the plants grow slowly, but that as soon as their heads are large enough to meet and to give shade to the soil, they start away with great vigour. The reason of this lies in the tendency the plant has to throw out fine superficial rootlets, which ramify close to the surface of the ground, and for the very life of which protection from the sun's rays is necessary.

7. *Cinchona officinalis.*—The species yielding the crown bark of commerce has not answered well in any part of Sikkim; and so sickly were the plants at Rungbee during their visit in February 1871, that the Commission appointed to report on the plantation recommended the abandonment of Crown bark cultivation. A large proportion of the plants of this species have died out, and over almost the whole area of permanent *officinalis* plantation *succirubra* has been substituted. I am not without hope, however, that on drier spots than have hitherto been tried the species may yet be got to grow. Only 100,000 plants of *officinalis* are now returned as in permanent plantation.

8. *Cinchona calisaya.*—The plant yielding the yellow bark of commerce, and a sort second to none in value, promises to do well in Sikkim. From the difficulty of propagating this species artificially, the progress made has hitherto been slow. A few trees have, however, now begun to yield seed. This is scrupulously saved for sowing, and every effort is being made to extend the cultivation of this most valuable species, which with *succirubra* must be our stand-by in Sikkim. There are now about fifty acres of *calisaya* planted out, but I

hope before next year greatly to enlarge the area. It is interesting to note that whereas *officinalis* has done well in the Nilgiris, *calisaya* has hitherto thriven badly there, and is indeed now little cultivated.

9. Grey bark, although rich in the other alkaloids, is found to be poor in quinine. The cultivation of the species yielding it (*C. micrantha*, *nitida*, and *peruviana*), has therefore been practically abandoned for some years. The 29,000 old trees in permanent plantation look well, and are growing rapidly.

10. *Disease.*—In his evidence given before the Cinchona Commission in February last year, Mr. McIvor, Superintendent of the Nilgiri Plantations, gave rather an alarming account of a disease prevalent at Rungbee, and expressed it as his opinion that there were on the plantation at the time his evidence was taken (28th February, 1871), 100,000 plants at the age of from four to six years which would die before the end of the year, and that this disease would make the formation of a permanent cinchona plantation at Rungbee or Rishap impossible. The same gentleman has since entered into greater detail on this subject in a report addressed to the Madras Government, and which, having been noticed in an English scientific periodical, has apparently got into circulation in England.

11. Opinions of this sort, so strongly expressed by such an eminent cinchona cultivator, naturally led me to examine the whole plantation carefully and with some anxiety. Since doing so I have had the advantage of going over all the Government and most of the private cinchona gardens on the Nilgiris in company with Mr. McIvor, and I must candidly say I cannot agree with him in his gloomy views regarding either the present condition or probable future of the cinchona enterprise in Sikkim. The four to six-year old plants particularly referred to by Mr. McIvor have been most carefully watched. They form some of the best pieces of the plantation, and I am glad to say that at the end of March, 1872,—that is, thirteen months after Mr. McIvor's prophecy was made,—they were not only in life, but growing vigorously, and that the dreadful mortality predicted by Mr. McIvor does not seem even now to be impending. In his report Mr. McIvor enters on some calculations illustrative of his anticipations as to the small outturn of bark which will be yielded at Rungbee owing to this disease and to other causes; and concerning one of the finest plots of trees on the plantation he writes as follows:—

"On the thirty acres of red bark near the Rishap bungalow, already mentioned as being the finest and most uniform on the Sikkim plantations, each alternate row of plants was cut down when three and half years old. The produce obtained from these plants was 40 maunds (equal to 3200 lb.) of dry stem and branch bark. The quantity of bark on the trees left standing on the ground would thus be 40 maunds also. Previous to the alternate line of trees being removed, about 20 maunds (equal to 1600 lb.) of bark from thinnings had been obtained from the same piece of ground. I thus estimate that if these 30 acres had been entirely cut down, they would have yielded a total produce of 100 maunds or 8000 lb. of dried stem and branch bark, or 273 lb. per acre." Now these thirty acres were a few months ago carefully pruned and slightly thinned, and the bark obtained from the prunings and thinnings was daily weighed. It amounted to no less than 26,459 lb. when wet, which is equal to more than 8000 lb. when dry. In other words, the bark actually obtained in the course of an ordinary cultural operation, undertaken without reference to bark, and by which the trees are supposed to have benefited, is equal to more than twice the amount, which, according to Mr. McIvor's estimate, would have been got by cutting them all down for the sake of their bark. Nor has the pruning knife been used severely, for the ground on which the trees stand is still in deep shade from their spreading heads. Mr. McIvor prefaces his report to the Madras Government by saying, "I would respectfully call attention to the fact that I visited the Himalayan plantations at a season of the year when the plants are in the worst condition. My observations were made during a short stay and at an unfavourable time, and my impressions as to the condition of cinchona cultivation in the north of India might have been somewhat modified had my visit been made at a more favourable season." He advances his opinion, that "permanent plantations of these species (*C. succirubra* and *C. calisaya*) cannot be formed in British Sikkim," "with the deepest regret," and I have no doubt whatever will be very glad to learn that the two predictions concerning these plantations in which he enters on special details have not been fulfilled.

(*To be continued.*)

HEAT AND THIRST, AND SOME OF THEIR POPULAR ANTIDOTES.

(*By the Author of a "Report on Cheap Wines."*)

(*Continued from p.* 88.)

There are some personages of a dogmatical and categorical frame of mind, who are always perplexing their neighbours with classifications and distinctions, and who are pleased to draw a line between food and physic, or between food and stimulants. The difference, however, really lies in the application rather than in the absolute nature of things. A dietary should embrace all that is needful, not only for life but for health and comfort, and (above all things) for the exhilaration and enjoyment of soul and body; and this whether the circumstances be ordinary or extraordinary—in rest and idleness, or in great fatigue and exhaustion. Hence it is not enough for the quenching of thirst to have water merely. We want that which shall make water pleasant to the palate, and we may make it the means of introducing those supplementary and occasional forms of food which we vulgarly call physic.

In the shape of mineral waters, we have such things ready to our hands, whether they come from some "Deus," or "Melior natura," as Ovid says, or whether due to the fortuitous concourse of atoms. If medicine be a supplement to food, then it ought to be taken with food, if sufficiently palatable and congenial to the stomach not to interfere with the enjoyments of the table.

Of table waters in common use, it is unnecessary to reckon up the common soda-water and the real soda-water, such as is made by Ellis or Hooper, the common Brighton seltzer of the pastrycook and that which is made by scientific chemists, at Brighton and elsewhere. The German (real Nassau) seltzer-water is also well enough known, but not so much prescribed as it deserves to be, from its mild, soothing, milky, nourishing taste, and sedative effects on the throat and lungs. The objection commonly raised against these waters is, that they are debilitating, that they tend to wash people out. But it must be borne in mind that the most debilitated persons may be thirsty, that dryness at the mouth may be caused by tonics, and that the skin may be dry and unrefreshing and the kidneys overloaded, and that some such remedy as the seltzer-water, which unites the gently piquant with the sedative in an admirable manner, may make the patient very grateful to the practitioner who recommends it. Seltzer-water and milk, equal parts, suit well in cases of irritable throat-cough, acute bronchitis, etc. But it is not everybody that likes seltzer-water, and they who do may like a change, and no practitioner is ever the worse for two strings to his bow.

Amongst table waters of the decided alkaline sort, I need not mention the *Vichy*, which is a whit too powerful for general use. The *Vals* (*Précieuse*) is a delicious water—cool, sparkling, and light. The *Apollinaris* is remarkable for the tenacity of its aeration, so that, however exposed, it does not get flat. The *St. Galmier* is simply delicious. The *Condillac*, described on the label as "*la reine des eaux de table*," seems to be in great favour at Smyrna, Alexandria, and Gibraltar, and is a palatable, refreshing water. The *Schwalheim* water is highly diuretic; more so, it appears to me, than those of *Ems* and *Faehingen*, as imported. If I may venture to advise my medical brethren, it would be to study these waters as they would so many kinds of wine, and the only available way is to have a few bottles and drink them. They would then know instinctively what patients each was likely to suit.

The above waters are alkaline and aerated, containing chiefly bicarbonates of soda and lime, with minute quantities of common salt, iron, etc. But iron itself, in my judgment (if it is, according to the prevalent hypothesis, to act on the blood, and not merely as an astringent on the digestive mucous membrane, which is the truer explanation of its *modus operandi*), is best given at meals. A few drops of tincture of steel in a glass of cold water is not to be despised, but it has not the subtlety and virtue of a really good aerated iron water. The Spa water is hard, heavy, and headachy. As for the cold, flat English waters, as those of Tunbridge Wells, etc., practitioners on the spot generally prefer to give steel as a medicine. But of steel waters fit for table use at mealtimes there are three chief ones. The *Orezza* I have recommended to several patients labouring under diseases of chronic debility, who have described it as very exhilarating and tonic; the *Schwalbach*, less alkaline, highly invigorating; and the *Bussang* (which is said also to contain arsenic) may be recommended to any patient who likes to take his food and his physic at one operation.—*Medical Times and Gazette.*

THE ADULTERATION OF PALM OIL.*

BY CHARLES A. CAMERON, PH.D., M.D.
Analyst to the City of Dublin.

The fatty substance known by the name of palm oil is obtain from the pulp of the fruit of the *Elais guineensis*. Its colour is bright orange, and its odour somewhat resembles that of violets. It consists of a mixture of liquid and solid fats, and its consistency is, at 60 degrees Fahrenheit, about that of butter. The solid fat—the most abundant ingredient—is termed palmitin, and is a compound of palmitic acid with the hydrocarbon of glycerine. Palm oil is easily saponified, and enormous quantities of it are imported into the United Kingdom (chiefly from the west coast of Africa), to be employed in the manufacture of soap. This fat is also largely used in the manufacture of candles, and of compounds used for lubricating machinery. When fresh, palm oil melts at 80·6 degrees Fahr.; but after some time its fusing point rises to about 100 degs. Fahr.

Palm oil, hardened by the addition of tallow, is the material chiefly employed for the purpose of lubricating the wheels of railway carriages. Some railway companies pay several thousand pounds per annum for palm oil. The purity of this article is, therefore, a matter of considerable commercial importance. I presume that soap boilers, who are the chief consumers of this fat, are well able to judge of its purity, and are not likely to have an adulterated article palmed off upon them; but the managers of railways, whose attention is occupied by so many different matters, often, if not invariably, purchase, as pure palm oil, an article containing from 25 to 90 per cent. of foreign matter.

Some time ago the manager of the Midland Great Western Railway Company of Ireland sent me some specimens of palm oil and other greases for examination, and I was surprised to find in each of them a large amount of water. The following table contains the results of the analyses of these samples, and of a few others which I procured from different sources:—

Composition of Palm Oil and Waggon Grease.
100 parts of each contained—

No.	Name under which the grease was sold.	Fats.	Tar and matters insoluble in Ether.	Mineral matter.	Water.	Total.
1	Palm oil	96·60	0·78	0·22	2·40	100·00
2	Do.	97·00	1·40	0·44	1.16	100·00
3	Do.	33·40	6·30	0·08	60·22	100·00
4	Do.	25·13	5·99	0·08	68·80	100·00
5	Do.	39.00	3,40	0·12	57·48	100·00
6	Best do.	50·31	6·99	0·10	42·60	100·00
7	Best Waggon grease ...	74·64	20·12	3·12	4·12	100·00
8	Sir Wm. Rose's Infusible Waggon grease	69·43	11·23	1·40	17·94	100·00
9	Palm oil	10·11	15·80	0·66	73·42	100·00
10	Do.	19·21	6·89	0·32	73·58	100·00

No. 1 and No. 2 were obtained from the establishments of Messrs. M'Master, Hodgson and Co., Capel Street, and Leslie and Co., Bride Street, Dublin, wholesale druggists. The other specimens were sold or offered for sale to railway companies and other large consumers of lubricating grease. No. 7 and No. 8 contained a large proportion of tarry matter; and neither melted at a temperature of 160 degs. Fahr., showing that tallow entered largely into their composition. Two of the samples of palm oil appeared to contain horse grease coloured with annatto.

It is surprising how large a quantity of water could have been incorporated into Nos. 3, 4, 5, 9, and 10. The latter two contained very nearly three-fourths of their weight of water, whilst in pure palm oil there is only from one to three per cent. of moisture. Of really effective matter for lubricating purposes, No. 9 contained only ten per cent.

The following are the prices at which some of the more commonly used fats are at present sold per ton:—

Palm oil, from	£37 to £40.
Cocoanut oil	£32 to £36.
Cotton Seed oil	£26.
Horse grease	£32.
Australian tallow	£38 to £43.
Best tallow	£52.

The adulterated palm oil above referred to was sold at a much lower price than the genuine article commands, but still at prices considerably above their actual value. I believe the lowest price asked for any of the specimens of grease, the composition of which is given in the table, was £26 per ton. The actual money value of No. 10 could not have been more than £12 per ton at the very highest estimate.

Considerable injury must be occasioned to the "wearing parts" of the wheels of locomotive engines, and railway waggons, and carriages by the use of such spurious stuff as Nos. 3, 4, 5, 9, and 10 in the above table. If lubricated with such a poor material, the steel or hard parts of the wheels and axles would soon become highly heated, and after a time permanently soft. In extreme cases the metallic parts might become red hot by the continuous friction of dry surfaces. Under such circumstances, an accident might probably occur. Fortunately, the railway people generally prepare themselves a lubricating compound, by mixing palm oil with tallow; but even this mixture may prove to a great extent inoperative, if palm oil containing 70 or 75 per cent. of water forms the greater part of the mixture.

* Read at a Meeting of the Anti-Adulteration Society of Irealnd.

MEETING AT MANCHESTER.

A meeting of the pharmacists of Broughton and Cheetham was held at the Knowsley Hotel on Wednesday night. There was a good attendance. With the exception of a few who were unavoidably absent, all the pharmacists of the district were present. A resolution was passed recommending the entire closing of shops on Sunday, and, where practicable, at eight o'clock on other days. Reference was made to the Post-Office arrangements for the late collection of letters from receiving-houses, which often prevents early closing. An advance upon the retail prices in the Manchester list was also approved. It was suggested that at the next meeting the subject of Pharmaceutical Education should be discussed.

NORWICH CHEMISTS' ASSISTANTS' ASSOCIATION.

The annual supper of the above association was held at the Rooms, on October 10th; the President, Mr. A. Hill, occupying the chair.

There was a fair attendance of members. After the usual loyal toasts, the Chairman rose to propose the health of the Vice-President, Mr. E. Nuthall, and at the same time stated that he had the pleasure of asking his acceptance of a despatch-box, subscribed for by the members of the association, in token of their esteem; and also of gratitude for the kindness and untiring energy which he had displayed in conducting the affairs of the society. Mr. Hill said further that Mr. Nuthall had founded the association, and it was mainly due to his great exertions that it had prospered.

Mr. Nuthall made a brief reply in acknowledgment, and the remainder of the evening was spent in proposing various toasts, which were pleasantly interspersed with songs by a few of the members.

LEEDS SCHOOLS OF ART AND SCIENCE.

On Monday, October 7th, there was a large gathering in the picture gallery of the Mechanics' Institute, Leeds, the occasion being the distribution of prizes to the successful pupils connected with the Leeds Schools of Art and Science. Sir John Pakington, M.P., presided, and in opening the proceedings said that there was no use mincing matters, but, no doubt, partly from their insular position, and partly from the habit Englishmen had of entertaining rather a good opinion of themselves, they in their pride were formerly unconscious of the ignorance which was a disgrace to the people, and which was not only a disgrace, but was interfering with and marring the material welfare and prospects of the country. He alluded to the spread of mechanics' institutes throughout the country; and said that where, as in Leeds, the commerce consisted of a great variety of manufactures, he was convinced that nothing could be more likely to promote those manufactures and make them creditable to the locality and beneficial to the people engaged in them than the cultivation of art and science.

CANON KINGSLEY ON LECTURE TEACHING.

As President for the year of the Birmingham and Midland Institute, the Rev. Canon Kingsley delivered the inaugural address on Monday, October 7, before a numerous audience. The address was a very important and suggestive one, and contained the following remarks upon the extent to which attendance at lectures is of service to the student:—

"The student, if he wished to diverge from the narrow ruts of an old-fashioned grammar-school curriculum, had to find his way for himself; to search for himself for facts, for books which might contain the facts he needed scattered up and down in them. Probably he never found the books he needed; too probably, also, the books did not exist—certainly not the school books; and if he found them he had to arrange and to infer for himself, with what mother wit he might possess, while they now had all, and more, done ready to their hand than he in his youth could do for himself, or even get done for him. Other men had laboured, and his dear young hearers were entering into their labours. If they asked his friend Professor Henry Morley how he got the materials for those lectures on English literature, in which he, above any man in England, had the right to be heard —lectures at which he would gladly sit at his feet as a disciple, and which moved in him as much energy as he was capable of; if they asked him, he said, how he came to know all that, he might be too modest to answer them, but he (Canon Kingsley) would answer for him—not by other men's speech, but from his own work; not by attending lectures, though he might have done that and profited by them, but by that which alone could make lectures profitable to him—by honest private toil, by long and careful study of the documents themselves, by deliberate and original thought about them, spread, he doubted not, over many years. The once famous Sir Nicholas Grimcrack, who tried to teach himself to swim by lying on his dinner table, and striking out in imitation of the frog in his basin, taught himself at least the attitude of swimming; but by merely attending lectures they would not teach themselves even the attitude necessary for their subject—the attitude of mind by which the facts were discovered, by which they must be understood, by which they must be turned to use—they would not acquire the inductive habit of mind which arranged and judged of facts. Still less, therefore, would they acquire the deductive habit of mind which made use of facts after they had been arranged and judged, and the lecturer would be to them but a sort of singer, a player upon a fiddle, who made for them pleasant and interesting noises for a while, producing mere impressions, which never sank into the intellect, but merely touched the emotions, to run off them, at the first distraction, like water off a duck's back. He would therefore advise his younger friends to remember this for themselves in this age of periodical literature and learning made easy,—that we were all too apt to forget that we must work for ourselves; that good lectures, like good reviews, were not meant to see for us, but to teach us to use our own eyes; and those they must use at home, in hard study, personal study, continuous study—and study, too, rather of one subject than of many subjects, in order that, by learning how to learn one thing thoroughly, they might learn how to learn anything and everything else in its turn. If the students would bear in mind this homely saying of his, they would find, he doubted not, their admirable programme of lectures and classes as useful as it was comprehensive."

EARLY CLOSING IN BALLARAT.

A meeting of chemists and druggists, and their assistants, was held at Lester's hotel, Ballarat, on the 10th June, at 10 o'clock P.M., to consider the feasibility of shortening the hours of business. The strongest argument that could be advanced in favour of the reform was, that their time of meeting, and the close of their deliberations, extended beyond our usual time of going to press. At the latest moment we learn that extracts from a leading article of the PHARMACEUTICAL JOURNAL, by Mr. Giles, of Bristol, were read, and reports of the movement in the different towns in England; and it was resolved that, on and after the 1st August, the chemists and druggists of Ballarat should be respectfully requested to close their shops at nine o'clock, the public to be duly notified by advertisements in the daily papers of the change, so that no vexation or disappointment should be caused. Cases of emergency to be attended to as usual. The hon. secretary, Mr. Chamberlain, was instructed to obtain the signatures of all who were prevented from attending the meeting, and to notify them of the unanimity and necessity which existed in the movement. He was also instructed to notify the change to the public.—*Ballarat Courier.*

The Pharmaceutical Journal.

SATURDAY, OCTOBER 19, 1872.

Communications for this Journal, and books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Elias Bremridge, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PATENT MEDICINE LICENCES.

A correspondent has directed our attention to the "great injustice" he and others similarly situated labour under from the present state of the law with respect to the rates of licence for the sale of patent medicines. It may be of service, therefore, to indicate what the law on the subject actually is, and what are the regulations under which these licences are granted.

There are no less than three rates of licence for makers or vendors of patent medicines—

	£	s.	d.
The cities of London, Edinburgh, and Westminster	£2	0	0
Within the limits of the twopenny post	2	0	0
In any other city or borough, or in any town corporate	0	10	0
In any other part of Great Britain	0	5	0

These rates of licence have been in existence for many years, but it is questionable whether there is any good ground for continuing the special rate of licence for places within the range of the twopenny post. This range is not very well defined; and it is not very evident what equivalent advantages it presents to a dealer in patent medicines that he should be compelled to pay for a licence four times as much as is paid by a chemist in any town in England. There is perhaps no great hardship in compelling a chemist in a corporate town, city, or borough, to pay ten shillings for a licence, whilst a person in a smaller place pays only five shillings, because it may be supposed that the business of the latter will, as a rule, be much more insignificant than that of the former. For the sake of simplicity, however, it would be much better to have one uniform rate of licence, and we think this change would be an advantage both to the Revenue authorities and to the vendor of patent medicines.

As long as these rates of duty are legal, such anomalies as those mentioned by our correspondent must exist; on the borders of cities, boroughs, and corporate towns, there will be cases where chemists within the boundary will pay the ten shilling licence, and others just outside will only pay five shillings; similarly, those immediately within the limits of the twopenny post will pay £2, whilst those just outside will also pay ten or five shillings, as the case may be.

It matters not how many shops may belong to one person, one licence will authorize the sale in them all, if notice be given to the Revenue authorities when the licence is taken out; but it must at the same time be distinctly borne in mind, that if one shop is so situated as to be liable to a higher rate than the others, such higher rate must be paid for the general licence. Under this regulation, our correspondent has to pay a licence of £2 for two shops, because one is within the limits of the twopenny post, and, therefore, he must pay the higher rate of duty.

The publicity given to the subject in the Journal may possibly direct the attention of the Revenue authorities to the present anomalous state of the laws regulating the granting of licences for the sale of patent medicines; and we hope it will not be necessary for further action to be taken to induce the Legislature to deal with the subject. A suggestion has been made by our correspondent to abandon the present rates of licence duty, and to substitute in lieu thereof a uniform rate of duty just sufficient to raise the same amount of revenue as is obtained under the present laws, which average rate would be about eleven shillings. For our own part we should be inclined to agree with that suggestion, so far as the equalization of the rate for licences is concerned, but we would at the same time suggest that it would be advisable to adopt the present higher rate of £2 for all licences, or at least some approximation to that sum, rather than the lower rate mentioned by our correspondent. We believe such a course would be conducive to the interests of the chemist and druggists, inasmuch as it would tend to prevent the now very general sale of patent medicines by booksellers, grocers, and hucksters, and transfer it to the hands of those who are legitimately entitled to deal in the potent drugs frequently contained in the preparations sold under stamp.

In connection with this question we may mention that the 'Medical Times and Gazette' has recently urged that in view of the prosperous state of the revenue, an attempt should be made to induce the Chancellor of the Exchequer to repeal both the stamp duty on proprietary medicines and the excise duty on medicine vendors. It is of opinion that no tax inflicts so much injury on public health and morality, since for less than £100,000 per annum the nostrum purveyors are enabled to vaunt that they carry on their trade "under Government patronage," or "protected by a Government stamp." We cannot agree with our contemporary in the opinion that the abolition of the duty would at all restrict quackery.

THE EARLIER CLOSING MOVEMENT.

In referring again to the Earlier Closing Movement among pharmacists, we are glad to be able to report that it is still making considerable progress. We learn that several pharmacists at the West End have commenced closing their shops at eight o'clock on week days, and keep them entirely closed on Sundays. The chemists and druggists of Lewisham, Blackheath, and Lee, also, having unanimously agreed to close their shops at eight o'clock (Saturdays excepted) after October 21, have issued a joint notice to their customers to that effect, bearing their signatures. A similar resolution has been arrived at by the chemists and druggists of Camden Town and Kentish Town. In Manchester, the pharmacists of Broughton and Cheetham have decided not to open on Sundays, and, where practicable, to close at eight on other days.

But perhaps the most remarkable instance of the spread of the movement is to be found in the fact that the chemists and druggists of Ballarat, induced by the example of their brethren in this country, and especially by an article which appeared in this Journal, are also attempting to arrange for a shortening of the hours of business.

We hope that in order to obviate any possible desire to recede from this attempt to educate the public into sending earlier for their medicines, etc., this movement on the part of the principals to curtail the hours of business will be fittingly responded to by the assistants and apprentices, by their making good use of spare time to prosecute their studies, and thus disproving fears that have been expressed upon the matter. We cannot do better than recommend them, and all connected with pharmacy, to read attentively Mr. Stoddart's most excellent Inaugural Address, delivered on the Opening Meeting of the Session, and endeavour to carry out his admirable suggestions.

THE NEW ADULTERATION ACT.

The carrying out of the provisions of this Act as to the appointment of analysts has been as yet but very partial. Probably it will be necessary to wait some little time to allow local authorities to move in the matter; but if the Act is eventually to become anything more than a dead letter, it is probable that the superior powers vested in the Secretary of State and others will have to be exercised; and those who wish to make the Act operative by the appointment of public analysts will meanwhile have to use their influence to secure that end.

At Liverpool the Local Government Board have appointed James Campbell Brown, D.Sc., as public analyst, and a prosecution for adulteration has already resulted. In Bolton, where Mr. John Collins has been appointed public analyst, the Act is being put into force, as we are enabled through the courtesy of Mr. Dutton, to report at p. 317. It is also stated that a public analyst is to be appointed at Glasgow. On the other hand, an application to the Bermondsey Vestry from the local Master Bakers' Association to carry out the provisions of the Act has been received with laughter, and the Clerkenwell Vestry has decided not to appoint an analyst. This, as far as we are aware, is all that has yet been done in the matter, but we shall be glad to receive information from any of our readers concerning further appointments or prosecutions under this Act.

Transactions of the Pharmaceutical Society.

EXAMINATION IN LONDON.

October 11th, 1872.

Present—Messrs. Allchin, Barnes, Carteighe, Cracknell, Davenport, Edwards, Gale, Garle, Haselden, Ince and Linford.

Dr. Greenhow was also present on behalf of the Privy Council.

Modified Examination.

Forty-five candidates were examined; of these, *fifteen* failed. The following *thirty* passed, and were declared qualified to be registered as Chemists and Druggists.

Appleby, William .... Scarborough.
Atkinson, Robert John .... Sheffield.
Betts, William .... Newtown, Gosport.
Boorman, Charles John ...... Manchester.
Bowen, John Thomas .... High Wycombe.
Bratley, William .... Gainsborough.
Calvert, Edwin Archer .... Brighton.
Clutterbuck, Samuel Richard .. Birmingham.
Coke, Richard Sweet .... Swindon.
Davies, Charles Edward ...... London.
Daymond, Samuel .... Tavistock.
Donston, William .... Woodhouse.
Furniss, Thomas .... Halifax.
Houseman, Alfred Hodgson .... Tunbridge Wells.
Hughes, John Henry .... Holywell.
Johnson, Edward .... Southport.
Jones, Owen .... Litherland.
Kay, John .... Crewe.
Lambert, George Pitt .... Brompton Road.
Leithead, John Henry .... Chester.
Markham, John, jun. .... Reigate.
Miller, William Edwin .... Liverpool.
Moate, Benjamin .... Lincoln.
Penrose, Thomas Samuel ...... Launceston.
Prentice, Charles William .... Shrewsbury.
Sharpley, Samuel .... Sheffield.
Smith, Henry, jun. .... Wellington.
Spinney, Frank .... Bournemouth.
Strachan, James .... Aberdeen.
Taylor, Isaac .... Doncaster.

Preliminary Examination.

Certificates, as under, were received in lieu of this examination:—

Certificates of the University of Cambridge.

Need, John .... Great Malvern.
Standen, Peter .... Ironville.

Certificates of the University of Durham.

Nicholson, Walter Joseph ...... York.
Umpleby, Samuel Sayer ...... Harrogate.

Certificates of the University of London.

Greenish, Henry George ...... London.
Pumphrey, John Henry .... Evesham.

Certificate of the University of Oxford.

Morris, John Quarles .... Bristol.

Certificates of the Society of Apothecaries.

Dent, Francis A. .... Holloway.
Vickery, Alice .... Camberwell.

Certificate of the College of Preceptors.

Bray, Ernest Edward .... London.

N.B.—The list of successful candidates at the Preliminary examination held on the 7th instant, will be published in the next number of the Journal.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL STUDENTS' ASSOCIATION.

On Thursday, October 10th, a meeting of assistants and apprentices of chemists and druggists in Sheffield was held in the Music Hall, Surrey Street, for the purpose of inaugurating a society to be called "The Pharmaceutical Students' Association." There has been a great want of a society of this kind, and it is to be hoped that the efforts of the founders may be successful in benefiting educationally the young men, and also prove conducive to the welfare of the trade generally. Upon the proposition of Mr. Hollinrake, seconded by Mr. Thompson, Mr. E. R. Learoyd was unanimously appointed president, Mr. James Appleton being elected secretary and treasurer. A general committee was also formed. Mr. Bradwall has kindly consented to give the opening paper of the session.

BRISTOL PHARMACEUTICAL ASSOCIATION.

The first general meeting of the present session was held at the Philosophical Institution, Queen's Road, on Friday, October 11th, under the presidency of Mr. C. Townsend. There was an average attendance. It had been announced that the president would introduce the subject of pharmaceutical education, with the view of eliciting from the members of the association an expression of opinion thereon.

The President, in introducing the business, said he was glad to meet the members and students at the commencement of another session, which he hoped would be even more prosperous and harmonious than the one before.

The minutes of the last meeting having been read and confirmed,

The President delivered the inaugural address as follows:—

The council of your society having in a moment of weakness re-elected me as president, it becomes my duty to open our fourth session. But, in place of the usual address, it has been thought well that this evening should be devoted to the consideration and discussion of the one question which is of the most vital importance in the future of pharmacy; which lies at the root of all success, and will become, accordingly as it is dealt with, either a source of strength and vigour, gathering fresh life and energy for us every year, or a rock of danger and ruin upon which we may, if we are not wise and cautious, find ourselves in a wreck of almost hopeless and helpless confusion.

It is not too much to assert that, upon the treatment of the question of Pharmaceutical Education in the present crisis will depend the entire character of pharmacy for the next half century; a mistake may prove fatal to all our brightest hopes; a wise decision, carried out with breadth and firmness, will win for us the respect of the whole trade, by degrees remove the prejudices of those who now would willingly stand aloof, and will lay the foundation, strong and firm, for a future of gradual and wholesome progress.

In introducing the subject for discussion this evening, I propose very briefly to recall to your attention some of the most important and prominent opinions which have already been expressed, notably at, and subsequent to, the meeting of the British Pharmaceutical Association at Brighton in August last. These may be fairly taken as representative of the various phases of thought in the matter throughout the kingdom, and will clear the way for a better understanding as to the position in which matters now stand. And the first point which comes out is, that it was the idea and intention of the founders and early supporters of the Pharmaceutical Society that it should be and should continue to be an educating body; and that as time progressed, local and provincial schools of pharmacy should be established. Then, according to Dr. Attfield (and I see no reason to doubt his conclusions), there has been, since 1868, a large and most unhealthy increase of cramming for the Minor examination,—the result doubtless of the desire upon the part of large numbers of applicants whose early education has been defective to qualify themselves to enter into business. This is to be deplored, but might reasonably have been expected under the circumstances; and the remedy for this appears to be a more severe Preliminary examination in the future, and the compulsory requirement that the applicant shall have attended a course of lectures upon chemistry and botany, with some recognized teacher or school (not necessarily in any way connected with our Society); and last, but by no means least, that he shall have spent two, three, or four years with a chemist and druggist, or pharmaceutical chemist. All the laboratory instruction, course of lectures, and other aids to scientific knowledge, absolutely necessary as they are, will never enable young men to dispense with that practical knowledge which can only be gained at the counter and in the dispensary at home.

If it were possible to prevent any chemist taking an apprentice who had not passed the Preliminary examination, I would go as far as this in the future. The fountain must be kept bright and clear if we are to have a pure and healthy stream.

Passing on, you will find several schemes proposed for the establishment of either technical schools in the provinces or local schools of pharmacy to be aided more or less by the parent Society; and Dr. Attfield himself suggests the establishment of residential halls in connection with such schools. My friend Mr. Schacht has, as you are aware, himself proposed a scheme which has met with more approval than any other, and since he is, I am happy to say, present here to speak for himself, he will enlighten you on this part of the subject far more than I can do. A late President of the Society, Mr. Sandford, dissents from Dr. Attfield's conclusions that the Society was originally intended to be permanently an educating body, and protests against the conclusions that it was to become "a vast charity for the education, not of the children of chemists, but of all those lads whose parents might in future claim to make them chemists." Doubtless the founders had no intention to form any such permanent charity; and as Mr. Sandford points out, the London schools having established the fact that they can be made self-supporting, all other schools must, if they are to last, be ultimately made self-supporting also.

Mr. Sandford proposes to grant aid to such provincial schools as prove themselves to be working in the right direction, and this unfettered either by special details or by payment for results, until they are able to stand alone.

The most important contribution to the discussion of the whole question is the paper by Professor Redwood, published in the Journal of September 28th.

I will endeavour to indicate its chief points. Strongly urging the need of an early passing of the Preliminary, the Professor thinks that young men of average ability, having the acquirements necessary for this examination, ought in a three or four years' pupilage under a competent master, either with the aid of systematic instruction by classes and lectures, or without that aid if the pupil be properly guided in his studies, successfully to prepare for the Minor. Considering that there may be some gradations in the needed qualifications for a chemist and druggist, suitable to different circumstances, Professor Redwood yet believes the present minimum qualification to be sufficiently low, and our present arrangements defective and insufficient even for the accomplishment of what the law demands; advocating the establishment of schools where in every case provision should be made for complete and thorough instruction in all knowledge required for the highest qualification in pharmacy, and urging that these schools should be all self-supporting, and not mere sucklings of the parent society.

Remembering also that the contemplated education in the future is for all, whether connected with the Society or not; that scientific knowledge is now absolutely requisite; that in the past and as an experiment, education has been supplied by the Pharmaceutical Society at a merely nominal charge, as the only means to give it a fair trial; but having now been tried, approved, and sanctioned by law, Professor Redwood considers it ought in the future to be paid for by those to whom Parliament now exclusively entrusts the practice of pharmacy.

He also thinks that to subsidize schools is unwise, and that their present weakness is in the insufficiency of fees charged to students, and that all occasion for thus cheapening education has ceased.

In place of this he proposes to endow such schools as are required, and argues that this is strength, when a subsidy is weakness. He would not alter the constitution of the Board of Examiners, believing it to be the fittest for its purpose, and also that it would be a mistake to endeavour to suppress superficial training by giving the examination a higher and more scientific character.

In view of more work, Professor Redwood proposes the addition of assessors to the Board; considers that examination is now the all important work to be accomplished by the Pharmaceutical Society, and that it should apply its available means principally in this direction rather than in that of education.

Very hastily and imperfectly, gentlemen, I have endeavoured to sketch an outline of opinion on this vexed question. I must say that for myself I do not see that any sufficient reasons have been given to prove that it is the duty of the Pharmaceutical Society, permanently to grant pecuniary help for educational purposes, either in the Metropolis or in the provinces, but I am nevertheless of opinion that for a time, and in the present stage of matters, aid to establish schools should be given when it can be proved that there is a reasonable prospect of their being efficiently maintained; and that our future safety and stability lies in a strict and compulsory preliminary entrance examination, and in ultimately raising the standard of examination to that of the Major. Any permanent system for granting pecuniary help to schools or pupils in town and country, either in the way of payment for results, or by cheapening education, will, I believe, only weaken our strength, and lower the level both of men and their attainments; and I look forward to the time when every school, both in London and the provinces, shall be independent and self-supporting, and the Pharmaceutical Society of Great Britain shall become chiefly, if not wholly, an examining body.

Before I close I feel that I ought to make some reference to our Bristol Society. The report published in July proves that we have not been idle; every one of our students who went in for examination passed, and for the second time a Bristol student has been honoured by a Queen's Medal. With more than three-fourths of the whole of the trade in our city members of our society, and with a large number of earnest and industrious students, we may claim to have evinced a practical interest in the educational movement second to no provincial city or town; and it is a source of great gratification to feel that Bristol is represented at the Council Board by two gentlemen who are not its least distinguished members.

Let me say one word in conclusion to our friends, the students present. You have many of you done well, but do not, I pray you, depend upon mere book knowledge; do not think that an attendance upon so many lectures is all that you need. Learn to distinguish between *knowledge* and *wisdom*,—between a mere collection of facts, or of principles which you do not know how to use or to apply. Remember that all you can gain now is only a stepping-stone to new and unexplored fields of information.

Charles Kingsley wisely said the other day that "lectures were but intellectual dissipation unless supplemented by work and thought at home;" and you will find all you now know pass from you like a dream unless you are willing to educate yourselves, and to turn to profitable account the active principles which are given you to manipulate.

> "Knowledge and wisdom, far from being one,
> Have oftimes no connection. Knowledge dwells
> In heads replete with thoughts of other men;
> Wisdom in minds attentive to their own.
> Knowledge, a rude, unprofitable mass,
> The mere materials with which wisdom builds,
> Till smoothed and squared and fitted into place,
> Does but encumber what it seems to enrich.
> Knowledge is proud that he has learned so much;
> Wisdom is humble that he knows no more."

I now beg to call upon Mr. Schacht to move a resolution of which he has given notice.

Mr. G. F. Schacht said that though he had prepared a resolution he had endeavoured to frame it so as to limit as little as possible discussion on the matter. In common with the President he hoped most sincerely that this evening's discussion would be such as to elicit every gentleman's ideas on the subject. But although he hoped that the expression of opinion would be ample, he wished to be allowed to say that his special attention having been given to the subject since he had the honour of being a representative, he had been brought to the conclusion he was not quite prepared for a few months ago, that, as public opinion upon the matter appeared to be so indefinite, it would be unwise in the executive of the Pharmaceutical Society to adopt at the present moment any scheme whatever. He was in hopes that their discussions would gradually lead to something like a crystallization of ideas around a few central doctrines, and then action might be taken with more hope of useful result. It was in that hope he had preluded his own scheme with three "principles," and in the same hope he now introduced his resolution—

"That in the opinion of this association it is desirable that scientific pharmaceutical education throughout the country be promoted by the Pharmaceutical Society of Great Britain, and be assisted by its funds; and it declares its hope that the attention of the entire pharmaceutical body will continue to be directed to the subject until a generally satisfactory scheme for the distribution of that assistance can be devised."

That resolution he thought was sufficiently vague not to tread on the corns of any one who had a pet project; but it asked a distinct verdict upon the principle their President had already alluded to, and which lay at the bottom of the whole concern, whether or not, it is desirable that the Pharmaceutical Society of Great Britain should take on itself any responsibility in this matter. A good many opinions had been offered, more or less bordering on the position that the Pharmaceutical Society had better leave the whole question alone; and an endeavour had been made to get quit of the question by contending that the Society should confine its attention to the examinations and the distribution of the Benevolent Fund. Now, he thought they should look this position straight in the face and see what it involved. The Pharmaceutical Society had been established something like thirty-one years, and through all its course up to the present time, whatever had been the theory of its founders, one thing was quite clear, that the managers of the institution had decidedly adopted the course of educating or promoting education. That they had done so in a very unmistakable manner was proved not only by the large number of students who had received the benefits of the institution, but also by their having spent an enormous sum of money on education—a sum amounting to over £100,000.

The President: Is that the gross sum expended?

Mr. Schacht: Yes.

The President: The receipts from students were not equal to that.

Mr. Giles: That is not the balance of expenditure over returns.

Mr. Schacht said he quoted it as the gross expenditure of the Society in this direction, and his contention was that—so large an expenditure could not have occurred unless the principle of which he was speaking had been adopted. If the Society's duties were now declared no longer to include an educational department, a large portion of their invested funds would become unproductive capital; it would involve the necessity of dismissing their professors; handing over the institution in Bloomsbury Square to the highest bidder; discontinuing all connection with the Pharmaceutical Journal—another great means of instruction—and then, perhaps, they might reduce the subscriptions of members to, say 2*s.* 6*d.*, which indeed would be quite sufficient. He thought that would be a somewhat revolutionary proceeding, though it need not frighten them; it was a perfectly logical position, and one for which a great deal might be said. There was another idea which he was sorry to say had received a considerable amount of support. Many who seemed to go with them so far as to think it would be a mistake, certainly at present, to close the connection of the Pharmaceutical Society with education in the abstract, dissented from them when they ventured to move it out of the establishment in London. The position thus assumed appeared to him to be much like this,—they admit the right and duty of the Pharmaceutical Society to educate, but endeavour to concentrate all their power in strengthening and fostering education at the central establishment only. In his opinion this was open to greater objections than the other doctrine. For himself he declared distinctly that it was the duty of the Pharmaceutical Society to do the best it could to assist education. It was right and proper for the Society to do so if on no other ground than that they had gone to Parliament announcing a certain standard of qualification, and obtaining a legal power to refuse the right to practise in the trade to all that failed to reach this standard. Therefore, they should be prepared to show that they had made corresponding efforts to supply the opportunities for the acquisition of those qualifications. Another set of arguments was what might be called the confederacy line of argument, and ran somewhat in this direction: It was said, let the pharmacists teach their apprentices themselves and cease to look to the Pharmaceutical Society for aid in so doing. No doubt a very large number of masters were qualified to teach their apprentices the sciences as well as the practical management of the shop. But it might not be convenient nor advantageous for them to do so, and it struck him that the best qualified men in the business would find it more to their own and their pupils' interest not to undertake to teach them the two sciences of chemistry and botany, but to provide this teaching for them away from home. Again, the entire income and power of the Association were gathered from the length and breadth of the land, and by the abstract rule of right and justice, its benefits should be dispersed on an equally broad principle. To gather from the many and lavish on the few,—to develope high scientific culture in a few, and to leave the many uncared for,—must be wrong under any circumstances, and especially wrong in the case of an organization that had itself set the standard of legal qualification. They could all rejoice in the fact that men like Professor Redwood, Professor Bentley, Professor Attfield and Dr. Tilden had sprung from their body, but they ought rather to rejoice could they succeed in elevating the average chemist and druggist by such an education as would enable him to pass the required examinations creditably. Whether they agreed with him remained to be seen by the vote he asked them to give; and allowing him for one moment to suppose that they did, he would pass on for a few minutes to the question they were necessarily thinking of, viz., the next step in the process. Supposing it granted that the Pharmaceutical Society ought to promote scientific education amongst the trade generally throughout the country various methods suggested themselves. Their President had briefly but with very good judgment summarised the general opinions on the subject. Briefly, there was the process advocated by Professor Redwood, which, seeking for a word to characterize it, he should call the process of endowment. Then he thought there were only two alternative schemes, consisting of that generally recognized as proceeding from Mr. Reynolds, and that which bore his own name, and which he would call, for distinction sake, payment for results. It seemed to him that the notion of endowment was, with all respect to its origin, a professor's idea completely, and one which he did not think would be generally acceptable to the other side of the community, for in the first place they had no stock from which the endowments could come. The funded property of the Pharmaceutical Society amounted to a few thousands—£14,000. £100 per annum represented £3000 so that £14,000 would not go far in endowments. In the next place having endowed, they parted with all management of the fund. Possibly this difficulty might be in part met by a carefully devised project, but the chances were that having parted with their money they would lose all control over it; and in what respect, supposing the scheme to be well conducted, it excelled that of subsidizing, which the Professor regarded in such an unfavourable light, he could not imagine. Subsidizing left untouched the capital—its resources were the current income of the Association, and as long as the Association lived it came in, and when it died its duties died with it. Subsidizing too presents this argument, that it need not be given unless it be supposed to be earned; you give on the year's experience, while if you endow you give for fifty years hence, of which time you know nothing and can form no opinion. As regards Mr. Reynolds' scheme, it was a kind of multiplication of Bloomsbury Squares throughout the country; and though there were not many objections in his mind to this in principle, there were many in respect of the details. It was an extremely difficult matter to arrange and work, for every scheme and application would have to be judged by a different set of individuals from year to year, and no recognized principle could be carried out excepting by the imposition of a very rigid set of regulations, the first attempt to impose which had disgusted the authors of the scheme. With regard to his own scheme, he considered it open to none of the objections he had named; because, as he had ventured to say at Brighton, not a single sixpence would be expended unless earned. The process leaves the individual organization to manage its own affairs exactly as it may think best adapted to the circumstances of the locality. It merely helped those who worked to recover part of the money cost without imposing any more than the simplest regulations on local institutions. They had seen it working most satisfactorily under Government management at the School of Mines in their own city, and no doubt elsewhere. Consequently he was still of opinion that it was the duty of the Pharmaceutical Society to aid in scientific pharmaceutical education as broadly as possible, and he knew of no better scheme of distribution than that founded upon the principle of payment for results.

The President remarked that perhaps he might be allowed to say that it appeared to him the question of the entire giving up any control over education on the part of the Pharmaceutical Society was not quite what would seem to be indicated by those to whom Mr. Schacht had alluded, but rather that education must be made self-supporting; that while the London school existed under the control of the Society, the school as a school should be made to pay. His own feeling was that all schools should be made to pay in future, and that those who intended to enter into the business of chemist and druggist should be prepared to pay for their education just in the same way as they paid for their schooling and apprentice fees. He thought a necessity had been shown for assistance up to a certain point, from the fact that the whole thing wanted further development, and that for some years they would not have the standard of preliminary education so high as it would be ultimately.

Mr. Giles suggested that the words "assisted by its funds" be omitted from the resolution, and then they could all assent to it.

Mr. W. Stoddart seconded the resolution, as he thought it must be self-evident that it was the duty of the Pharmaceutical Society to help education in every way possible. The time however had not come for the adoption of any particular scheme; but one of two things must take place,—either the adoption of some such scheme as Mr. Schacht's, which embraced every locality and circumstance, or one dependent on the requirements and circumstances of those requesting aid. If every place was like Bristol, with large classes and plenty of students, there would be no difficulty. But if they took the outlying districts where there were only two or three young men, it would be as difficult for them to come to Bristol as to go to London. Then, again, there was more value attached to going to London than to Bristol. Most young men would prefer going to London, because there was more value attached to an education there. Where they had a class of fifty students, and all passed well, the payment for results would be something worth having; but if only a few passed, the results would be so small as not to be worth troubling about. In any scheme each application should stand on its own footing, as in one case very little help might be required in money, while in another they would find the entire help of the Society was required. He did not see his way to the adoption of any scheme, though Mr. Schacht's was the best of which he had heard. In some towns the classes did not answer, and, therefore, the results would be very small. At the present time all they could do was to entertain each application on its own merits. Mr. Schacht's resolution held good for that, and no doubt the Pharmaceutical Society would tacitly admit the principle and help them. He knew as a fact that if they applied for a subsidy they would get it, because they were helping themselves; but the Society would do a wrong thing to say "yes" to applications from places where they never tried to help themselves. But to help those who helped themselves was just what the Pharmaceutical Society did, and they could not be expected to go further at present. There was a danger of making the way too easy, against which acting in the light of trustees they should guard. They should improve as much as they could, and not go back to the state from which they were endeavouring to raise pharmacy. If they made the way easy by lowering the fees, they would be doing an injustice to those coming after them. They should raise the status of the profession, if they wished to leave behind them a better state of things than they had in their own time. He did not understand Mr. Schacht's allusion to Mr. Reynolds' scheme as a multiplication of Bloomsbury Squares, as both schemes proposed to better the status, though he did not think it would be politic to say positively that any scheme should be adopted for future guidance. That did not debar him from seconding, with great pleasure, the proposition of Mr. Schacht, because he believed that the Pharmaceutical Society would help any scheme for the development of pharmaceutical education in the provinces.

Mr. Taplin said he had drawn up a statement which he intended sending to the Pharmaceutical Journal, and which he would read to the meeting. It would be difficult to disagree with Mr. Schacht's resolution, although his friend Mr. Giles had been clever enough to find some objection in it, and he (Mr. Taplin) intended to move a resolution that would put things in a more practical shape. The Pharmaceutical Society had been in existence for nearly the third of a century, and it was pretty well time that they had ready something like a scheme for the development of compulsory education. He would first of all read the statement, and then move a resolution:—

"Pharmaceutical education is a question of absorbing interest to those engaged in the honourable, responsible and laborious occupation of a chemist and druggist, and of no small consequence whether realized or not to the public generally. For more than 30 years efforts have been made as is well known, to improve the qualifications and thereby the status of this important section of the commercial community, which resulted some three or four years ago in an Act of Parliament, rendering that compulsory which had hitherto been voluntary. By this means the Pharmaceutical Society obtained an engine of mighty power, but which, after five- or six-and-twenty years' preparation, and three or four years' possession, the Council appear unequal to set in motion; and whilst there has been a great deal said by authorities, reputed great and small, it appears very little indeed has been done, inasmuch as Bloomsbury Square remains as before education was rendered compulsory by Act of Parliament. Notwithstanding the time that has elapsed since obtaining compulsory powers, and the large increase of funds from annual subscriptions, the Council of the Pharmaceutical Society seem to be making a football of the question, kicking it from Dan to Beersheba. It is time we have had one or two definite proposals: one which has met with no little favour has been propounded by an earnest worker in our midst, viz., Mr. Schacht, but which I humbly think is altogether insufficient for the object to be attained, from its want of comprehensiveness; as well expect to capture a beleaguered city by flying a kite into it, or obtain a crop of grain without tillage and sowing, as to meet the requirements of pharmaceutical education by the proposed process of payment by results. Another able and earnest worker amongst us, is Mr. Stoddart, who gave last season (without fee or reward) to the students of Bristol fifty lessons, and proposes to give another course this session on the same generous terms. I rather think the time has not arrived to take action by the Council of the Pharmaceutical Society, notwithstanding that young men cannot qualify as associates or members or go into business on their own account without passing the necessary examinations; and Bloomsbury Square cannot, according to the evidence of Professor Attfield, accommodate more than a fifth of the number who should annually present themselves for examination. The latter gentleman's enigmatical statement that pharmaceutical education is not compulsory, is beyond my comprehension, and he is very loud in his condemnation of 'cram.' Why, cram is the natural outcome of compulsory education, without suitable provision, as much as smuggling is the natural outcome of extravagant duties on imported goods. Do the Council propose to accumulate the subscriptions until Three per Cent. Consols will pay the cost of establishing and maintaining an efficient pharmaceutical college or colleges, which may be somewhere in the end of the next generation? or will they take the matter resolutely in hand and provide suitable and sufficient educational establishments for the whole kingdom, either in London altogether, or in London, Birmingham, Bristol, Manchester, Glasgow, or Edinburgh? and with, I would suggest, two annual sessions of four or five months' duration, at fixed moderate charges—say £20 or £25, including board, lodging, and education;—then I think we may obtain an Act of Parliament requiring that every apprentice should spend one or more sessions at these establishments, and thereby do away with the necessity or temptation to that bugbear and sham, 'cram,' and show to the public and our brethren that we have not only obtained what we had long sought, but know how to appreciate the boon, both to our own and the public weal." Mr. Taplin moved the following resolution :—

"That in the opinion of this meeting the time has arrived for the establishment of one or more pharmaceutical halls or colleges, and that action should be taken by the Council of the Pharmaceutical Society for this purpose."

He wished to say, with regard to Mr. Schacht's scheme, that it was not sufficiently comprehensive. It might do very well, as Mr. Stoddart said, in a place like Bristol, but how would it act in small towns such as Clevedon, Taunton, or Bridgewater, where young men had very few opportunities for qualifying themselves beyond the ordinary routine of the shop? He submitted that young men in such towns ought to have the opportunity given them of going to some public institution where they could obtain scientific instruction of the highest character. The payment for results would answer pretty well in Bristol, where they had such men as Mr. Stoddart, Mr. Leipner, Mr. Coomber, and Mr. Schacht, but they would not find their equals in a place where there were only three or four chemists. A great injustice would be done to young men in small towns if they were placed on the same level with students in towns of larger size and possessing convenient educational appliances. With respect to the proposed halls, he would have three or four only—at Bristol, Birmingham, Manchester, and Glasgow or Edinburgh. Residence in one of these halls should be compulsory before proceeding to the examinations in London, by which means they would do away with the system of "cramming." The sessions need not be too long, costing about £25 each, including board, lodging, and education, and if necessary the members of the Pharmaceutical Society should increase their subscriptions to two guineas rather than lower them to 2*s.* 6*d.*, as suggested by Mr. Schacht. He did not care whether any one seconded his resolution or not. It embodied his own convictions on the matter, and he wished to place it on record.

Mr. Schacht, as a matter of order, said they could not discuss Mr. Taplin's resolution now, unless it was to be moved as an amendment.

Mr. Taplin declined to move his proposition as an amendment.

The President invited the opinions of the students present.

Mr. Sampson (a student) inquired whether payment for results worked well in connection with South Kensington. If the system worked well there, they might have every hope that it would do the same in pharmacy; if not, it would be a great pity to follow it.

Mr. Giles asked the President whether he understood him to say that he gathered that the universal expression of opinion was that it was the duty of the Pharmaceutical Society to provide education?

The President: Not quite that; but that the idea and intention of the founders and early supporters of the Pharmaceutical Society was that it should be and continue to be an educating body.

Mr. Giles said he was quite content with that. There was no doubt the Pharmaceutical Society was established as an educating body. They had, however, arrived at a new epoch, and the less they looked back and the more they looked forward the better. They had heard that the Society had expended some £100,000 in education, and it would be utterly beyond its powers to provide education over the whole country. It never undertook to do so, and could not be accused of failure if it declined what it had never undertaken. Let them see what were the circumstances of the trade. The law required a candidate to pass a certain examination as laid down by the Pharmaceutical Society. The Society had laid down a Preliminary, Minor and a Major examination, but the Legislature had cut out the Major and reduced the standard. He thought the Legislature did wisely in coming to the conclusion that the standard was too high. It was advantageous and honourable to have among them their Bradleys and Stoddarts; but it would have been a most lamentable thing if the standard had been placed so high that the large majority of those desirous of being chemists and druggists must have failed. Looking at the various schemes of education, Mr. Giles said they would all help to form their views into shape and prevent their rushing blindly at this important stage into any definite course. He did not think it required much assistance to attain to the qualification as fixed by the Legislature for a chemist and druggist. Certainly they did not want any assistance in Bristol, nor did he see that assistance was wanted in smaller places, because any man capable of ordinary application, with ordinary assistance, could pass the Minor examination. He did not want to see the system of pharmaceutical education made too easy. In law and medicine there were no means of obtaining collective instruction. Pupils knew the conditions of entering those trades, and they fulfilled them. So in their own trade, especially as they had not come to a very high standard, it should bring men prepared mentally and financially to meet the requirements of the trade. Mr. Giles therefore expressed an opinion that the Pharmaceutical Society should confine its assistance to those who desired to go further than the Minor examination. That was the kind of education the Society was established to promote, and not that kind that every young man could get for himself behind the counter, or by reading; and it was a question whether it was proper to limit to such the school of pharmacy in Bloomsbury Square, or whether they should have a kind of matriculation examination in the Minor and extend the school to high pharmacy. He was pleased to hear Mr. Taplin enunciate the opinions he had expressed at Brighton, that they should establish a few schools in various parts of the country. He had said that the time had arrived for that to be done in Edinburgh, but it was not at all fair to come on the Pharmaceutical Society to pave the way for people to slip into the trade in an easy manner. They should tax themselves to advance the higher pharmaceutical education, such as exists at Bloomsbury Square, by utilizing the opportunities of scientific instruction existing in the country and also by encouraging local organizations. By so doing they would effect a great national good to other classes besides their own. He did not think they wanted anything more than the organizations throughout the country already provided for. Science schools should only be kept up in certain centres. There would be outside places in everything; and they could not suppose that young men would have the same opportunities at Stoke Pogis as in Bristol. Things always equalized themselves, and there were few young men who would not get to London or some other big town. The question resolved itself into this—that, having made the Minor examination compulsory, they should associate with that the Major examination for which some special training was required. Now all that was requisite had dwindled down to the Minor; every young man with fair opportunities as an apprentice ought to pass, as the difficulties were not of that nature to require any heroic exertion. The Pharmaceutical Society should keep the higher standard of pharmacy up to a satisfactory point.

Mr. Schacht said he was obliged to Mr. Sampson for his inquiry. Possibly his faith in the scheme had been somewhat shaken by a correspondent asserting from time to time in the PHARMACEUTICAL JOURNAL that the South Kensington scheme had been an utter failure. But he was happy to say, on the authority of the 'Blue Book,' that the total number of students in January, 1871, was 5760 more than the number two years before, and that in the subject of chemistry alone the number of students was 5000 odd in 1871, as compared with 2000 odd in 1869. That looked so little like a collapse that he was astonished at the audacity of the writer who made the assertion. He was obliged to Mr. Giles for his remarks; and he could not help, without any violent twist, perverting them as an argument in favour of his own scheme. He gathered that whilst approving and estimating highly the good which the school in Bloomsbury Square accomplishes for high pharmacy, he also sees that for the requirements of the Minor examination a not very high class of qualification is necessary. And yet the Minor required something like the study of two important sciences, and the skeleton scheme of his aimed at little more than imparting these two sciences as part of the qualifications of the many students who may be brought into the smaller centres. He failed to see that Mr. Taplin's plan would prevent "cram"; on the contrary, he feared it might encourage it, by inducing men to substitute a three months' course of chemistry and botany for the more legitimate and effectual study of these sciences.

Mr. Giles said he was not speaking against Mr. Schacht's or any scheme.

The resolution was then put to the vote and carried unanimously.

Mr. Taplin then proposed his resolution, and said their students had not the same facilities as medical or law students. Medical students went to some hospital, while law students went to their employers' agents in London to get that knowledge they could not procure in provincial towns or villages. Mr. Giles was favourable to keeping up Bloomsbury Square as a high school of pharmacy, but that was not so legitimate as the establishment of halls in various parts of the country.

Mr. Giles seconded the motion.

Mr. Boorne said he preferred the resolution passing without the rider of Mr. Taplin. The Pharmaceutical Society from the first had sought to make examination compulsory, and had recently obtained the sanction of the Legislature to the Minor examination; but if they committed themselves to the obligation to educate, they must ask Government to make compulsory the Major examination. The difficulty was not as to the desirability of promoting education, but as to the mode. Mr. Schacht's scheme in theory was a really practical one, but it was like putting the cart before the horse. It asked the Society to give payment for results when they wanted payment in order to obtain results. He thought it was desirable that the Society should make grants to any provincial association that would use them usefully, and from which results were likely to flow. As to the establishment of colleges, he hardly imagined that the day was come for that, but it might shortly. At present hardly sufficient support would be given to maintain such colleges in the provinces. The tendency of all technical education was towards London. It was desirable that young men should learn all they could in the provinces, and so prepare themselves for a very short time in London to complete their education.

Dr. Tilden, in response to an invitation from the President, next addressed the meeting. He thanked them for the honour they had done him in admitting him as an honorary member of the association, and was glad of that opportunity of meeting his old pharmaceutical friends. With regard to the question of the establishment of colleges and the question of pharmaceutical education, he had very little sympathy with any scheme for the distribution of the funds of the Society merely to enable students to pass the examination. He thought Mr. Schacht's scheme would supply the demand for local education, but would only go so far as to bring a considerable number of students up to the Minor. That was a very low standard, and one of which he was not particularly proud. They should look for something beyond that. Another difficulty had been alluded to by Mr. Giles, and that was the position of the institution in Bloomsbury Square. Pharmacy had cut a very poor figure in times past, and its present position was owing to the existence of the school in Bloomsbury Square in a flourishing condition. That school showed the outside public that they were doing a good work, and not merely following the occupation of an ordinary chemist and druggist. He had supported Mr. Schacht's motion, because he took it as an expression of opinion in favour of scientific pharmaceutical education—that education that leads on to pharmaceutical research, leaving the money-grubbing behind, and leading on to better results than in the past. He had a notion that local branches associated with Bloomsbury Square could not fail to be an advantage in enabling young men to get a thorough grasp of the subject, and there was an advantage in working with fellow-students which could only be obtained in large establishments.

The President said he was glad the subject had excited discussion, but as it was late he must ask them not to prolong it much longer.

Mr. Schacht said this resolution was offered to the Council of the Pharmaceutical Society, and urged on them a certain course. He was not sure if he was correct, but did Mr. Taplin wish them to assume the duties of housekeeping in which they had had no experience?

Mr. Giles: That was in the speech, not in the resolution.

Mr. Schacht: The resolution goes for a home for students from all parts of the country.

Mr. Taplin: That is perfectly right.

Mr. Schacht: Rather a new field for the Council of the Pharmaceutical Society to enter upon. But in his capacity he must be silent, and receive the request from the association if they chose to adopt it.

The President said he did not see any great advantage in residential houses or colleges. He would rather support the idea that all young men take lodgings and provide for themselves.

Mr. Taplin pointed to the facilities for board and lodging afforded at Cambridge and Oxford, and said he hoped the resolution would pass, as he should be glad to see it brought under the notice of the Society.

The resolution on being put to the vote was negatived by two to one, and the proceedings terminated.

MANCHESTER CHEMISTS' ASSISTANTS' ASSOCIATION.

The second annual meeting of the above association took place in the new lecture-room of the Chemist's and Druggists' Association, 37, Blackfriars Street, on Monday evening, October 7th; the President, Mr. W. Lane, was in the chair, and, after delivering a few introductory remarks, called upon the Secretary, Mr. J. T. Clarke, to read the report on the past session.

The committee reported that during the second session ten papers had been read, followed by animated discussion, which, it was believed, must have afforded matter of interest and instruction to all present. Reference was made to the want of good attendance of members; and it was pointed out that the larger the attendance, the greater the encouragement for the production of papers. Another point in which there is room for improvement was said to be the small number of members on the roll. It was suggested that each one should do his utmost to make known to his friends the existence, object and result of the meetings, and induce them to attend, so that while increasing their knowledge they might promote generally that feeling of friendship and union so necessary to their existence as an educated and influential body.

The President, in moving the adoption of the report, wished to thank those gentlemen who had contributed so largely towards the success of the past session. In doing so he had to regret the loss of a most energetic member in Mr. Arkle, whose excellent paper, entitled "Notes," was one calculated to do much good.

A vote of thanks was then passed to the retiring officers and committee, and the following gentlemen were elected for the present session:—

President, Mr. W. Lane (re-elected); Vice-President, Mr. J. Tyson; Secretary and Treasurer, Mr. J. T. Clarke (re-elected); Committee, Messrs. Blayney, Booth, Burton, Dodge, Hedley and Sanders.

The President, after thanking the meeting, called attention to the increased accommodation and means provided for the benefit of students preparing for examination, and others connected with the business. He said that with the source of instruction now thrown open, Manchester would be second to no other provincial town in England; and urged students to appreciate the untiring efforts of those gentlemen who had laboured hard to procure for them these facilities. This was to be done by regular attendance at the lectures; and not only by actual attendance, but also by that careful attention to every fact brought before their notice, which would undoubtedly gain for them the respect and admiration of their fellows as being a class of hardworking students. This he felt sure would be the highest reward and thanks they could possibly tender the founders of the Manchester School of Pharmacy.

The next ordinary meeting will be held at 35, Blackfriars' Street, on Monday evening, October 21st. A paper on Elementary Chemistry will be read by Mr. J. T. Clarke.

Proceedings of Scientific Societies.

AMERICAN PHARMACEUTICAL ASSOCIATION.

The twentieth meeting of the American Pharmaceutical Association was commenced in the city of Cleveland, Ohio, on Tuesday, September 3, at 3 o'clock.p.m., under the presidency of Professor Enno Sander. The permanent secretary, Professor J. M. Maisch, called the roll of the members present; about eighty registered their names before the close of the meeting. Credentials of delegates from twenty colleges of pharmacy and pharmaceutical associations were accepted. The names of seventy-five candidates for membership were read, and they were, after a ballot, declared to be elected.

Various reports were then read. One from the Business Committee, upon a proposition to take the management of the business matters from the general body of members and vest it in a council, was considered the next morning, and after discussion, in which the bulk of opinion was adverse to such a course, the subject was indefinitely postponed.

The President then read his annual address, in which he said that the financial affairs of the Association were in a much more prosperous condition than they had ever been before, and advised that the fees for initiation should be funded for future use.

The second session was held on Wednesday morning at 9 o'clock. The committee on nomination presented their report, recommending the appointment of Albert E. Ebert, of Chicago as President for the ensuing year, and, as Vice-presidents, S. S. Garrigues, Ph.D., Saginaw, Mich.; E. P. Nichols, M.D., Newark, N.J.; and H. C. Gaylord, Cleveland, Ohio. It also nominated the members of the Executive Committee, the Committee on the Progress of Pharmacy, the Committee on the Drug Market, the Committee on Papers and Queries, and the Business Committee. The report was accepted, and on a ballot, all the persons nominated were elected.

Professor Ebert, the President elect, having, at the request of the President, been conducted to his seat by Mr. Wm. Procter, jun., and Professor J. F. Moore, briefly returned his thanks for the honour conferred upon him.

The Report on the Drug Market, by John M'Kessor, jun., was then brought forward, accepted, and referred to the Publishing Committee. The following are a few extracts from this report:—

"The drug trade of the past two years has been more generally prosperous than in any previous one succeeding the war. Drugs are mostly imported commodities; and as the premium on gold advanced during the year from 13 per cent. to 15½ per cent., the general tendency of prices was upward.

"The prospect for business for another year has been improved by Congress further increasing the free list, adding to it almost all of the crude drugs, including a number of the essential oils, which will reduce considerably the value of goods. The few crude articles still subject to duty were probably overlooked, and the error will no doubt be rectified at the next session of Congress. Among these are opium, which pays a specific duty of 1 dollar per lb.; assafœtida, 20 per cent. *ad valorem*; Barbadoes tar, 20 per cent.; lime-juice, 10 per cent.; quicksilver, 15 per cent., etc.

"We have to deplore the growing tendency among merchants to give longer credits as an inducement to obtain orders, rather than as an aid to retailers to meet their engagements. That manufacturers should require extended credit until their productions can find a market is not unreasonable; but for dealers who sell their merchandise for cash, prompt payment is the only correct principle, as the extension of time to this class of buyers often leads to over-trading, followed by those periodical disturbances of business relations.

"The great facilities for intercommunication that have arisen in the extension and the opening of new lines of railways, has had a wonderful effect in benefiting business, and the enormous increase in the consumption of all articles of luxury indicates a continued advancement of wealth in the interior.

"*Chemicals* have excited considerable attention, and those for which we are in a great measure depending upon England, and that are so largely used by our manufacturers, have been in extensive demand. The enhanced price of labour and of fuel in Europe have added so much to the cost of production that an advance in nearly the entire list has taken place.

"*Morphine* has, as usual, followed the variation in value of opium, and the market has been well supplied with quinine. This has not been the case during September, when there was a very deficient supply of this important remedy, and the rather extraordinary figure of 3 dollars 75 cents was paid for some small parcels to meet urgent demands which had suddenly sprung up in the west owing to the prevalence of fever; telegraphic orders were sent to Europe, but by the time the quinine arrived the excitement had subsided, and importers had to accept the then ruling figure, 2 dollars 50 cents, or hold their stock in bond for re-shipment. The English makers have advanced their rates, and now ask equal to 18 cents more than the opening price; and our manufacturers are obtaining an advance of 15 cents. This price is likely to be maintained, as the foreign article will cost, to import under the new tariff of 20 per cent. *ad valorem*, about 2 dollars 60 cents. Probably the quantity contracted for has been lighter than usual, so that if any unexpected demand arises next fall, as was the case last September, the manufacturers may make their price as low as they please, but those who may have a stock will be able to get any price they may ask. The finer grades of calisaya and red cinchonas have been scarce, but the higher prices offered in Europe have induced shippers to seek that market; and for the best red bark we have been compelled to get our supply through London.

"*Cundurango Bark.*—The extraordinary properties ascribed to this article, and the enormous prices, 50 dollars to 100 dollars per lb., paid for the first few pounds brought to this country, were an inducement for parties in South America to send here all that could be gathered, and between October and February 1367 ceroons were entered at our Custom-house. Whether it is going to rank in our materia medica among important alteratives is as yet an unsettled question; opinions as to the value of its medicinal properties are greatly at variance. The medical fraternity have not been disposed to look upon it favourably, owing perhaps to the effort which was made to introduce it to the public in the form of a proprietary remedy. Much of the stock in market is considered worthless; the best bark can be bought in small lots at 75 cents per lb.

"*Vanilla Beans* of really fine quality have been scarce, and the new crop which but recently came into market is not much better than last year's, and high prices are asked; although the duty of 3 dollars per lb. is to be taken off on the 1st August next, consumers will not be able to purchase lower than heretofore, and some holders even ask higher prices."

William Procter, jun., then read a letter from Mr. H. B. Brady, President of the British Pharmaceutical Conference, accompanied by an album containing the photographs of the past and present officers of the British Pharmaceutical Conference, the Pharmaceutical Society of Great Britain, and some of the prominent members of each of the organizations.

A resolution was passed accepting the present, and the secretary was requested to return the hearty thanks of the association for this token of friendship.

At the third session, which was held on Wednesday afternoon, the report of the Committee on Legislation was read by its chairman, Professor Maisch. The paper gave a *résumé* of the subject of pharmacy as affected by the laws that had been passed in several of the States, and of what had been accomplished in improving the status of the profession. The attempt of certain persons in Pennsylvania to secure the passage of a law which would require all in the State now engaged in the business to pass before a *single* "Board of Pharmacy," who were authorized to charge a high fee for examination, and to receive the fees in lieu of other compensation, was alluded to, and its defeat noted. As the subject of legislation on pharmaceutical matters will probably be brought before several of the State Legislatures at the coming sessions, members were recommended to be on the alert, and see that no swindling laws were passed.

In reference to the value of cantharidate of potash as a vesicant, Dr. E. R. Squibb stated that having made large quantities of the preparation, and distributed it in various directions, he expected to hear at a future time some conclusive proof of the therapeutic value of this article. In some cases, when of recent make, it had been effectual, prompt, and cleanly in use; but recent trials of some which had been made for nearly a year failed to act promptly or satisfactorily. He expected by next year to report further on the subject. Messrs. Eberle and Ebert stated that ointment and plaster made by a method in which cantharidate of potash would be present had proved ineffectual in their experience.

Mr. Procter read a paper from R. Rother, of Chicago, in reference to the best method of separating the pectinous principle from senega root in making the preparations of the drug. After the reading of the paper Mr. Eberle stated that he had attained the most satisfactory results by exhausting senega root with water, evaporating to a syrupy consistence, treat the result with alcohol, filter, distil off the alcohol, dissolve the residue in water, and, with the proper proportions of sugar, form a syrup.

Mr. Bedford stated that he had no difficulty with the officinal formulæ, modifying the treatment of the tincture (obtained by exhausting the root as directed in the U. S. P.) by heating it for a few moments to the boiling-point, allow it then to stand until *cold*, filter, evaporate or distil off the alcohol, and then, with the proper quantity of sugar, form the syrup.

A paper by Mr. E. J. Weeks, of Jackson, Mich., on tests of purity for Oleum Erigerontis Canadensis, was read, suggesting that liq. potassæ with an equal bulk of the oil, if pure, will separate in two strata and remain clear, while any fixed oils, if used as an adulterant, would cause an emulsion, and, at times, a black colour. The use of sulphuric acid as a test was also mentioned.

Mr. J. F. Hancock, of Baltimore, read a paper on the best arrangement for the dispensing counter. The paper was illustrated by drawings, which helped greatly to appreciate the description. The front store, or dispensing department, was 16 × 24 feet, and the prescription department 15 feet square. The drawing represented a door with windows on either side at the front of the building, counters on three sides of the store, with a space of two feet between the front of the rear counter and the ends of the other counters, and the same space between the back of the counters and the face of the drawers behind, except behind the prescription counter, which should have three feet or more behind it. The partition dividing the store from the back room should have an arch door opening in either direction, kept closed by springs; on the top of prescription counter a frame 30 inches high containing a French plate glass, protects the counter from unnecessary interruptions, and yet permits the persons employed at the counter to observe what may occur in the store. Within sight are balances, weights, desks, and all the operations of dispensing prescriptions. We briefly note a few items suggested. Balsams, oils, honey, and similar substances should be kept in an appropriate closet in the counter, and the counter should be specially arranged to give ample facilities for labels, cut paper, spatulas, and all the various "tools of our art." Poisons used for dispensing should be kept in a separate closet. The main point insisted upon was plenty of small drawers, slides, and shelves arranged to meet the constant wants of the dispenser.

Dr. E. R. Squibb read a volunteer paper on aconite root. In alluding to the fact that much of the aconite root is destitute of the activity of the drug, he states that he relies mainly on *taste* as a means of determining quality. In taking a small handful of roots from a bale as a sample, at least eight of ten should give the peculiar feeling of *numbness* to the tip of the tongue and lips which is characteristic of this drug. In testing this root but a very small fragment should be tasted, and immediately spat out; if no numbness is experienced within five minutes, another piece of the sample may be tasted; but whenever numbness is produced, no other piece should be tried until the sensation disappears. If this method be adopted he thinks no one need be troubled with an unsatisfactory lot of aconite root.

A volunteer paper on rhubarb was also presented and read by Dr. Squibb, in which he reviewed the character and quality of supply during the past year, and alluded to the disposition to prepare the root in a form convenient for use, but which destroyed the appearance, so that the characteristic appearance of the original was lost in manipulation, and thus afforded opportunities for unprincipled persons to foist a worthless article on the public.

A paper on the quality of phosphoric acid in the market, by Professor A. B. Prescott, of Ann Arbor, Mich., was in his absence read by Wm. Procter, jun. The paper stated that in six samples examined all contained a small proportion of soda, and traces of silicic acid, and in one sample a trace of arsenic. Dr. Squibb stated that he had been troubled with minute quantities of manganese which gave it a pinkish colour, and of late always passed sulphuretted hydrogen through the solution, and filtered before completing the process for dilute phosphoric acid.

Mr. Enno Sander read a paper on the existence of wood creasote in the market. On trying several samples, only one of them, according to the test proposed by Morson, indicated that it was wood creasote. Mr. Remington stated that his experiments indicate that glycerine would make a clear solution with all creasotes he had tested except Morson's; and Professor Maisch remarked that Flückiger had asserted that glycerine was not a reliable test for German wood creasote.

(To be continued.)

PARIS SOCIÉTÉ DE PHARMACIE.

At the sitting of this Society on the 7th of August, under the presidency of M. Stanislaus Martin, M. Adrian shortly described some researches by M. Mondet upon squill. The author had operated upon some squill collected in Algiers from which he had obtained two products—one diuretic and non-poisonous, scillitine; the other having an acrid taste and very poisonous, which he described under the name of skulleine.

M. Marais remarked that M. Mondet had really reverted to antiquated ideas upon this subject; it was now admitted that, contrary to the opinion of Vogel and Tilloy, only one active principle existed in squill.

MM. Delpech, Méhu, Vigier ainé, Duquesnel and Mayet, were appointed as members of the Commission of Prizes for 1872.

M. Bussy described M. Vial's process of printing by means of nitrate of silver. He presented to the Society an album containing various designs printed upon cloth by this process.

M. Limousin recalled the fact that paper impregnated with nitrate of silver is reduced by free hydrogen. He illustrated this by directing a current of hydrogen upon white paper which he had marked in several places with solution of nitrate of silver. The previously invisible writing immediately became visible, assuming a black colour.

M. Baudrimont wished to draw the attention of the Society afresh to the question, how best to avoid errors from the substitution of one substance for another. He read a memoir which he believed to contain a solution of the problem, and at its conclusion requested that a committee should be appointed to consider the subject, and that a copy of his paper should be sent to every member of the Society, in order that a thorough discussion of it might be taken at a future meeting.

M. Buignet said that a committee appointed in November, 1867, had made an analogous report, which had received great publicity, and some of the measures which it had proposed had been adopted in practice. Nevertheless, he thought the proposition of M. Baudrimont of sufficient importance to justify the Society in submitting the subject to a fresh investigation.

M. Limousin, in conjunction with M. Lebaigue, had made some experiments which induced them to think that it would be useful to introduce into certain poisonous medicaments an inert colouring matter; for instance, a few drops of a dilute solution of fuchsine in poisonous salts before crystallization.

M. Roucher thought that all these modifications were good, but they would have no real efficacy unless they received a legal sanction; they ought to be submitted to the commission appointed to consider the changes to be made in the law regulating the practice of pharmacy.

It was finally decided to remit the subject to the consideration of a new commission, consisting of MM. Baudrimont, Mayet, Lebaigue, Limousin, Schaeuffele, Vigier ainé, and Grassi, and that a copy of M. Baudrimont's paper should be sent to each member of the Society.

M. Bourgoin detailed the result of the analytical researches upon the leaves of Boldo, undertaken in conjunction with M. C. Verne. The other papers read were one on "Curare," by M. Mayet fils; and one on the "Preparation of Tar Water," by M. Teillet.

Parliamentary and Law Proceedings.

PROSECUTIONS UNDER THE NEW ADULTERATION ACT.

Several prosecutions under the Food Adulteration Act came before the Bolton magistrates on Monday, Oct. 14. A grocer named Hurst was summoned for selling ½ lb. of coffee adulterated with chicory, and without either verbally or by other means informing the purchaser that it was sold as a mixture of chicory and coffee. The magistrates imposed a fine of only 2*s*. 6*d*. and costs, as this was the first offence of the kind. The same defendant was fined 2*s*. 6*d*. for having sold butter which contained 20·31 per cent. of water and 7·63 per cent. of salt, the same being highly-coloured and rancid.—A woman named M'Moran was fined 10*s*. and costs for selling a pint of milk which contained an admixture of 20 per cent. of water and only 2 per cent. of cream, whereas there ought to have been from 6 to 9 per cent. of cream.

SELLING PETROLEUM WITHOUT A LICENSE.

At Tunbridge Petty Sessions, Mr. Arnold, chemist and grocer, of Edenbridge, was summoned for having a quantity of petroleum on his premises without a licence. Mr. Palmer, who defended, explained that on his application the oil had been sent to Mr. Howard, of Tunbridge Wells (Mr. Wibmer refusing) for an independent test. Mr. Alleyne (the magistrates' clerk) read Mr. Howard's certificate, which was that the oil flashed at 98°. Mr. Palmer said Mr. Francis, the inspector, made the oil flash at 94°. Some of the oil was sent to a person in London, who said that the oil flashed at 104°. The certificate with the oil when sold guaranteed that it would not flash under 106°. He only mentioned this to show that Mr. Arnold had exercised every diligence and care. He had advised Mr. Arnold to take out a licence. The bench fined the defendant 10*s*., and costs, £1. 2*s*. 8*d*.—*Grocery News*.

ROBBERY OF SURGICAL INSTRUMENTS.

At the Middlesex Sessions, Edward Marsh, 43, described as a "chemist," and well educated, pleaded "Guilty" to stealing, on the 28th of February last, a case of surgical instruments, the property of Mr. George Stevens, surgeon, of Stoke Newington; and on or about the same day, a second case of instruments belonging to Mr. Wadsworth, surgeon, of Dalston. In both cases the prisoner had called at the prosecutors' houses in their absence, and, under pretence of waiting for their return, gained access to a room where the instruments were kept.

Reeves, a prison warder, stated that in 1869 the prisoner was convicted at the Middlesex sessions of a similar offence, and was sentenced to two years' imprisonment, on which occasion there were four charges of the same kind against him.

The prisoner, in mitigation, urged that he was suffering from a painful malady necessitating the use of opiates and stole the instruments when under the influence of that drug.

Sir W. Bodkin sentenced him to be kept in penal servitude for five years.

SUICIDE OF A CHEMIST BY STRYCHNINE.

On Monday, October 14, an adjourned inquiry was held at Bethnal Green by Mr. Humphreys, touching the death of Mr. Ebenezer Aquilla Toye, aged 27, a chemist, who was alleged to have committed suicide by taking poison. It appeared from the evidence at the previous inquiries, that on Sunday fortnight Mrs. Toye, widow of the deceased, upon returning from church found the house had been on fire, and her husband was much excited. The deceased said he believed the fire occurred through an escape of gas. She thought he was insured for £150, but there was not much damage done. About one o'clock on Monday morning she found her husband trembling violently in bed. He asked for some mustard and water several times, which was given him. He said that he had taken something, which he must bring off his stomach, or he would be a dead man very soon. A doctor was at once sent for, but Toye never rallied. She believed he died from the shock from the fire. William Withers, superintendent of the Salvage Corps, said he attended the fire, which broke out under the showboard in the shop window. There were gas-fittings above it, but the meter was turned off. The deceased was insured for £300. Witness thought the stock and furniture worth about £200, and that the fire was not accidental. John Blyth, Salvage Corps Auxiliary, was left in charge of the house on the night in question. The last he saw of the deceased was at twelve o'clock, when he retired to rest. Mr. Toye said he would be ruined by the fire, as he was not insured sufficiently, and he had some bills coming due. He was but little excited. He came downstairs again a few minutes after twelve, and went into the back parlour, took a bottle from off the sideboard, and said, "There is no sherry in it." He took another bottle, containing essence of lavender, smelt it, and put it down again. A bottle was missing from next the one he had replaced. Mr. Shepherd, landlord of the house, living opposite, saw deceased standing at his door within ten minutes of the fire breaking out. Mr. Llewellyn, surgeon, found no marks of violence on deceased. He had forwarded the contents of the stomach to Dr. Tidy, of the London Hospital, for analysis, as directed. Mr. Bass, gas inspector, examined the meter, which had not exploded, but was melted by the fire. The fire could not have originated through the fault of the meter. Dr. Tidy, lecturer on chemistry, etc., at the London Hospital, said he analysed the contents of the stomach of the deceased man, and found minute but distinct traces of strychnine, which he believed was the cause of death. The Coroner then summed up, and the jury returned a verdict that "Deceased took a quantity of strychnine while of unsound mind."—*Standard.*

Suicides by Prussic Acid.

On Tuesday, October 1st, an inquest was held by Mr. William Carter, the coroner for East Surrey, respecting the death of Mr. Edmond Edmonds, aged 76 years, who committed suicide by poisoning himself with prussic acid. Mr. George Edmonds stated that the deceased was his father, and carried on the business of a surgeon and physician at Hercules Buildings, Lambeth. On the previous Tuesday morning, at about a quarter past one o'clock, while witness was engaged in the surgery, the deceased came in, having on his boots, but being otherwise undressed, with the exception of his nightdress. After speaking to witness deceased walked into the consulting-room at the side of the surgery. The gas was burning at the time, and witness observed him walk towards a desk between the counter and the surgery door. Witness asked him what he wanted there, and he replied, "Nothing, nothing." He then opened one of the small drawers, and upon witness walking into the room he observed the prussic-acid drawer partially open. Witness closed it and said to him "What do you want; you don't want anything out of this room?" He replied, "No, nothing." He then opened two or three other small drawers, but witness did not see him take anything out of either. He then walked back into the surgery, and thence upstairs, as witness believed for the purpose of retiring to rest. About five minutes afterwards witness heard a groaning and gasping noise proceeding from the drawing-room upstairs. He ran up to that room immediately, and found the deceased lying upon the couch upon his back, gasping for breath. On the table in the room he saw a blue vial, which was partially filled with prussic acid. The room smelt very strongly of that drug, and upon going to the deceased witness found him in a state of insensibility, and foaming from the mouth. Medical assistance was sent for, but deceased died in about half an hour. The jury returned a verdict "That the deceased destroyed his life whilst in a state of mental derangement."

A determined suicide by prussic acid is also reported from Derby. Mr. Joseph Pickering, a well-known conveyancing solicitor in Derby, on Saturday evening, October 12th, retired to rest at his usual hour. Deceased and his wife slept in separate rooms. Nothing was noticed in his manner to excite the least suspicion, but early next morning, as he had not made his appearance downstairs, his room was entered, and he was found lying undressed by the bedside quite cold. Beside him lay a small bottle, three parts full of prussic acid. Medical assistance was called in and pronounced life to have been extinct for several hours. The bed clothes were merely turned down, and it is supposed that deceased took the poison, and died before he could get into bed. No motive can be assigned for the rash act beyond a complaint he had uttered of loss of memory.—*Standard.*

Obituary.

GEORGE CONDER.

We regret to have to record the death, after only a week's illness, of Mr. George Conder, Pharmaceutical Chemist, of Hastings, at the age of 29. In 1869, Mr. Conder obtained the Pereira medal. Since then he had resided for nearly two years at Hastings, where he had been very much respected.

Notice has also been received of the following deaths:—

On the 30th of August, Mr. Philip Marrack, Pharmaceutical Chemist, of West Cowes, Isle of Wight, aged 29. Mr. Marrack had been a member of the Pharmaceutical Society since 1867.

On the 16th September, Mr. Walter Tracey Walker, Pharmaceutical Chemist, of Croydon. Mr. Walker had been a member of the Pharmaceutical Society since 1867.

On the 1st of October, Mr. William Collier, Pharmaceutical Chemist, formerly of Sheffield Moor, Sheffield. Mr. Collier had been a member of the Pharmaceutical Society since 1853.

On the 6th September, Mr. Edward Russell Warrington, chemist and druggist, of Castleford.

On the 10th September, Mr. Alexander Wylie, chemist and druggist, of Port Glasgow.

On the 16th September, Mr. Richard Twitchell, chemist and druggist, of Plymouth.

On the 16th September, Mr. William Whittle Brown, chemist and druggist, of Ormskirk, Lancs.

BOOKS RECEIVED.

Qualitative Chemical Analysis. By Dr. C. Remigius Fresenius. Eighth Edition. Translated from the Thirteenth German Edition. By A. Vacher. London: J. and A. Churchill. 1872. From the Publishers.

Round the Table. Notes on Cookery and Plain Recipes, with a Selection of Bills of Fare for Every Month. By "The G. C." London: Horace Cox. 1872.

Aide-Mémoire de Pharmacie. Vade-Mecum du Pharmacien. Par Eusèbe Ferrand. With 184 Engravings. Paris: Ballière et Fils. 1873.

Correspondence.

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

Pharmaceutical Examinations.

Sir,—In common with many of my pharmaceutical brethren I have been deeply interested in the discussion started by Professor Attfield, and just concluded by Professor Redwood.

I feel it is a subject not only of deep interest to us all, but, moreover, affecting our very characters individually. My opinion is, that the question, whether desultory laboratory instruction, or precise cram are to be the order of the day, is of very little consequence indeed, The problem we have yet to solve is, how to make the Minor examination a real test of a man's capacity to carry on to the satisfaction of the public and medical profession the business of a chemist and druggist.

Smatterings of chemistry and botany are about as useful to a chemist as they are to the medical man; and the Minor examination will never be a real test until the candidates are examined more on their five years' apprenticeship or practical instruction, than on that knowledge which can avowedly be picked up in Bloomsbury in five months, or at a cram shop in one.

How many men spread a plaster at their examination table?

How many candidates run out of a chemical and prepare it, if practicable, on the spot?

How many blisters are prepared by the candidates in the course of a year?

How many candidates are asked to test for albumen, sugar, or bile, etc., in urine in the course of a year?

How many kinds of pills are prepared by each candidate, and how many coated or silvered?

To what extent are they tested as to their capacity for incorporating essential oils in pills?

How many students are tested in making pills with creasote or carbolic acid?

How many men are asked to clean a dirty bottle expeditiously?

How many prescriptions are dispensed by a candidate to test his accuracy, and is not this the last accomplishment a chemist learns, and a vital one, too?

I ask these questions, a few only; it is wondrously easy to add to them; and are they not the questions a man has practically to solve daily behind his dispensing counter?

I say, if you make your examination a crammer, cram is the best answer for it, and the public will be more perplexed with licensed chemists than they ever were with licensed doctors; and it will be almost a science to sift the wheat from the chaff.

Two really good practical assessors would be well worth £800 a year* to the Society, and that I consider is the direction our surplus funds should take, and not be frittered away in dilute chemistry and botany through the provinces.

Five years is supposed to be devoted to practical instruction. Ten months is the top run for the theoretical. And yet I understand the practical in value, compared to the theoretical, is about 1 as to 7. Five years will scarcely teach the former; the latter can be picked up at Bloomsbury in five months, or, still better, at a cram shop in one. Of course, cram succeeds with men of average memories, for the practical knowledge and handicraft count a mere nothing against the ornaments.

Let me be thoroughly understood. I value science and scientific thought very much; but if I wanted a carpenter to work for me, what would it avail me that he knew the grain of every wood, the composition of cellulose, the laws of cell multiplication and division, the difference in structure between exogens and endogens, if he sawed in a crooked manner or planed awry? And so with the Bloomsbury brand. Unless it marks the neat plaster-spreader, the apt chemical-maker, the careful tester, the deft pill-maker, and the tidy silverer, in addition to the ornaments of a pharmaceutical curriculum, we shall fall into greater error than did our medical friends before they insisted on at least three sessions attendance at a medical school as a *sine quâ non* for candidates for medical diplomas; for we do not work in the cloud land of mystery—patients must die some day; but flat pills are terrible accusers; we cannot hide our misfits underground.

George Mee.

79, *Grosvenor Road, Highbury New Park,*
September 30th, 1872.

* I say £800 a year, because three days' practical examination would be little enough for a batch of candidates, and for £400 a year each we could always secure the best men.

Sir,—I would very willingly have left the revision of the examinations in the hands of the Board of Examiners without any public comment on my part, had it not been for the report of the Tyneside Chemists' Assistants' Association's meeting, giving a notice of my remarks upon this question, which is calculated to give a false impression of my views. At the meeting alluded to, I described the kind of Preliminary education I thought desirable, and hoped that the revision of the regulations of the Board would do something towards ensuring it. I thought that the Preliminary examination should not only show that the youth had had an ordinary liberal schooling, including a sufficient knowledge of Latin, but should show that he had an aptitude in the kind of subjects which would afterwards become his special studies, and for that reason I would include elementary botany and chemistry, I thought that the Preliminary examination should not only show that the mind was stored with certain facts, but had acquired certain powers; that the observing and thinking faculties had been so far developed as to put the youth in a position to take advantage of the circumstances with which he would be surrounded during his apprenticeship; and that while I would not object to French, German, and Greek questions being included in the examination paper, the student being at liberty to choose for himself which he would answer, I was much more desirous to see physical subjects added, which, however elementary in character they might be, would give some guarantee that the apprentice was in a condition to observe and understand something of the materials and processes coming under his daily notice. I would like to see the examination paper include questions upon heat, light, electricity, and the general properties of common objects; the candidate again being left at liberty to choose which of these subjects he would select for treatment. And the subjects given for English composition might also be changed with advantage; instead of being as now a request for twenty lines upon "strikes," or "Westminster Abbey"—subjects as far as possible removed from his pharmaceutical requirements,—they might with advantage require a short essay on "glass," "iron," "paper," "water," "grass," "a plant," "chalk," "coal," "heat," "light," "magnetism," etc., which would not only afford opportunity of showing his power of expressing himself correctly, but also giving some clue to his general information and intellectual condition.

I thought it most important that the regulations for the Preliminary examination should be such as to keep from entering the business all such as were not sufficiently informed and sufficiently educated to prosecute pharmacy with advantage. I thought comparatively few of those who might enter the business under such circumstances would be found deficient after their term of pupilage, but at the same time the Minor and Major examinations might be made broader and more practical, being spread over a longer time, and including practical operations in testing, etc. And I will now add a point which I did not then advocate, but which I think of some importance, viz., that the two latter examinations might be divided into two portions, a written examination to be conducted as the Preliminary now is, and which might advantageously include, as Professor Redwood suggests, an inquiry into the particulars of the candidate's education. The time of the Board, and both the time and money of the student, would be saved by calling to the metropolis for the practical part of the examination only those candidates who might give satisfactory evidence in their written replies of having at least a fair prospect of passing the remainder.

Barnard S. Proctor.

11, *Grey Street, Newcastle, Oct. 14th,* 1872.

Patent Medicine Licences.

Sir,—I wish to point out a circumstance which in the present state of the law, is "a great injustice" to a certain portion of the chemists and druggists, viz., "The Patent Medicine Licence." I have two shops, the one in Thames Street, Kingston-on-Thames, Surrey, the other in High Street, Hampton Wick, Middlesex. They are within ten minutes' walk of each other, by just crossing Kingston bridge. For the shop in Kingston the licence is 10*s.*, while for the other in Hampton Wick I am made to pay £2, the latter sum allowing me to sell at both shops, but were they occupied not by the same party, the licence would be £2. 10*s.* for the two shops.

Now at Moulsey (Hampton Court Palace) the licence is but 5*s.*, and distant from hence, about a couple of miles. Upon mentioning the difference of charge to the Inland Revenue officer, he concurred with me that it was an unfair charge, and said a similar grievance existed until this year with the pawnbrokers, those within the limit of the twopenny post paid just double the amount of licence to those without it; they represented their grievance to the proper authority, and obtained an equal adjustment of their licence. And I have no doubt if the Pharmaceutical Society were to place the matter before the same authority and point out its injustice, they too would obtain redress.

As a sufferer with others, I would respectfully request the Council of the Pharmaceutical Society to use their efforts to obtain an equal adjustment of this licence.

J. Barker, Pharmaceutical Chemist.

Thames Street, Kingston-on-Thames,
and High Street, Hampton Wick,
Sept. 4th, 1872.

Early Closing.

Sir,—I have been much gratified by receipt of a kindly communication from a previously unknown correspondent at Ballarat, which, I think, will also interest many of your readers who have taken part in the recent endeavour to effect some amendment of the unreasonable hours of chemists' business.

Mr. Brind and his pharmaceutical friends in Ballarat have been stimulated, and are kind enough to say, assisted by the efforts in the mother-country, to make a first attempt to obtain similar advantages for the similarly suffering pharmacies at the antipodes, adopting, though with a difference and for this occasion only, the homœopathic maxim, "similia similibus curantur."

It seems by reports of meetings and newspaper articles, which Mr. Brind has obligingly forwarded, that the hours of business observed by pharmaceutists in Ballarat have hitherto been extremely onerous, viz., from early morning till ten and eleven P.M., with but little relief on Sundays: such hours in fact as we knew in England before the Pharmaceutical Society had taught us to estimate our own value a little more worthily and to be a little less jealous of our neighbours. We learn by these reports that the moderate appeal of our Australian brethren for an abridgment of their hours of business has been cordially supported by the medical profession and the public press, and that it has been adopted with much unanimity by those more immediately concerned.

It is impossible not to feel an emotion of pleasure at this evidence of the good influence exerted by home proceedings in lands so distant, yet so closely associated with the old country; and we see in it an illustration of the wisdom of seemingly improvident admonition, "Cast thy bread upon the waters and thou shalt find it after many days." We heartily wish our upside-down brethren "God speed," and that their present action may contribute to their personal and scientific advancement.

Richard W. Giles.

Clifton, September, 11th, 1872.

The Reports of the Meetings of Council.

Sir,—May I be allowed, through the medium of your Journal, to ask the reason that of late the names of gentlemen voting in divisions of the Council are not given as heretofore? it seems such an omission is most undesirable, depriving the members of all knowledge as to the votes of their representatives. I would ask you to draw attention in your next issue to this omission, and urge the return to the open voting.

Elector.

The Jacob Bell Scholarships.

Sir,—The perusal of the amendment concerning the Jacob Bell Scholarships gave me great pleasure; certainly a better step could not have been taken, for it is not when they have finished, but when they are commencing, their studies after apprenticeship that pharmaceutical students want assistance.

We have no business to expect too much, but there is one thing that I think might be given without spoiling us. Of course the scholarships are in a great measure intended to aid brains that are not backed by too comfortable pecuniary circumstances. Now supposing a young man, at the expiration of his apprenticeship, competes for the scholarship, and is successful, he would not have great difficulty in getting through a year. At the end of this time he should be fit for the Minor; but after that, to study for the Major, he is left wholly dependent upon his own resources, even for the continuation of his education. Now if a Scholarship could possibly be offered for competition among holders of the Minor diploma, it would give the man of limited means another chance, and, if he were successful, enable him to study for the Major. This plan has its objections, but with a few modifications I think it might be carried out, and prove a very effectual stimulation.

I could say more, but will not trespass further on your patience, but conclude with a hope that those who have influence will give this point consideration.

Syrupus.

October 13th, 1872.

Chloride of Calcium as a Disinfectant.

Sir,—Among the advantages claimed for Chloride of Calcium as a disinfectant, it has been said to be "harmless," and the statement has passed unchallenged, so far as I am aware, by the medical journals; I believe this to be a dangerous error, and that a wineglassful of concentrated solution of Chloride of Calcium would, if swallowed, be as certainly fatal as a like quantity of Chloride of Zinc; nor would the irritant properties of the former salt be diminished by the proposed admixture of a considerable percentage of Hydrochloric Acid.

W. Bland.

57, *Penton Street,*
Sept. 28th, 1872.

Erratum.—A course of sixty lectures on Botany will be delivered by Mr. Leipner in connection with the Bristol Pharmaceutical Society, and not six, as was, through a printer's error, announced last week on p. 299.

Mr. F. Andrews.—We have received your letter in reply to "Quærens," but we are unable to find room for it in this week's Journal.

"*Ranunculus.*"—There is no limitation as to age at pesent.

G. W. Stephens.—Dorvault's 'L'Officine' may be obtained from Messrs. Dulau, Soho Square.

"*Darenth.*"—The plant is *Lycium barbarum.*

"*A Student*" (Alresford).—Hardwich's 'Photographic Chemistry.'

"*Inopis.*"—' Journal de Pharmacie et de Chimie:' Paris; Masson, Place de l'Ecole de Médecine.

James Copley.—The subscription is 18 fr. per annum, and it may be obtained through Messrs. Williams and Norgate, or direct from M. Masson, the Paris publisher, Place de l'Ecole de Médecine, for an additional ten centimes per number.

"*Jacobus*" will find the formula in Redwood's 'Supplement to the Pharmacopœia,' Beasley's 'Pocket Formulary,' and other works of a similar nature.

"*Minor.*"—We do not think there is any method for doing it effectually.

R. C. Moore.—You will find the full formula for Parrish's Chemical Food in vol. I of the present series of this Journal, p. 857.

"*Weston-super-Mare.*"—The question is of a legal character, concerning which we should recommend you to consult a solicitor.

J. C. S.—The article referred to is a proprietary one. Consequently we cannot give you any information as to its preparation.

F. J. M.—You will find formulæ for Brilliantine on p. 437 of the first volume of the present series of the Pharm. Journ. Your question should be addressed to the Apothecaries' Company.

M. P. S.—We cannot undertake to recommend makers of apparatus. You should consult some acquainted with the practical working of the instrument.

Mr. T. H. Hills.—The newspaper received with thanks.

Communications, Letters, etc., have been received from Mr. C. Umney, Mr. Jackson, Mr. G. Harrison, Mr. A. Courtenay, Mr. E. Clift, Mr. Valentin, Mr. W. Wilkinson, A. D., "A Local Secretary."

THE MEDICINAL PROPERTIES OF THE COW TREES OF SOUTH AMERICA.

BY JOHN R. JACKSON, A.L.S.
Curator of the Museums, Kew.

The presence of milky juices in plants is not uncommon; indeed, it is a character of many natural orders. In the numerous plants which yield caoutchouc, or india-rubber, the juice, as it flows from the tree, is milky white, becoming coloured on exposure to the air, or in process of solidifying. The juices of some of the milk-yielding trees, however, do not solidify, and they are used as an article of food. Several of these trees, from the fact of their yielding wholesome milks are known as Cow-trees. In South America, which is the head-quarters of these Cow-trees, they are called Palo de vaca, or Arbol de leche. Perhaps the best known of these trees is that referred to *Brosimum galactodendron*, Don. It grows in large forests on the mountains about Cariaco, and in other parts of the sea-coast of Venezuela. It forms a tree frequently over 100 feet high, and often running to a height of 60 or 70 feet before branching. The milk, which is obtained by making incisions in the trunk, is said to have a very agreeable taste, somewhat resembling that of sweet cream, and a slightly balsamic odour; the only unpleasant feature about it is that it is somewhat glutinous, but it is very nourishing and perfectly wholesome. Humboldt says, "We drank considerable quantities of it in the evening before we went to bed, and very early in the morning without feeling the least injurious effect. The negroes and the free people who work in the plantations drink it, dipping into it their bread of maize, or cassava, The majordomo of the farm told us that the negroes grow sensibly fatter during the season when the Palo de vaca furnishes them with most milk. This juice, exposed to the air, presents at its surface—perhaps in consequence of the absorption of the atmospheric oxygen—membranes of a strongly-animalized substance, yellowish, stringy, and resembling a cheesy substance. For several months of the year not a single shower moistens its foliage. Its branches appear dead and dried; but when the trunk is pierced there flows from it a sweet and nourishing milk. It is at the rising of the sun that this vegetable fountain is most abundant. The blacks and natives are then seen hastening from all quarters furnished with large bowls to receive the milk, which grows yellow, and thickens on its surface. Some empty their bowls under the tree itself; others carry the juice home to their children. Like animal milk, it turns sour and putrefies after a few days' exposure to the atmosphere. It has been found to contain more than 30 per cent. of galactin."

Tabernæmontana utilis, Arn., known as the Hya-Hya, or Cow-tree of British Guiana, likewise yields a milky juice, which is perfectly bland and wholesome, though the general characters of the order are poisonous and acrid. The tree is tapped to obtain the milk. The milk, or Cow-tree of Para, known as the Massaranduba, has been referred to *Mimusops elata*, Allem; but its determination is doubtful, though there is no question of its belonging to the natural order Sapotaceæ. The milk, which flows slowly from the wounded bark, resembles good cream in consistence, but it is said to be too viscid to be a safe article of food.

Certainly, the most important in a pharmaceutical point of view of all the Cow-trees is the *Clusia galactodendron* of Desvaux. The tree has a thick bark covered with rough tubercles, and bears leaves of an obovate form and about three inches long. It is a native of Venezuela, but is also found in the Cauca Valley, north of the State of Antioquia, on the banks of the Abraeto river and on the Pacific coast as far as Tumaco.

Many interesting accounts have been given of this tree, but the following notes from a letter on the subject, written by Mr. R. B. White, of Medellin, are the most comprehensive. The tree, it appears, has a decided partiality for certain localities, and there can be no doubt that while it needs the warm damp climate of the Choco, it likes good drainage, as it is always found on the low ridges just rising off the plains; mean temperature 27° to 30° Cent., and never exceeds 200 metres above the level of the sea. The general utility of the milk of this tree is well known, but its most valuable property has been quite overlooked, that of curing dysentery. It contains a resinous and an astringent principle, and an aromatic and tonic substance. The action of this combination is mechanical so far as relates to the resin, which no doubt coats the intestines with a film and allays irritation; and, secondly, it is astringent, tonic and antispasmodic. So far a knowledge of the constituents of this milk would lead one thus to judge theoretically of its action. With regard to practice, no other medicine is used in the Choco and on the Pacific coast of New Granada for dysentery; and this disease is thought little or nothing of as it is so easily cured. The milk is to be procured everywhere, and is generally sold at from one to two dollars per bottle. Mr. White says, "For upwards of two years I saw it constantly used amongst the workmen employed on the Buena Ventura Road, Pacific Coast, and in the most unhealthy climate. We had at times from 500 to 700 men employed, and out of numberless cases of severe dysentery I never knew of a fatal case, and I have seen cures effected when the cases had gone so far as to seem hopeless. As a general illustration of its action, and method adopted of using it, I will refer to my own case. I was attacked with diarrhœa, which in two days passed into dysentery, very severe. In the short space of twelve hours I was reduced to a state of utter prostration, suffering the most excruciating pains imaginable. The bloody discharge was so terrible that it seemed easy to predict death within a few hours; not a shadow of a medicine was to be had, as I was in a hut in the woods, and the violent phase of the disease was only developed at night-fall, and thus I passed the night in a helpless state. At daybreak the wife of one of our inspectors was called in as a nurse, and by 9 o'clock "leche de vaca" was procured. Up to this time I had been getting rapidly worse, and was then hardly conscious. The milk was given to me (a table-spoonful in a glass of water with a little sugar) every half-hour till 12 o'clock midday, and at this hour I was perfectly free from dysentery or the slightest symptom of it. Broths and light food were then given to me for a few days, and I was restored to perfect health without taking any more milk or other medicine, and without having the least recurrence of symptoms of dysentery. I have seen many severe cases successfuly treated in this way, but none more severe than my own, and am sure that no medicine or known system of treatment can be so efficacious as the leche de vaca treatment.

"Admitting the fact of its power to cure dysentery, a little reflection will convince one that the composition of this milk is wonderfully calculated to produce the results I have stated. The only question is, can it be used otherwise than in a fresh state. Up to a certain period I can answer this question in the affirmative. The milk, even when corked in a bottle, soon turns sour and coagulates, but this for many months at least does not impair its efficacy. It is possible that if putrefaction ultimately ensues, the milk will lose its properties. It is also possible that in certain cases the sourness of the milk would be prejudicial, but I do not see why this should not be remedied by the addition of some inoffensive alkali."

Mr. White says he has some milk which he brought himself from the Choco, which has been contained in a bottle for more than a year and a half, and is apparently as good as ever. One of the great advantages of the use of this milk in dysentery is the radical cure it effects. Its tonic and astringent properties appear to be brought into play as they are required, and as the resinous principle first serves as a palliative, the antispasmodic tonic and astringent properties work out the cure.

Mr. White's opinion of the medicinal properties of this milk is so favourable that he concludes his notes by saying that he cannot but think that, in combination with other medicines, it might serve as a base for successful treatment of cholera.

It has been said that a single tree will yield as much as a quart in an hour. These notes will, no doubt, prove interesting to the readers of this Journal. An examination and trial of the milk in this country would also prove of much interest.

PEPSIN, BISMUTH AND STRYCHNIA.

BY R. ROTHER.*

The most direct and satisfactory quantitative test for pepsin is unquestionably its power to dissolve coagulated albumen. This method of assay should invariably hold a conspicuous rank in all processes for the liquid preparations of pepsin, and none should be deemed complete before their strength has been adjusted by this standard. But to obtain accurate and strictly reliable results in every instance by this method, a most perfect familiarity with every phase of the operation is indispensable. The delusive simplicity misleads all beginners, and no one should consider himself qualified to pronounce on the questions of pepsin until he has thoroughly digested this rudiment.

Eberle, in his researches on artificial digestion, first pointed out the existence of the principle now known as pepsin. But Schwann was the first who isolated the body by precipitating it from its solution with mercuric chloride, and who further ascertained that its acidified solution acted as a powerful solvent upon coagulated protein substances.

Wasmann instituted the most elaborate investigations. He prepared pepsin by digesting the mucous membrane of a hog's stomach with distilled water at slightly elevated temperatures for several hours; then rinsed it well with cold distilled water, and again macerated it with successive portions of distilled water until putrefaction set in. The viscid neutral liquid resulting from these macerations he precipitated with plumbic acetate. By separating the metallic oxide from this precipitate, he obtained the pepsin in solution. This liquid, after careful concentration, he treated with alcohol, which completely separates the pepsin as a flocculent precipitate. According to Wasmann, this pepsin, when dissolved in 60,000 parts of water acidulated with hydrochloric acid, dissolves coagulated albumen in six to eight hours, and also acts powerfully as a similar solvent upon bone cartilage and gelatinous tissue. He also ascertained that an aqueous solution became turbid in the presence of a small quantity of mineral acid, but again became clear by adding an excess of acid. He likewise made the important observation that alkalies destroy the digestive property of pepsin by abstracting the free acid, and that higher temperatures also had a destructive effect.

Pappenheim found that ferrous and cupric sulphates and other salts precipitated pepsin, and that the precipitate is again soluble in an excess of some of these reagents.

Bidder and Schmidt isolated pepsin by neutralizing the peptic fluid with lime water, filtering, evaporating to a syrupy consistence, and precipitating with alcohol. This was dissolved in water, reprecipitated with a large excess of mercuric chloride; the mercury removed with hydric sulphide, and the solution evaporated to dryness. The residue could endure a heat of 170° Centigrade without suffering decomposition. C. Schmidt promulgated the theory that the true digestive principle was a combination of Wasmann's pepsin and hydrochloric acid. This coupled acid he denominates pepsin chlorhydric, or chloropeptic acid—a compound of a definite character, for whose formation the hydrochloric acid must never be below a certain fixed proportion. The effect of this agent upon the protein bodies results in the production of peptones and parapeptones.

The methods for the preparation of effective pepsin have heretofore been tedious and circumstantial. But Mr. Scheffer, taking advantage of the well-known property of concentrated saline solutions to precipitate the protein bodies, has succeeded in producing pure pepsin easily and expeditiously by precipitating it from the peptic fluid by adding sodium chloride to saturation. The pepsin thus obtained is dried after mixing it with lactin, and further attenuated with this substance until the dry pepsin amounts to one-tenth of the whole weight. Scheffer calls this mixture saccharated pepsin. Pepsin carefully prepared in this manner is always definite in its action, and forms the most convenient and reliable base for the preparation of liquid pepsins. But to obtain the whole of this again in solution requires a prolonged maceration with acidulated water before filtering, and even then a small quantity of insoluble residue always remains. This liquid filters with great difficulty, and after part of it has passed through, the sediment obstructs the filter, and a new one must be supplied to procure additional quantities of filtrate. To obviate this annoying difficulty, the writer filters the solution through cream of tartar. A beautifully clear filtrate and a rapid process are thereby ensured.

The numerous liquid forms of pepsin, called pepsin wine, rennet wine, liquid rennet, liquid pepsin, and elixir of pepsin, being always in demand, the writer constructed a formula for a liquid preparation to supplant them all, as follows:—256 grains of saccharated pepsin is macerated for several days in eight fluid ounces of water acidulated with hydro-

* Reprinted from the 'Pharmacist.'

chloric acid or cream of tartar; two drops of oil of orange peel or oil of lemon, three fluid ounces of syrup, three fluid ounces of orange-flower water, and two fluid ounces of strong alcohol are then mixed, united with the first solution, filtered through cream of tartar, and sufficient caramel added to give the filtrate the colour of sherry wine. Moderately acid mixtures containing fruit oils of the aurantaceæ rapidly generate the disagreeable odour which characterizes a mixture of oil of turpentine and strong sulphuric acid. But a saturated solution of cream of tartar, which even then contains mere traces of this substance, especially in the presence of alcohol, does not affect the grateful flavour of orange peel, moreover the presence of oil of orange flower seems to exercise a protective influence.

The simple solution of pepsin in water acidulated with cream of tartar, and filtered through this substance, was mixed with water acidified with hydrochloric acid, and fifty grains (a slight excess) of freshly coagulated albumen added. An unfiltered solution of saccharated pepsin in six fluid drachms of water acidulated with hydrochloric acid was also treated with fifty grains of albumen. Both mixtures were then placed in a water-bath, at a temperature ranging from 100° to 105° Fahrenheit. After about four hours the albumen in both mixtures was almost completely dissolved. Double the quantity of albumen, with twice as much of the pepsin solution, was then diluted with water to six fluid ounces, and set aside. At the ordinary temperature, after a little over three days, only a trifle of the albumen remained undissolved. To the mixture of the unfiltered pepsin solution an additional 50 grains of albumen was added, and diluted with an equal volume of water. After four hours, at a temperature of about 105°, no very appreciable diminution of the albumen was visible. More of the acidulated pepsin solution was then added, and after about four hours only six grains of albumen remained.

Popular opposition to the use of alcohol in solutions of pepsin, and the writer's aversion to glycerine, induced him to make a syrup of pepsin, by dissolving without heat about 12 or 13 ounces of sugar in 8 fluid ounces of aqueous pepsin solution filtered through cream of tartar. In making syrup without heat, the operation is much facilitated by reserving a small portion of the liquid, pouring the rest over the sugar, stirring frequently during a proper period, and decanting the syrup through a strainer; then, by adding the reserved liquid to the residuary portion of undissolved sugar, this will quickly dissolve, and may be added to the rest through the strainer.

To try the effect of a concentrated syrupy solution of pepsin upon albumen, a quantity of unfiltered acid pepsin solution, representing six grains of saccharated pepsin, was added to half a fluid ounce of simple syrup containing 45 grains of albumen, and diluted with water containing hydrochloric acid to the volume of a fluid ounce. After a digestion of six hours at the required temperature, no apparent change in the albumen had occurred. This, on removal from the liquid, and thorough drying between folds of bibulous paper, seemed larger and firmer than before its treatment, and had actually gained 10 grains over its original weight of 45 grains; showing that an assimilation of water had probably taken place without materially affecting the physical appearance.

(To be continued.)

THE PRESENCE OF AN ORGANIC ALKALI IN BOLDO.

BY E. BOURGOIN AND C. VERNE.

The boldo is a tree indigenous to Chili, which sometimes attains the height of from five to six metres, and belongs to the order *Monimiaceæ*. It was first attributed to a laurel, the *Laurus dioica* of Dombey. It is the *Boldoa fragrans* of Jussieu, the *Ruizia fragrans* of Ruiz and Pavon, and the *Peumus fragrans* of Persoz. Baillon has recently described it under the name of *Peumus boldus*. The leaves have a strong piquant camphorate savour. They contain an essential oil and an organic alkali, to which the authors propose to give the name of boldine. The following method was adopted by them in their researches.

The powdered leaves were exhausted with washed ether in a displacement apparatus, by which method a well-saturated aromatic tincture was obtained. When this was submitted to distillation, the thermometer after the ether had passed over remained stationary at 185°, and a certain quantity of an essential oil, recalling the odour of the plant, was collected. The thermometer then rose gradually to about 230°, when it again remained stationary for some time, and afterwards mounted to about 300°. These facts showed that the ether had taken up some complex volatile products; in other words, that the essential oil of boldo is a mixture of several bodies, agreeing with what has been observed in regard to most aromatic plants.

When the powder would yield nothing more to ether, it was exhausted with 90° alcohol, containing tartaric acid in solution. Upon evaporation, a syrupy acid residue was obtained, which was agitated with washed ether, in order to remove a brown odorous matter, soluble in ether, alcohol and acids. After saturation with bicarbonate of potash it was agitated afresh with ether, which then took up a matter presenting all the characteristic reactions of an alkaloid; this was impure boldine.

In order to purify this product, it was dissolved in water slightly acidulated with acetic acid, and then precipitated by ammonia added in slight excess. This alkaloid existed in small quantity in the leaves operated upon—about one part in one thousand,—and moreover it was difficult to obtain it pure, since the aromatic matter previously mentioned, which was soluble in acids, clung to it with great persistence.

The above process being one rather of research than of extraction, after various experiments the following was adopted:—The leaves, coarsely powdered, were exhausted by infusion in water acidulated by thirty grains of acetic per kilogram of product. The liquor was filtered and evaporated in a water-bath to the consistence of thick honey. It was then acid, and contained, beside the alkaloid, a little aromatic matter and a large quantity of acetate of lime. When the acetic acid was replaced by citric acid, alcohol caused a voluminous precipitate of citrate of lime; with sulphuric acid it formed an abundant deposit of sulphate of lime. These facts indicate the presence in the leaves in large proportion of a lime salt. The operation was terminated by washing with ether, saturating with the alkaline bicarbonate, and taking up the alkaloid with ether. Upon evaporation a residue was left which was dissolved in diluted acetic acid and then precipitated by ammonia. It was usually necessary to repeat this process to rid the alkaloid of a small quantity of yellow matter.

Boldine is very slightly soluble in water, to which, however, it communicates an alkaline reaction and a perceptibly bitter taste. It is soluble in alcohol, ether, chloroform, caustic alkalies, and in crystallizable benzine. From solution in acids it is precipitated by ammonia and the double iodide of mercury and potassium, and gives with solution of iodine a chestnut-brown precipitate. Concentrated nitric acid immediately colours it red, and it assumes the same coloration in the cold with sulphuric acid.—*Journal de Pharmacie et de Chimie* [4] xvi. 191.

CINCHONA PLANTATIONS IN BRITISH SIKKIM.

Tenth Annual Report by GEORGE KING Esq., M.B., *Superintendent, Botanical Gardens, and in charge of Cinchona Cultivation in Bengal.*

(*Concluded from p.* 304.)

12. Mr. McIvor, in the body of his report and in his evidence, refers to only one disease, and that he calls "canker." After a very careful examination it appears plain to me that two distinct forms of disease occur in the Sikkim plantations,—the one, a constitutional malady affecting the whole plant and usually fatal; the other, local and by no means fatal. The former disease is confined entirely to trees which have been originally planted in damp situations, or in situations which have become damp subsequently by the oozing of drainage water in the way already explained. Disease first attacks the roots of such trees. Its existence becomes apparent by the discolorization of their leaves, which ultimately all fall off. Gradual shrivelling of the cortical and woody tissues then takes place from the root upwards, and before this process has gone far the death of the plant has begun. This disease is in fact apparently nearly identical with that known to gardeners in England as "canker;" it is not in any way infectious or contagious, as some appear to think. It depends entirely on a local cause, namely, excess of moisture in the soil; and where that does not exist it cannot occur. In the cinchona planted on the western end of the Rungbee Valley (the peculiarities of which will be borne in mind) patches of trees killed by this disease are not uncommon. Such patches are invariably co-extensive with damp, watery soil, and should never have been planted. At the time they were planted, there was absolutely no experience whatever on the subject of cinchona cultivation to appeal to; the peculiar physical conditions of the Rungbee Valley, as above explained, were unknown; and the idea prevailed that cinchona in its natural habitats delights above all things in shade, moisture of soil, and a misty atmosphere. The mode of planting adopted was to form a continuous belt, and where these damper places fell in the line of extension, they were not passed over. I am assured that for some years many of the patches that have now died out from this form of disease were for the first two or three years extremely healthy, and I do not think that those who planted them can be charged with any want of judgment. But with the experience now accumulated, showing as it does that cinchona suffers more from an excess of shade and moisture than from the opposite conditions, it would be folly to plant in similar places. I have accordingly decided to do so only on such selected spots as possess good and equal soil with free drainage, and all the plants recently put out are in such situations. The recurrence of this first and fatal form of disease need not therefore, I hope, be anticipated.

13. The second form of disease does not affect the entire constitution of the plant, but manifests itself in patches on the stem and branches. The appearance of one of these patches is as if some escharotic had been dropped on the bark, which is of a dark, unnatural colour, shrivelled, dry, and brittle; occasionally these appearances extend to the wood, but as a rule they do not. In size the patches vary; many are about the size of a shilling, others are much larger. They are not numerous on one tree, and are often confined to a single branch. When small, no apparent affection of the general health of the plant occurs, and growth goes on unchecked. Where, however, a large patch occurs on a small tree, involving the bark pretty nearly all round the stem, death results. Death from this disease is, however, as far as my observations go, not common; and it is a well-established fact that a tree which has been extensively affected will, when cut down, throw up from its stump perfectly healthy shoots; while in hundreds of trees at Rungbee I have seen illustrations of recovery, the little patches of diseased bark being thrown off and replaced by perfectly healthy tissue, and the plant apparently as robust as if it never had been attacked. I had not sufficient leisure last year during the season at which this affection is most prevalent, namely, the rains, to make successive observations on the state of the diseased tissues, and I am prepared with no theories about its cause; I hope, however, to find out something during the approaching rains. This disease is not confined like the last to certain spots, but is found on plants in all parts of the plantation. I do not think it is to be feared much, and I certainly do not concur in Mr. McIvor's views concerning its dangerous nature. In my opinion it must be accepted as one of the drawbacks attending the cinchona experiment in Sikkim, in the same way as high winds and dear labour have to be accepted in the Nilgiri cultivation. Orchard-planting is not given up in the south of England because apple trees are especially subject to canker, nor are plantations abandoned in Scotland because a deadly disease (compared to which this form of cinchona disease is a trifle) attacks the larch.

14. *Summary of the year's work.*—During the past year 166,285 plants of *Cinchona succirubra* and 44,500 of *Cinchona calisaya* have been added to the permanent plantation. Propagation has been carried on vigorously, and the seed and nursery beds at present contain 600,000 young plants of the former and 147,500 of the latter species. The whole of the plantation has been carefully gone over, and every sickly plant has been rigorously cut down, while the healthy ones have been pruned and thinned. This has taken a great deal of time and labour, but I am convinced they have not been ill bestowed. A considerable extent of new land has been cleared and prepared for planting, and will be covered with cinchona as soon as the weather is favourable. Some new plantation roads have been made, and the old ones have also been kept in repair.

15. *Yield of bark.*—Nearly a hundred and sixteen thousand pounds of green bark (equal to about thirty-nine thousand pounds of dry bark) have been collected from the prunings and thinnings above mentioned, not a single tree having been cut merely for the sake of its bark. In accordance with the recommendation of the Cinchona Commission, a quantity of the best of this bark has been packed for transmission to England. The smaller bark, which it is considered more profitable to utilize in the manufacture of alkaloid, has, conformably to the instruction of Government, been stored up, pending the appointment of a quinologist. The bark will not deteriorate by being kept, and its storage costs nothing.

16. *Expenditure and Revenue.*—The budget allotment for the past year for all purpose, was Rs. 63,621, and the expenditure Rs. 50,463-13-5, showing a saving of Rs. 13,157-2-7s. The present is the first year in which revenue has been received from the sale of bark. During the year 7016 lb. were sold by auction in the London market. The bark was very varied in quality, a large proportion of it consisting of small quills of little value. The average price realized per pound was about one shilling and five pence, and the total amount received was equivalent to Rs. 5,068-1-2. When the mixed quality of the bark is considered, I think the result of this the first sale may be looked upon as favourable. The sum of Rs. 783-14 was received as rent for small patches of land within the cinchona reserve which are unsuited to our cultivation and which have been let to natives. This amount was paid into the civil treasury at Darjeeling.

17. *General considerations.*—The production in India

of cinchona bark as a crop cannot, I think, fairly be considered as yet beyond the condition of an experiment. It has indeed been demonstrated that cinchona trees can be grown successfully up to the age of about ten years, and that their bark is quite as rich in alkaloids as that obtained from the South American forests; but whether they will reach maturity remains to be seen. It has still to be settled how the bark crop can most advantageously be taken, and the respective merits of the systems of mossing as invented and practised by Mr. McIvor, of systematic coppicing, and of working forest-fashion by selection and thinning, cannot be determined without much additional experience. Connected with the commercial aspect of the matter, there are as unsettled problems, the probable extent to which the price of the drug will be affected by the introduction into the European market of the large quantities of bark which must soon begin to be turned out by the various Indian and colonial plantations that have been established, the amount by which the demand for preparations of cinchona will be increased by the fall in their price, which is almost certain to take place, and finally, the advantages or disadvantages of the manufacture of an amorphous preparation at the plantation as opposed to the complete separation of each alkaloid in a pure form, or to the more primitive plan of exporting all the bark to England, and of taking prepared alkaloids in exchange as part payment.

18. It is, however, a matter of satisfaction, that substantial progress has been made towards the realization of the great object which Government had in view in undertaking this experiment, namely, "to secure for the fever-stricken millions of India the inestimable blessing of an abundant and cheap supply of the only specific for the most deadly of all Indian diseases." That object will not be thoroughly secured until a febrifuge in some efficient form is procurable in every village in India. The amount of fever prevalent in the rural districts is, I believe, much greater than is usually supposed, and for its alleviation the sufferers have at present, as a rule, nothing more effectual than some selections from the wonderful farrago of substances known as "native medicines," few of which have much therapeutic influence in malarious fever. Any preparation of cinchona is to many a villager a thing unknown, unseen, unheard of. The amount of labour lost annually to the State by reason of the prevalence of fever is simply incalculable, while the loss of life is enormous; and I have no hesitation in saying this state of matters is to a great extent preventible by the dissemination of a cheap febrifuge.

19. As to the probable quantity of quinine that could be used in the Bengal Presidency, I calculate as follows:—There are in the provinces of Bengal, Orissa, Assam, Burmah, Behar, Oude, the North-Western Provinces, Central Provinces, and Punjab, probably a hundred millions of inhabitants, all more or less subject to fever, and it is, I think, no extravagant estimate to allow five grains of quinine *per annum* to each, which is equal to a total of 65,000 lb. or about 29 tons. In these circumstances it is probably premature to fear that too many cinchona trees are being planted.

20. In conclusion, my acknowledgments are due to Mr. Gammie, the resident manager of the plantation, and to Messrs. Biermann and Jaffrey, for the efficient and hearty way in which they have performed their duties.

21. The usual returns are appended.

Table showing the Number and Distribution of Cinchona Plants in the Government Plantations at Darjeeling on the 1st April, 1872.

Names of species of Cinchonia.	Number in permanent plantation.	Number of Stock Plants for Propagation.	Number of Seedlings or Rooted Cuttings in Nursery Beds for Permanent Plantations.	Number of Rooted Plants in Cutting Beds.	Number of Cuttings made during the Month.	Total Number of Plants, Cuttings, and Seedlings.
C. succirubra	1,400,000	....	480,000	120,000	....	2,000,000
C. Calisaya	77,500	10,000	70,000	77,500	....	235,000
C. micrantha	29,667	....	....	....	....	29,667
C. officinalis and varieties	100,000	....	....	....	25,000	125,000
C. Pahudiana	5,092	....	....	....	....	5,092
C. Pitayensis	....	16	....	....	24	40
Total......	1,612,259	10,016	550,000	197,500	25,024	2,394,799

THE LAVENDER COUNTRY.

In a ride by rail from West Croydon to Sutton, and on both sides, commencing at Waddon, as far as the eye can reach, are long narrow strips and occasionally broad expanses of lavender. After a thunderstorm, refreshed by the rain, the colour is deep and intensified, and the perfume crosses the pathway of the train. When the sun is shining with unusual brightness, any one standing in the midst of those fields may see the sky reflecting back the colours from the earth, the blue tints exchanged to lavender. Alighting at Sutton—the limit for the present of this cultivation—the road turns sharply to the right, and passes the well-known sign of the Cock, an hostelry of sporting notoriety, and brings us back on foot in the direction of Carshalton. Had we chosen the left-hand side of the railway, we should have been upon a plain stretching far away from Banstead Downs to Epsom Downs. There seemed something so unusual, peculiar and attractive in the appearance of the landscape; to ride through miles of vineyards in the Côte d'Or, the "golden hillsides" of France, or watch the terraced heights on the Rhine banks, where the sun casts back it rays from the broad waters like a mirror, and great and influential people discuss the merits of this or that year's vintage of Burgundy or hock in all parts of the world—compared with such scenes and thoughts lavender seemed to possess far humbler pretensions. But then we are told that it had unfailing medicinal qualities most valuble to workers in the fields; moreover it formed a component part or entered more or less into the composition of every description of scent; and the toilette and boudoir are not trifling questions in our days of supposed luxury and refinement unprecedented. We well remembered those little muslin bags—possibly there might be one or two stowed away forgotten in drawers at home. Hereafter they would be better appreciated for their modest appearance by the side of the gorgeously-decked perfumes of a Rimmel. The road lies high, and commands an extended view, and the patches of lavender seemed to thicken and multiply, some near at hand, others in the hollow, to our unaccustomed eye having a strange effect, when placed in contrast with light greens of standing waving corn, the graver greens of the fences, and the still darker green of the trees, with the fairy-like structure of crystal glistening in sunlight on the horizon. The crop, we were told, was looking remarkably well, with every chance in favour of an average. The subject appeared to possess considerable interest to wayfarers like ourselves. It was not difficult to get information from the humbler sort of folks, and we followed the route prescribed through Carshalton, frequented by trout fishers and brothers of the angle, and described by a great art critic as the most picturesque of all the villages of England. A stream that emerged into the roadside seemed to race with our footsteps, then disappeared, when turning sharply about on the right we were at Wallington, in the centre of our search. The district of Beddington, associated with the palatial residence of the Archbishop of Canterbury, of which Wallington is a hamlet, contains about 200 acres devoted to the growth of lavender. According to our informant, throughout the whole locality, including Sutton on the extreme verge, Carshalton and Mitcham, there may be counted about 300 acres of lavender fields. Mitcham is the parent source of the herbal or "physic gardening," in the native *parlance*, and from that place, about twelve or fifteen years ago, some transplants were made to Beddington. From thence the growth has extended to the neighbouring parishes, until, as at present, the eye is attracted on all sides by the broad sheets of colour, and the air is scented with the perfumes. In no other part of England has the same success attended this kind of gardening, except in Cambridgeshire, where the production is said to be inferior, although this opinion might even be reversed by inquiries in that quarter. However, it is evident in the case of the hop gardens in Kent and Sussex, something peculiar existing in the soil or climate, or both, makes these plants to thrive. Those who have crossed the plains of Spanish Estremadura could have seen miles of waste land covered with the *Lavendula* species, and florists conclude that the same skill brought to the assistance of nature might equally result in the successful crop that finds its way first to the distillery, and then by many transmutations to the scent-bottle or the medicine chest. The only peculiarity observable is a loamy upper surface for several feet upon a substratum of chalk, rather of a "holding nature," although dry. The ploughing at present is not so deep as in former years, and to this circumstance has been assigned the reason why in place of bearing for eight or nine years as formerly, the plants are now exhausted in three or at the utmost in four years. Upon an open space at Wallington of thirty acres, the largest lavender field in the locality, we were able to observe the different growths of the one, two or three years. Nearly adjoining was another four-acre enclosure spread out as level as a billiard-board, which we can readily believe to be the finest example of the one year's crop that could be seen anywhere. Only a moderate application of manure is necessary at the outset in the autumn, when the planting takes place; and after the first year's harvesting, the plants have grown to such dimensions that every other row has to be taken out, and every other plant in the row that remains. The three years' growth are the first to come to maturity, and then the second, and then the third. The harvest takes place in August. The cutting, which is done by the sickle, appears an art of itself, which affects the crop in the future year. The labourers are followed by women and girls, who immediately pack and tie the lavender up in mats, to protect it from the rays of the sun, or otherwise the quantity of oil to be extracted would be reduced before it could be taken in hand at the distillery. Small quantities have been previously cut before they are fully ripe, for Covent Garden Market, or for sale about the towns and villages in the neighbourhood. The distillery process is carried on upon the spot; as the volumes of smoke from several chimneys and the strong odour of herbs around the buildings sufficiently testified to some very odoriferous process within; for it must be remembered that peppermint, rosemary, dill, chamomile, as well as lavender, have to find their way to same crucial test. Beneath a brick-built shed stands a row of stills, with what are called worm-tubs attached to each still. Upon the ground-floor the furnaces are being attended, and the percolator watched, as a trickling noise indicates that the oil is being extracted by the process going on. Above the furnaces are the stills, of dimensions sufficient either to contain half a ton or a ton weight of herb, and the building is spacious enough to admit of carts being driven in for the purpose of unloading. The still is filled thrice in four-and-twenty hours, namely, eight hours to a run. The men get upon the upper floor, remove the still-head by a lever, then take the lavender from the mats and tread the stalks down with their feet until the copper is tightly filled to the brim. Liquor at boiling heat is then taken from the top surface of the worm-tub, although at the bottom and lower surface the water is quite cold, and the furnaces are set to work. The *worm* consist of piping attached to the head of the still, and passes round and round the tub which contains the cold water. The men watch the bringing over of the still—that is, the moment when the liquor begins to flow over the head into the worm. Directly it does so, they know that the oil is running, and immediately damp down the furnaces. The boiling liquor from the herbs, by passing through the tubing immersed in cold water, becomes condensed, and the oil separates from the water and runs into the percolator at the foot of the worm-tub. This bringing over is the most critical point in the whole operation; then great attention and experience are needed, otherwise the herbs, both stalk and flower, might be taken into the worm, and the oil be spoiled. So well practised, however, are the men employed that what is called a "run foul" is scarcely known during the whole of the distilling season. From thence it is taken and placed in dark glass bottles with short necks, containing 4 lb. to 7 lb. each, ready for merchandising. When one lot has been distilled the still top is removed by the lever, and the charge taken out with long forks. The steam and vapour that arise are very great—for the uninitiated quite overpowering; and what is termed the "walk" being very heavy, the men themselves have to labour hard to get out the refuse, which is thrown just at the back of the building for manure. The coppers are filled up again with herbs, fresh water is pumped into the worm-tub to supply what has been taken off the surface for the still, and to replace what has passed off in the evaporation that has been always going on, and the process again proceeds. The quantity of oil extracted from a ton of lavender varies according to the influence of the season; from 15 lb. to 16 lb. is considered a fair average, very seldom it reaches 21 lb., sometimes not more than 10 lb. The distilling lasts about two months, from the first week in August to the second week in October, according to the abundance or otherwise of the surrounding crop. The business itself is separate from the growing; the small growers as well as the large take their crops to the distillery, and pay a certain agreed upon rate per ton. The results during the present season have been favourable, although the continuance of wet whether somewhat interfered with the out-door work. These operations may be seen and inquired into by following out the route we had taken from Sutton, through Carshalton to Wallington, thence by the footpaths across the lavender fields to Beddington, and on to Waddon station upon the railway of the London and Brighton Company.—*Journal of Applied Science.*

The Pharmaceutical Journal.

SATURDAY, OCTOBER 26, 1872.

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

PHARMACEUTICAL REMUNERATION.

THE labourer is worthy of his hire, and despite all the inequalities and injustice which exist, he generally gets the value of his abilities and attainments in an open market. The employer who engages a servant at wages below those current in the labour market, as a rule discovers defects in the service performed. If not, the servant quickly discovers the value of his labour, and either takes it to another market, or demands increased pay. In public appointments, to which the salaries affixed are limited, in order to obtain the right men for the right places, the vacancies are announced, with the emoluments attached to them, in the most suitable channels for attracting the eye of would-be candidates. If a church living becomes vacant, the *Times* announces the death of the vicar, and that the living, which is in the gift of so-and-so, is worth so much. To replenish the ranks of the army the recruiting sergeant, with his ribbons and jests, haunts taverns and frequents fairs and markets, where loiterers and idlers are to be met with. But a more frequent way of making these announcements is by an advertisement in a public journal. Whether it be an errand boy, a secretary, or a professor that is wanted, he is advertised for. The plan has many advantages; it generally draws a choice of candidates to select from, and evades the possibility of round men being placed to fill square holes.

A Birmingham correspondent, at page 340, has directed our attention to one of these advertisements. The hospital for women in that city, being in want of a dispenser, advertised the vacancy, offering the modest salary of "£20 a year. Hours from 3 to 6 or 7 P.M." His letter tells its own tale. The poor we have always with us, and Birmingham, we know, nobly supports its charities. The governors of these have a duty to perform in seeing that the funds entrusted to them are judiciously and economically disbursed. Nevertheless, justice comes before generosity, and to offer a candidate competent to fill the post such a salary is defrauding him of his due. The hours are short, but they are the golden hours of a pharmacist's day; and one in whose hands is entrusted the balance of life and death of thousands annually, ought to receive a higher remuneration than threepence per hour for his services.

When such tempting offers as the above are held before the poor disciple of ÆSCULAPIUS and GALEN, need we wonder that the faint-hearted ones amongst us, deterred by examinations, as well as by poverty, should leave our ranks to join those of MARS, whose humblest worshipper, the raw recruit, is better remunerated than the Birmingham dispenser. Should his lot be cast in with FALSTAFF'S followers, and he likes them not so well as his first love, he may still adhere to this with advantage both to pocket and to pride, if we may judge from the following extract from a contemporary,* which another correspondent has kindly sent us:—

"Sergeant Wade, now serving as hospital-sergeant of the Dublin City Militia, has been appointed dispenser of medicines at the Royal Hibernian Military School. This is an appointment of great responsibility, and is worthy the ambition of many a young fellow who has passed some of his time with a chemist and druggist before enlisting in the army. There are several such appointments in the army, and they are all well paid, and the holders of them comfortably lodged."

They manage things differently in Ireland, but we think the elected candidate would have better certified his fitness for the appointment if he could have shown a qualification superior to that which at one time accepted the recruiting sergeant's offer. In all these appointments we hope the day is not far distant when the candidates for them must show that they possess a pharmaceutical qualification. The old-fashioned apothecary is, in hospitals and dispensaries, either a *non est*, or he is above performing the duties the pharmacist is proud to do. Hence, the dispensing is frequently left to be done by porters, errand boys, and "compounders," who are frequently unaware that ether and spirit of ether are not synonymous, and do not know the difference chemically between a perchloride and a subchloride.

THE SALE OF QUININE WINE.

IF we may judge from the numerous inquiries received respecting the sale of Quinine Wine, considerable doubt and anxiety exist amongst chemists and druggists as to the regulations of the Board of Inland Revenue in reference to it. We therefore readily give insertion to the following letter, which has been kindly placed at our disposal by a correspondent who applied to the Board of Inland Revenue upon the subject:—

"*Inland Revenue, Somerset House, London, W.C.,*
"*9th October*, 1872.

"Sir,—In reply to your inquiry of the 5th instant, I am desired by the Commissioners of Inland Revenue to acquaint you that no licence is required for the sale of quinine wine, if made according to the recipe in the British Pharmacopœia, and not sold as a proprietary or patent medicine.

"I am, sir,
"Your obedient servant,
"Mr. J. Ingall." "C. W. PLOWMAN.

* *Weekly Dispatch*, Oct. 6th, 1872.

PHARMACEUTICAL UTILITY OF BOTANICAL GARDENS.

Botanic gardens and their uses is a subject that has been taken up and treated of very fully in a lecture by Dr. Von Mueller, of Melbourne. The great utility of a well-managed botanic garden in its various phases is pointed out, and he advocates that, in a pharmaceutical point of view, a botanic garden is not only an indispensable element in the education of the student, but is a constant and ready help through life. Dr. Mueller says:—"For toxicological experiments in a botanic garden the various poison plants become of importance, irrespective of the guardianship, which the display of these plants in a living state so instructively exercises. Investigations of this kind require lengthened attention, the separation, analyses, and identification of organic poisons being surrounded with far more difficulty than the examination of metallic or other inorganic substances. Besides, the development or intensity of the deleterious principle depends often on local causes, which are not always within ready range of observation, or perhaps even involved in mystery, such as physiology and chemistry have hitherto striven in vain to clear away. The so-called Cape weed (*Cryptostemma calendulacea*), for the presence of which I am not responsible, as it had already irrepressively invaded some parts of Australia as early as 1833, was recently subjected in my laboratory to examination, with a view of ascertaining whether any chemically separable active principle might produce the violent purging, terminating in acute, and often fatal dysentery, to which flocks occasionally become subject; but the investigation gave negative results. The deleterious effect arises, therefore, either merely from mechanical irritation and distension when sheep have gorged themselves with this weed, or it may be traceable to a locally developed poison, which in ordinary circumstances does not exist. The latter was ascertained to be the case by my own experiments as far as *Swainsona Greyana*, *S. lessertiæfolia*, *Lotus australis*, *Gastrolobium bilobum*, and, perhaps, *Stypandra glauca*, are concerned. The two former cause in some localities cerebral affections in horses and other pastural animals, terminating in death; but the cultivated plants were found harmless. *Gastrolobium*, with some species of *Oxylobium* and *Isotropis*, the bane of the heath pastures of West Australia, has hitherto baffled all efforts to detect an antidote, but one of the most dreaded species, *Gastrolobium bilobum*, proved here in cultivation inert. Desert specimens of *Lotus australis* produced in my local trials deadly effects on sheep, while our garden plant, or the fresh herb from the sand shores of Port Phillip, showed themselves innocuous. *Stypandra glauca* is reported to produce complete blindness of sheep in some districts of West Australia, the eyes, it is said, assuming a blue tinge throughout. Unless this grass lily has been confused with an alien and externally similar weed—namely, *Agrostocrinum stypandroides*—we have again a plant, which, with capriciousness, has hitherto baffled our toxicologic experiments. *Anguillaria* and *Burchardia*, which early in the spring sprinkle their pretty blossoms so universally over the pastures of the whole of extra-tropic Australia, produce, so I have ascertained, innocuous bulbs, although belonging to a tribe of plants which includes the dreadfully deleterious veratrums and sabadilla."

IPECACUANHA CULTIVATION IN INDIA.

In the report of the Royal Botanical Garden at Calcutta for the year ending March 31st, 1872, the superintendent, Dr. George King, refers to the progress of the experiment which is now being made to propagate the ipecacuanha plant in India. At the beginning of the year five plants in Sikkim and seven in the Calcutta garden represented the whole surviving offspring of a single plant received from Dr. Hooker in 1866. From the five Sikkim plants about four hundred cuttings were obtained, the greater proportion of which have formed good roots, and were at the date of the report fine healthy little plants. During the year, the plants—about one hundred—which last September* we informed our readers Professor Balfour had ready for transmission from the Edinburgh Botanical Gardens, have arrived at Calcutta in five Wardian cases, as well as about one hundred and fifty, in three cases, from Messrs. Lawson, the eminent nurserymen. The climate of Calcutta having, however, proved totally unsuitable to ipecacuanha, all attempts to propagate it in the garden there have been abandoned, and the plants were, by an order of the Government, based on the experience of the late Dr. Anderson, forwarded as soon as practicable to Sikkim, where the experiment of cultivation will be made under similar conditions to that of cinchona. The propagation is being carried on under the immediate care of the European gardeners of the cinchona plantation, chiefly in one of the hot deep valleys of the Rungbee reserve. Ipecacuanha appears to thrive best under deep shade, and in a hot, steamy, equable climate, conditions which are fully supplied in the valleys of the outer slopes of the Sikkim Himmalaya. A small valley near Sookna has accordingly been taken up as an ipecacuanha reserve; and soon as plants can be spared, experimental patches will be planted out at various places so as to discover the conditions of successful cultivation as soon as possible.

Last week, at Sidney Sussex College, Cambridge, a Scholarship in Natural Science was awarded to Mr. William Foster, F.C.S. Mr. Foster was Senior Bell Scholar in the Laboratory at Bloomsbury Square, during the Session 1869–70, and since that time has acted as one of the Gas Examiners under the Metropolitan Board of Works.

* Pharm. Journ. [3] vol. ii. p. 227.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

October 15*th*, 1872.

Present—Messrs. Aitken, Gilmour, Kemp, Kinninmont, Noble and Young.

Professor Maclagan was also present on behalf of the Privy Council.

Major Examination.

The undermentioned was examined, and declared qualified to be registered as a Pharmaceutical Chemist:—

*Moss, Albert .... Ilkeston.

Minor Examination.

Nine candidates were examined, of whom *three* failed. The following *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

*Mathie, William .... Edinburgh.
Carroll, George .... Bath.
Davidson, William .... Edinburgh.
Shepherd, Alexander Moir.... Aberdeen.
Platt, Jakeh Wright.... New Delph, Saddleworth.
Lindsay, George William .... Sunderland.

The above names are arranged in order of merit.

Modified Examination.

Four candidates were examined, and were declared qualified to be registered as Chemists and Druggists:—

Barton, Septimus William .... Manchester.
Kendle, John Cuthbert ...... Newcastle-on-Tyne.
Oakley, Robert .... Bridgnorth.
Proctor, Alexander Duff ...... Glasgow.

EXAMINATIONS IN LONDON.

October 15*th and* 16*th*, 1872.

Major Examination.

Seven candidates were examined, of whom *four* failed. The following *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Davies, Peter Hughes .... Peterborough.
Thomas, John Darby Dermott Clifton.
Brown, James .... Bideford.

October 16*th*, 17*th*, *and* 18*th*, 1872.

Minor Examination.

Seventy-one candidates were examined, of whom *thirty-six* failed. The following *thirty-five* passed, and were declared qualified to be registered as Chemists and Druggists:—

*Tully, John .... Brighton.
Equal. { *Hugo, Richard .... Bideford.
{ *Robertson, John............ Plymouth.
*Culverwell, John Sayer ...... Windsor.
*Aldersladc, William.......... Southwark.
*Hefford, Charles .... Sydenham.
*Russel, Thomas Gregory...... Cambridge.
Equal. { Lester, Henry .... Northampton.
{ Smith, Thomas Henry........ York.
Equal. { Capstick, John William ...... Lancaster.
{ Taylor, Stephen John .... Westbury.
Davis, William Richard ...... Douglas.
King, Horatio Alfred .... Norwich.
Parrott, John................ Norwood.
Rees, John Henry Williams .. Clutton.
Jefferson, John Mitchell ...... Southport.
Shirley, Stephen Shillito ...... London.
Equal. { Marjason, John Morriss........ Dublin.
{ Smithies, William Edward .... Elland.
Maitland, Pelham Christopher.. Launceston.
Rivett, Arthur James .... Yarmouth.
Pearson, Daniel .... Dudley.
Farr, Joseph .... Peterborough.
Hiscocks, Edwin Hilliar ...... Fairfield.
Bennett, Charles.............. Bristol.
Equal. { Flinders, Matthew Tom........ London.
{ Pickup, William.............. Blackburn.
Jenkins, Thomas Morgan...... Merthyr Tydvil.
Smith, Richard Fox .... Barton-on-Humber.
Cunnington, Richard Elliott .. Bristol.
Norweb, Arthur .... Nottingham.
Kershaw, Joseph Henry ...... Manchester.
Stamps, Fredcrick .... West Bromwich.
Dymott, Frank .... Southampton.
Litten, Henry................ Sittingbourne.

The above names are arranged in order of merit.

Preliminary Examination.

The Certificate of Examination of the undermentioned, by the Incorporated Law Society, was accepted in lieu of this Examination:—

Pryer, Henry .... Chipping Norton.

* Passed with honours.

The following is the result of the Preliminary Examination held on the 7th instant:—

England and Wales.

Two hundred and fifty-eight candidates presented themselves for this examination, of whom *eighty-five* failed. The following *one hundred and seventy-three* passed, and have been duly registered as Apprentices or Students.

Hall, John Marsden.......... Huddersfield.
Campbell, Neil Stewart ...... Newcastle-on-Tyne.
Smith, George .... Sunderland.
Hobson, Thomas Coultas...... Doncaster.
Holl, Edmund .... Scarborough.
Phillips, Thomas Powell...... Carmarthen.
Vaughan, John.............. Newtown.
Equal. { Bullock, John Alfred .... South Shields.
{ Evans, David .... London.
{ Hartley, Thomas .... Haslingden.
Ashweek, John Sydney ...... Torquay.
Equal. { Gilling, John Thomas .... Ripon.
{ Jones, James................ Southport.
{ Maggs, Frederick William.... St. Leonard's-on-Sea
Equal. { Edwards, James John .... Coventry.
{ James, Thomas Cragg........ Dalton-in-Furness.
Equal. { Bell, Henry .... Newcastle-on-Tyne.
{ Futcher, Alfred James........ Sandown.
{ Maish, Walter Machado ...... Bristol.
Chadwick, George Nicholas .. Dewsbury.
Equal. { Ponçon, Alfred Augustus .... Wallington.
{ Spencer, Robert .... Stourbridge.
Equal. { McGuiness, Joseph .... York.
{ Rushforth, George Frederick.. Louth.
Equal. { Allison, Joseph William ...... Sunderland.
{ Evans, David .... Porth.
{ King, William .... Southend.
Equal. { Littlefield, James Clarence.... Ventnor.
{ Jacobs, Henry Garrard ...... Portsmouth.
{ Carter, William Gibbon ...... York.
{ Wylde, James .... Reading.
Dalzell, Edward .... Burwell.
Equal. { Bessell, James Walter........ Ludlow.
{ Higgs, Alfred Henry .... Bristol.
{ Reade, Leonard James........ Wolverhampton.
Equal. { Davis, Richard Frederic ...... Ventnor.
{ Marshall, Charles William.... Devonport.
{ Williams, William Richard .. Carmarthen.
North, John Slingsby .... York.
Equal. { Marlow, Frederick William .. Coventry.
{ Stiling, John Edward .... Exeter.
Lewin, Arthur Clayton ...... Plymouth.
Equal. { Pattinson, William .... Hexham.
{ Sainsbury, Allan Fox .... Clapham.

Equal.	Fisher, John Little	Workington.
	Hodgson, Thomas Samuel	Hulme, Manchester.
	Taylor, Edward Lyon	Rochdale.
	Williams, John Frederick	Southsea.
	Griffiths, Benjamin Lloyd	Cardiff.
	Green, Edwin	Billinghay.
	Bletsoe, Francis Ferriman	St. Neots, Hants.
	Atkinson, John Thomas	Boston.
Equal.	Crooke, Charles Gibbins	Walsall.
	Kidd, William Champley	Malton.
	Kerr, William Henry	Honiton.
	Leslie, George	York.
	Dobson, Fred	Great Driffield.
Equal.	Oldershaw, William	Nottingham.
	Wells, Albert Charles	Leamington.
Equal.	Burrell, John Benjamin	Norwich.
	Satterthwaite, James	Ulverston.
	Lawton, John Dyson	Louth.
	Sketton, Tom	Maryport.
Equal.	Beach, Joseph	Colchester.
	Bevan, William	Ipswich.
	Jackson, George	Heywood.
Equal.	Davis, James Bailey	Chester.
	James, Joseph	Hanley.
	Knowles, James	Burslem.
Equal.	Case, William	Norwich.
	Wingrave, Thomas	St. Albans.
Equal.	Bright, Thomas	Shrewsbury.
	Daniel, John	Ceibach.
Equal.	Ellis, James	Dewsbury.
	Parkes, George James Robert	Tipton.
	Sewell, Jonathan Joseph	Workington.
	Swift, Phillip Dickerson	Spalding.
	Hopkinson, Stephen	London.
Equal.	Bell, John Conyers	Hull.
	Keer, Thomas Henry	Sudbury.
	Ellis, Richard	Knaresborough.
Equal.	Bentley, John Thomas	Hull.
	Jones, Llewelyn	Chester.
Equal.	Gibson, James	North Shields.
	Pannell, Charles	Boston.
	Porter, William	Bury.
Equal.	Hall, John	Oldham.
	Wood, James Burge	Lincoln.
Equal.	Dutton, Henry	Tewkesbury.
	Hellier, Henry John	Newport, Isle of Wight.
Equal.	Blewett, Frederick	Penzance.
	Wolstenholme, John, jun.	Bury.
Equal.	Pentelow, Harry	Oundle.
	Whitwell Ewen	Peterborough.
Equal.	Abraham, Alfred Clay	Liverpool.
	Gibbons, George	Adwy.
Equal.	Davies, Alfred Rogers	West Bromwich.
	Pennington, Thomas	Ashton-under-Lyne.
	Playford, Frederick William	Holt, Norfolk.
Equal.	Bayfield, Gabriel Thomas	Norwich.
	Waller, Francis	Doncaster.
	Clarke, Edward Theodore	Bermondsey.
Equal.	Beringer, John Jacob	Redruth.
	Stevenson, John Jewsbury	Derby.
	Herbert, Austin	Hereford.
	Carter, William	St. Neots, Hants.
	Wilson, Thomas Whiting	Harrowgate.
Equal.	Pickford, Henry Ragland	London.
	Smith, Charles	Heywood.
Equal.	Matthews, George Francis	Bristol.
	Shrimpton, Frederick George	London.
Equal.	Chambers, Herbert	Haddenham.
	Davenport, Charles Aldersey	Wolverhampton.
	Husbands, James Wessen	Bristol.
	Roberts, Herbert	St. Albans, Herts.
Equal.	Edwards, William Herbert	Kidderminster.
	Jones, Charles	Wellingborough.
Equal.	Blackbourn, Arthur	Birmingham.
	White, Osmar Alfred	Woolwich.
Equal.	Blyth, Archibald Darkins	Norwich.
	Jones, Samuel	Flint.
Equal.	Bates, George Tweedie	Hereford.
	Clarke, Ralph Tate	Workington.
	Evans, Thomas Jones	Wrexham.
	Fryer, Arthur	Ayston.
	Sheffield, Arthur John	Beverley.
Equal.	Chadwick, Andrew	King's Lynn.
	Chadwick, John	Accrington.
	Charles, Thomas	Bacup.
	Gregory, Walter	Taunton.
Equal.	Deakin, Thomas Riley	Blaenavon.
	Moore, Henry	Brighton.
	Nicholson, Charles	York.
Equal.	Jeans, Thomas Robert	Mansfield.
	Waldron, Arthur	Willenhall.
Equal.	Gibson, William	Penrith.
	Hobson, George William	Buxton.
	Bond, Henry Greensill	Portishead.
Equal.	Ison, Francis	Penrith.
	Smith, James	York.
Equal.	Ellis, James	Landport.
	Monti, Peter	London.
Equal.	Chapman, Leonard Parker	Rochdale.
	Greenhill, Samuel Osborne	Colchester.
	Worringham, Edward	Ipswich.
Equal.	Barton, Thomas James	Coventry.
	Holmes, Thomas Henry	Spalding.
	Wood, Henry	Bury.
Equal.	Howell, Evan John	London.
	Ray, William Frederic	Westerham.
	Smyth, Stephen Hill	London.
Equal.	Payne, Edward Marten	Wolverhampton.
	Williams, James Edward	Louth.
Equal.	Blencowe, Frank	King's Lynn.
	Clegg, James	Heywood.
Equal.	Collins, Thomas Robert	Leicester.
	Johnson, Edward	Stockport.
	Lakin, James	Derby.
	Sands, Thomas	Tunbridge.
	Thomas, David	Haverfordwest.
	Thomas, Thomas Gratton	Bagillt.
Equal.	Thornber, William	Preston.
	Yates, Charles William	Kegworth.
	Symington, William	Sheffield.
Equal.	Dunn, Albert Charles	Hereford.
	Morgan, Thomas Phillip	Tredegar.
Equal.	Griffith, Charles	Weston-super-Mare.
	Jeanes, George	Alverthorpe.
	Longmore, Henry Edward	London.
	Mills, William Hamer	Heywood.
	Wardle, James	Liverpool.
	Weatherley, Richard John	Teignmouth.
	Sharp, Everard Parkinson	Pinchbeck.

Scotland.

Twenty-four candidates presented themselves for this examination; of these, *seven* failed, and the following *seventeen* passed, and have been duly registered:—

	Dick, John Johnston	Dunfermline.
	Wallace, Andrew	Dunfermline.
	Aymer, James	Aberdeen.
	Thom, Robert	Glasgow.
	Davidson, Alexander	Insch.
	Clark, William Coltart	Dalbeattie.
	Cowie, John	Glasgow.
	Drysdale, Joseph	Edinburgh.
	Beveridge, William	Edinburgh.
	Irving, Peter	Dumfries.
	Buchanan, David	Stirling.
	Robertson, John	Inverness.
	Murray, Matthew David	Annan.
	Steele, John Cockburn	Greenock.
	Cairns, John	Kelso.
Equal.	Ogston, William	Aberdeen.
	Gibson, Robert James	Glasgow.

The following is a list of the Towns at which the Examinations were held, with the numbers of Candidates annexed:—

ENGLAND AND WALES.

	Candidates.	Passed.	Failed.
Ashton-under-Lyne	1	1	
Barnet	1		1
Bedford	1		1
Beverley	2	2	
Birmingham	3	1	2
Blackburn	3	2	1
Bolton	3	1	2
Boston	3	3	
Bradford, Yorks.	1		1
Brighton	1	1	
Bristol	6	5	1
Buxton	1	1	
Cambridge	4	2	2
Cardiff	2	1	1
Cardigan	1	1	
Carmarthen	3	3	
Cheltenham	2		2
Chester	3	3	
Cockermouth	4	4	
Colchester	3	3	
Coventry	4	3	1
Derby	2	2	
Devonport	1	1	
Dewsbury	2	2	
Doncaster	2	2	
Dudley	1	1	
Durham	1		1
Exeter	2	2	
Flint	2	2	
Gateshead	1	1	
Grantham	1		1
Guildford	1		1
Hanley	1	1	
Harrogate	1	1	
Haverfordwest	1	1	
Hereford	3	3	
Huddersfield	1	1	
Hull	2	2	
Huntingdon	2	2	
Ipswich	2	2	
Kidderminster	2	1	1
King's Lynn	2	2	
Knaresborough	1	1	
Knutsford	1		1
Leamington	2	1	1
Leeds	2		2
Leicester	3	1	2
Leominster	1		1
Lincoln	1	1	
Liverpool	2	1	1
London	31	15	16
Loughborough	2	1	1
Louth	3	3	
Ludlow	2	1	1
Macclesfield	1		1
Manchester	11	6	5
Margate	1		1
Merthyr	1		1

	Candidates.	Passed.	Failed.
Newcastle-under-Lyne	1		1
Newcastle-on-Tyne	3	2	1
Newport, Isle of Wight	1	1	
Newport, Mon.	2	2	
Newtown	1	1	
Northampton	3	2	1
Norwich	5	5	
Nottingham	4	2	2
Oldham	1	1	
Oxford	3	1	2
Penrith	2	2	
Penzance	1	1	
Peterborough	1	1	
Plymouth	1	1	
Preston	2	1	1
Reading	2	1	1
Retford	1		1
Ripon	1	1	
Rochdale	5	4	1
Ruthin	1	1	
Ryde	3	3	
St. Albans	2	2	
Scarborough	1	1	
Sheffield	3	1	2
Shrewsbury	1	1	
South Shields	2	2	
Sleaford	1	1	
Southampton	1		1
Southport	1	1	
Southsea	4	3	1
Spalding	1	1	
Stamford	1	1	
Stockport	2	1	1
Stoke-on-Trent	1		1
Stourbridge	1	1	
Sunderland	3	2	1
Swansea	7		7
Taunton	2	1	1
Tewkesbury	1	1	
Tonbridge	2	2	
Torquay	2	2	
Truro	1	1	
Ulverston	3	2	1
Wakefield	1	1	
Walsall	1	1	
Warrington	1		1
West Bromwich	1	1	
Weston-super-Mare	1	1	
Winchester	1		1
Wolverhampton	4	4	
Worcester	1		1
Wrexham	1	1	
Yarmouth	1		1
York	8	7	1

SCOTLAND.

	Candidates.	Passed.	Failed.
Aberdeen	3	3	
Berwick	1	1	
Dumfries	3	3	
Dundee	1		1
Dunfermline	2	2	
Edinburgh	9	3	6
Elgin	1	1	
Glasgow	3	3	
Greenock	1	1	

The questions for the Examination were as follows:—

LATIN.

Translate into English two at least of the following sentences:—

1. In castris Helvetiorum tabulæ repertæ sunt, literis Græcis confectæ, et ad Cæsarem relatæ, quibus in tabulis ratio confecta erat, qui numerus domo exisset eorum, qui arma ferre possent, et item separatim pueri, senes, mulieresque.
2. Hac oratione ab Divitiaco habitâ, omnes qui aderant, magno fletu auxilium a Cæsare petere cœperunt. Animadvertit Cæsar, unos ex omnibus Sequanos nihil earum rerum facere quas ceteri facerent; sed tristes, capite demisso, terram intueri.
3. Fiat mistura, de quâ cochleare largum unum secundis vel tertiis horis exhibeatur, sæpius rariusve prout febris vehementior vel mitior fuerit.
4. Macera per horas viginti quatuor; tum decoque ad congium, et liquorem adhuc calentem cola; denique ad idoneam crassitudinem consume.
5. Give the Nominative Case Singular of each of the following nouns: *domo*, *pueri*, *fletu*, *capite*, *horis*, *pacem*, *crassitudinem*.
6. If the persons differ in a sentence, with which does the verb agree? Give two examples.
7. Mention four *Impersonal* verbs. How are they conjugated?
8. Give the meaning of the following terms and sentences: Jusjurandum—ratibusque compluribus factis—obsides—gladiis destrictis—circiter mille passuum.
9. What parts of the verb are contigisse, tribui, consecuti, reservaretur, pervenerint, intellexit?

ARITHMETIC.

10. Write down in figures the following numbers: Two hundred and three millions four hundred and six thousand five hundred and eight.
11. Divide £7086. 8*s*. 0½*d*. by 785.
12. If 15 men build 37 roods of wall in 27 days, how many roods will 74 men build in 63 days?
13. What is the value of $\frac{7}{8}$ of a pound sterling?
14. Multiply ·786 by 100.

ENGLISH.

15. What is an Interjection? Name some.
16. Explain the difference between Copulative Conjunctions and Disjunctive Conjunctions.
17. What are *a* or *an* and *the* called in some modern systems of Grammar, and why are they so called?
18. Which is the Subject and which the Predicate in the following sentence?—"Good wine exhilarates the spirits."
19. Parse the following: They went to Switzerland for the annual trip.
20. Write from fifteen to twenty-five lines upon *one* only of the following subjects:—
    A. The Autumn Manœuvres.
    B. Westminster Abbey.
    C. The Game of Cricket.

Provincial Transactions.

ROCHDALE CHEMISTS' ASSOCIATION.

On Wednesday evening, the 9th instant, the first ordinary meeting of the Rochdale Chemists' Association was held in the refreshment room of the Town Hall. There was a good attendance of members. After the election of new members, and a special vote of thanks to Messrs. Evans, Sons and Co., of Liverpool, for their gift of a valuable cabinet of specimens, illustrating pharmacy and materia medica, Mr. Councillor

Booth (the President of the Association) delivered the following address:—

I congratulate the association on the position which they now occupy. Some years ago, before the establishment of the Pharmaceutical Society, the chemists and druggists of England were a disorganized body. They had no centre of life, no trade organization or association, and were consequently largely and sometimes perilously exposed to attacks from without, calculated to endanger the trade, and inconveniently to confine its operations. At the time to which we refer, the labour and anxiety, for instance, of getting up an opposition to an obnoxious measure was very great, and even at such times it required no small degree of eloquence and demonstration to arouse the generally dormant spirit of the trade, who appeared to think the world was bounded by their own horizon and themselves the centre thereof. On such occasions, the interests of the trade were greatly jeopardized, and but for the philanthropic and praiseworthy labours of such men as the late Jacob Bell especially, with Messrs. Allen, Farmar, Ince, Gifford, Herring and Barron, and the indefatigable secretary of the Pharmaceutical Society, the late Mr. George W. Smith, the business of pharmaceutical chemists and druggists would have been so crippled, "cabin'd and confined," that it would have ultimately died out, and the verdict would have been, "Died under the visitation and oppression of the Apothecaries' Acts."

It was in the year 1841 that a large and influential public meeting of the chemists and druggists of London was called at the Crown and Anchor, to take into consideration "a Bill to amend the laws relating to the Medical Profession in Great Britain and Ireland," introduced by Mr. Hawes, M.P. The object of this Bill was to curtail the freedom hitherto enjoyed by chemists and druggists prescribing and recommending medicines; in fact, to deprive them of the right to do so. The audacity of this proposal had alarmed the leading members of the trade in London, and forming themselves into a committee to resist the passing of the Bill, they entered into correspondence with members of the drug trade in the country. We believe the anxiety thus expressed by the London members was heartily responded to by the country, and Mr. Hawes soon intimated his intention to withdraw the obnoxious clauses affecting the drug trade, upon which his friend Mr. Wakley entreated Mr. Hawes to withdraw the remaining portions of the Bill. He did so, asking leave to bring in a new one, thus showing that the prime object of this Bill was so to break down and check the rising importance of the drug trade, that the interests, etc., of apothecaries might be enhanced. I am happy to say Rochdale took its part in this successful opposition, and continued to do so, for in the following month, an amended Bill was introduced by Mr. Hawes, "more insidious and injurious to the trade than the intelligible, clear provisions of the former Bill."

This Bill, had it become law, would have had the effect of suppressing the trade altogether, and establishing a monopoly of the sale and dispensing of drugs in the Society of Apothecaries; would have left the public, and the poor of England especially, to the tender mercies of those who were ready to say with Dr. Letsom,

"When patients sick apply to me,
I purges, bleeds, and sweats 'em;
If after that they choose to *dee*,
What's that to me, J. Letsom?"

On this occasion a petition was presented from Rochdale by Mr. Fenton and Mr. Brotherton. The House was "counted out" before the determination of the debate.

The committee who had thus so actively and successfully opposed the Bill, in reporting to their constituents, expressed their opinion that it had become necessary to watch with attention any future attempts at legislation with respect to the trade, as they had ascertained clearly that it was the intention of the College of Physicians, the College of Surgeons, and Apothecaries' Company, in their scheme for medical reform, to bring chemists and druggists by some legislative enactment under their joint control, but *especially that of the Society of Apothecaries.*

This meeting held on the 15th April, 1841, unanimously adopted the Report, and resolved, "That with a view to the protection of permanent interests of the trade, an association under the title of the Pharmaceutical Society of Great Britain should then be formed, and that a committee should be appointed to frame laws and regulations for its future government." Thereupon deputations visited various large towns, and everywhere met with hearty reception. Manchester and vicinity, represented at a special meeting in the Mechanics' Institute, was visited by the late Mr. Bell on the 15th November, 1841, and after an interesting discussion resolved on the formation of a branch association which was vigorously carried on for several years. Courses of lectures on Botany and Pharmaceutical Chemistry, etc., were delivered and fairly attended. But in five years, I am sorry to say, the library and reading-room were closed for want of sufficient interest.

As a proof of the necessity of some organization to watch over the interests of the trade, and that the establishment of the Pharmaceutical Society was most opportune and judicious, it may be stated that many attempts were made in Parliament to carry clauses in various Bills which would have been prejudical to their interests.

The Pharmaceutical Society was incorporated in 1843; and awake to the duty of guarding our trade interests, as well as providing means for the better education of chemists and druggists, set themselves with spirit to arouse their brethren to a sense of their responsibility to the public, and to the prime necessity of that better education for the right performance of the duty chemists and druggists professed to discharge, so they presented a bill for the regulation of the qualification of chemists and druggists in England and Wales—pronouncing it to be essential to the security of the public that those engaged in the preparation and sale of drugs and medicines, should possess competent knowledge of their characters and properties, and such other information required to enable the dispenser to prepare correctly the prescriptions of medical men. It is very remarkable, and is an exhibit of the general indifference to the subject in England, that almost every other European nation regulated by law the education of those engaged in pharmaceutical pursuits.

I will draw a veil over the state of pharmacy fifty years ago in this country. I will not particularize lamentable cases of presumption and ignorance, nor will we mention the fraud and imposition practised on the public by the sale of articles, mere adulterations and substitutions, which were palmed off as "the thing."

The attention drawn to the subject of pharmaceutical education has been beneficial; on all hands we perceive improvement. There is springing, up we might say, a new race of pharmacists who bid fair to be an honour to their country, and who will shortly far out distance their predecessors, as their opportunities and advantages are so much greater than theirs were. It is greatly to be desired that this progress (general as it is) were more rapid. The daily signs of it, however, give ground for cheering and bright hope.

The sale and preparation of medicines was in early times in the hands of comparatively few. They must have been observant and careful men, for they could only have arrived by such means at the knowledge of the particular effects of medicines. How many accidental deaths there must have been! How many cases in which experiments in medicines must have had terrific results! Reference to their works prove how they believed medicines to have been under the direction of the planets and zodiacal signs; and we may easily imagine how they would excuse some *disastrous effect* by the supposition of a malevolent influence intruding to mar the expected effect. And doubtless, under such circumstances, the practice of physic was doubtful and hazardous. Fearful must have been the suspense of individuals, when brought low by sickness, when some panacea said to have the effect of *kill or cure* was presented. No wonder then that physic should be suspected of being an ally of *Mors* himself. Heathen mythology relates that Æsculapius, the son of Apollo, made great progress in the medical art and gained the reputation of ability to raise the dead. But it is recorded that his success was so great that Pluto, who saw the number of his ghosts daily increase, complained to Jupiter, who killed Æsculapius with his thunderbolts. Doubtless it would be said by some medico-astrologer that there was an unfortunate conjunction of stellar influences.

After referring to the progress of knowledge, invention and discovery which has happily delivered us from the superstitions that formerly held the human spirit in bondage and retarded liberation from its wide-spread thraldom for ages, and paying a tribute to those who by their labours have prepared the way for the student of the present day, the speaker continued,—

Some here present have passed through difficulties to which I have only alluded, and have made good use of the advantages which they had to seek as they could, and for which, under stress of business, they had to deny themselves of needful rest and recreation; and some are now about entering the gate through which we passed. What will they find? They will find a path rendered easy by the labours of their predecessors; the difficulties which had well-nigh excusably deterred them smoothed down; and everywhere the hand of intelligent instruction eagerly inviting to progress.

Shall the opportunities now so freely offered be carelessly passed by? Shall all the wise provision of the Pharmaceutical Society, and the associations everywhere rising up in the country, be negatived by indifference and neglect? I trust not. The chemists and druggists of Rochdale, actuated by laudable feelings, now band themselves together, and appear at this their first ordinary meeting, to take the oath of allegiance to pharmaceutical science, and swear fealty to her rule and sway. And they desire in thus associating themselves together to render to each other assistance in the prosecution of their interests, whether commercial or scientific. Feeling each a brother's care, they desire to strengthen each other's hands, and diffuse around them thorough wise educational schemes,—the advantageous opportunities of instruction they have devised. Let no youth entering on the study of pharmaceutical chemistry be discouraged. Pluck up heart and hope on. How did Faraday obtain knowledge? By diligence, attention; by labour and work. And so with a thousand others. And so must it be with the young aspirants for pharmaceutical knowledge and fame. Let them remember the prize before them,—a status and a position to which we have not yet attained. But it can only be reached through labour. I remember in the frontispiece to an old school-book the Temple of Fame represented as being placed on an eminence, and in the valley below Science pointing ardent youths to the path which led to it, apparently cheering them on to the path leading to the temple. The path could not be seen; it might be dark, difficult, rocky and steep, but the light of the temple shone over the path if not upon it. So it is with you. It is a true saying there is no royal road to learning. Nor is there a railroad either. The way is too steep, even with all that can be done to ease it. But there is a real way, and you do not need to miss it. While I would commend you to enter with determination, I would have you enter with caution. Inquire for the right path. Do not take any side path however promising. There are real pleasures in store for you, and every turn of the true path will bring you to some halting-place for your encouragement; but you cannot make progress by merely looking out and staying in these groves of delights. Nerve yourselves again for the upward path.

I have been distressed to find so many incapables turned back at the Preliminary examinations. More strict examinations into progress must be the rule in educational establishments, for young persons ought not to fail at such an examination, to pass which may be said to be only the test of ordinary attention to study. The observations of Dr. Temple, Bishop of Exeter, go to confirm all that is said as to the necessity of application to study.

Offering advice to students, he warns them not to give way through weariness, for if there was not weariness in the work, they might be sure it was not so thorough going as it ought to be. Of all work that produces results, nine-tenths must be drudgery. There is no work, from the highest to the lowest, which can be done well by any man who is unwilling to make that sacrifice. Part of the very nobility of the devotion of the true workman to his work consists that a man is not daunted by finding that drudgery must be done, and no man can really succeed in any walk of life without a good deal of what in ordinary English is called pluck. This is the condition of all work whatever, and it is the condition of success. And there is nothing which so truly repays itself as this very perseverance against weariness. This is the Bishop's experience, and it is that of every successful man. On that which costs us labour we set most value in proportion to that labour. And we shall love and prize the learning we attain because it has cost us labour and anxiety. I counsel you to perseverance even under most adverse difficulties, assured that you will find solid pleasure and enjoyment in the study you pursue; and, finally, you will come to love the work most ardently. Read, mark and learn then with that persevering attention to which I have pointed. Wordsworth says of learning that it is—

> "A substantial world both pure and good,
> Round which, with tendrils strong as flesh and blood,
> Our pastime and our happiness will grow."

Mr. Alderman Taylor then moved a vote of thanks to the President for his valuable address, with a request that it should be printed. In the course of his observations he reminded the young men present of the superiority of their privileges over those enjoyed by young men in the days of his apprenticeship. Then, no time was left at liberty during the day for either study or recreation. Mental improvement could only be sought in hours that ought to have been devoted to sleep. Now, not only is time allowed, but teachers are provided, and the young man is without excuse if he fails to improve himself.

Mr. Councillor Scott seconded the resolution. He corroborated the statements of Mr. Alderman Taylor with regard to difficulties in the way of young men forty or fifty years ago. He also referred to the obstacles to the trade that had risen from the action of the Legislature, commencing with that promoted by the Apothecaries' Society, and having its last illustration in the action of the Medical Department of the Privy Council in reference to the question of poison regulations.

On the motion being submitted to the meeting it was carried very heartily.

Mr. J. W. Bramford then read a short paper on "Old Books," calling attention to some preparations in use a century ago, but now no longer used—illustrating one phase of the advance that pharmacy has made in the interval.

After this Mr. Robinson gave a brief description of a few of the fine specimens of drugs contributed by Messrs. Barron, Harvey, and Co, of London, viz., kousso, cassia fistula, areca nut, Indian hemp, St. Ignatius's bean, Chinese cantharides, guarana, and English otto of roses—a very rare specimen. He also described some of the valuable contributions by Messrs. Mottershead and Co., of Manchester. One of the most important of these was a drying closet, fitted with an apparatus for maintaining a constant temperature—a most important aid in the preparation of pharmaceutical products and analytical operations. It is so constructed that when the required temperature is secured, by the simple turning of a tap, any variation in temperature is prevented, and if left to itself will remain at that temperature for days if required.

A simple compact and useful pharmaceutical stove and drying closet, with a contrivance for heating the plaster spatula, and a kettle in which a pint of water may be boiled in less than four minutes, was also exhibited and described. The luminous butterfly was the most wonderful object exhibited. On exposure to the magnesium light, it became luminous when viewed in a dark room, and continued for several minutes to display the natural colours painted by the artist. Hydrometers, electric telegraphs, and other articles were also exhibited. The contents of the case given by Messrs. Evans were also displayed, as well as a similar one contributed by Mr. Alderman Taylor. Several microscopes were on the table, accompanied by a large number of interesting mounted objects. Mr. Lord brought for exhibition a number of vacuum tubes, to illustrate the phenomena of luminosity produced by a current of magnetic electricity being passed through them. Books, microscopes, manuscripts, photographs, skeleton plants, metric measures, etc., were contributed by the Chairman, Messrs. Alderman Taylor, R. Robinson, E. Lord, J. Hadfield, and J. W. Bamford.

The thanks of the meeting were presented to Messrs. Barron, Harvey, and Co., and to Messrs. Mottershead and Co., and also a very cordial vote of thanks to, and of sympathy with, Mr. Hudson, brought the proceedings to a close.

The next ordinary meeting will take place on the third Wednesday in November.

LIVERPOOL CHEMISTS' ASSOCIATION.

The first General Meeting, twenty-fourth session, was held at the Royal Institution on Thursday evening, the 10th inst.; the President, Mr. E. Davies, F.C.S., in the chair.

Messrs. Kennerley, J. T. Pratt and E. S. Sumner were elected members, and Mr. J. L. Warburton was elected an associate of the Association.

Mr. T. J. Abraham, on behalf of Dr. Cameron, presented to the museum a specimen of Guaraná.

The President then delivered the following opening address:—

President's Address, 1872.

Gentlemen,—The old proverb that "union is strength," and the saying of the wise king, "in the multitude of counsellors there is safety," receive in this age a very full application. From shoeblacks to philosophers associations for common purposes are everywhere met with, and co-operation is the panacea for mental and spiritual wants, as well as for material ones. Banded ourselves in such an association, I think that we shall derive benefit from a careful consideration of the objects of our union together, and how we can best increase its efficiency. Twenty-three years ago the founders of the Liverpool Chemists' Association first met; their objects being then strictly pharmaceutical, and the government of the society confined to chemists and druggists. That I am honoured by re-election to the post of your president is proof that those exclusive views have ceased to prevail, and now our constitution is as comprehensive as is the science by whose name we are called.

This is a matter of rejoicing; a merely class association might have degenerated into a trades-union, but with wide basis we can build a noble edifice, and being chemists in the widest sense, all things chemical have an interest for us.

The idea at the root of all such associations is a noble one. It is the helping of the weak by the strong; the abandonment of the position which exclusive knowledge gives by raising our fellows to the same level by imparting that knowledge, and the abnegation of self for the common weal. That, human nature being what we know it to be, this high standard is not perfectly attained does not astonish us, but it is a legitimate cause for joy that this thought is not forgotten, and that, to a great extent, it is carried out. There is a cynicism abroad, and rather fashionable, which disbelieves all this, or professes to do so, but I scarcely think that one amongst us is so bad as never to have felt that it is "more blessed to give than to receive." I shall take it for granted that you do think so, and that you wish the success, and, not content with wishing, will work for the prosperity of the association. Our object, as stated in the rules, is the advancement of chemical and pharmaceutical knowledge. Do we take the best means for the attainment of this end? if not, how shall we proceed in a more promising direction?

The almost universal plan in our own and other like societies is to have a paper read by some member, followed by a discussion upon it. This has the advantage of ensuring a thorough examination of a subject, by its being made a matter of careful thought in the quiet of the study, where authorities can be consulted and arguments maturely weighed. The disadvantages are the desirability of the paper embodying the results of original research, for which comparatively few have time in these busy days, when the ties of business and the feverheat of competition leave few opportunities for retiring from the noise and bustle of the world to work for other than material advantages. Then the modesty of some whose aid should be given, lead them to dread the ordeal of facing an audience, whose business is to be critical, for half an hour. The courage to do this is not always found in those who would really have nothing to fear, whilst it is sometimes present where there is little else to praise. The papers thus fall into the hands of the same individuals, and, in the dearth of anything new, subjects are chosen on which controversy has ceased, and the discussion resolves itself into a vote of thanks. I am not disparaging this feature of our proceedings, and should be sorry indeed if the reading of papers should cease to be the main attraction of our meetings, but I would like a variety in the bill of fare, and I believe that we should gain by it.

It is always easier to point out a difficulty than to show how to surmount it; to pine for improvement than to attain it. One suggestion, which I am happy to say will be tried when we meet again, is to have a subject expressly for discussion. It may be laid before us briefly by some member who has made it a subject of thought, and then opinions for and against, fairly and freely expressed, will give life and interest to the meeting. Each can speak on the particular aspect which is best known to him, and I trust that we shall all bear cheerfully to hear our cherished opinions somewhat roughly handled, and to meet opposition without anger or loss of temper. This is the *sine quâ non*, without which we shall either lose all profit in a strife of tongues or fall into listless acquiescence.

Meetings for miscellaneous contributions have been tried, and in some cases without great success. I have been sorry to find that this announcement on the circular has had the effect of reducing the attendance to a minimum. This might be remedied if notice were given to the secretary of the nature of such communications so that they could be announced on the circular. The fact is that so many of our members are content to be merely receptive, without troubling themselves to impart, that it never occurs to them that they ought, as a duty owed to the society, to help in ever so small a way. This feeling has doubtless been fostered by formal papers being the only means which they have recognized as proper; and as they perhaps could not aid in this way they never think to aid at all. Yet how much might be done if a new preparation were made known, or a new drug described, some quaint passage read from an old book, or prescription read presenting points of difficulty or interest, or some discovery in scientific or practical chemistry explained? It is deserving of thought whether it might not be desirable to have at least one evening in the session occupied by a lecture by some eminent stranger; but as this would involve an application to our treasurer, I forbear.

I would make one other suggestion, namely, to have an informal conversazione and microscopical meeting, not a dress affair, or, at the risk of being thought ungallant, open to ladies. The illustrations at this should be purely technical, and the object distinctly understood to be mutual intercourse of opinion on our noble science.

Our regular work at the ordinary meetings should not, in my opinion, be rudimentarily educational. Knowledge which can be derived from ordinary text-books is, I think, best got from them or from a competent teacher. This brings me to the consideration of the association's relation to its young members and associates.

Primarily, the idea in opening the association to these was to afford the aid which a valuable and well-selected library and museum could give to form a well-instructed mind; and that by listening to men of experience, they might learn in time to take their father's place as members. As examination has become compulsory, and young men must in some way qualify themselves for passing this, it becomes a matter for consideration what the association should do under these new conditions. Direct aid to education your association does not give; it does not pay teachers or provide apparatus or lecture-room. The advancement of chemical and pharmaceutical knowledge, not raising scholars to the present standard, is its end and aim. Yet, as a subsidiary object, I do not know how the energies of the association could be more usefully applied than in this direction. What line of action will be adopted I cannot say; and, as your President, I feel loth to say anything which might seem to commit your Council to any steps which they had not well weighed and deliberated. A suggestion that a box should be provided for the reception of queries to be answered by myself or any member most thoroughly acquainted with the special subject, met with the hearty approval of your Council, and has been carried out. Henceforth the receptacle will stand on the table, and any one may before the meeting insert the question, or on sending them to the secretary he will do so.

Another plan suggested, is to provide a place where students may meet and study, availing themselves of the aid which those more advanced can give. As this has not been discussed by your Council, I do not at present express any opinion upon it. One thing only I would say to any young fellow-student (for I am myself still a student) as one who has not yet forgotten his younger days and early struggles with the difficulties of knowledge, depend mainly on yourselves; do not believe that mental work can ever be replaced by anything in the world besides. What you find out you will remember, what you are told you may. You may get faster over the ground by the aid of a coach, but to know the country, its beauties and its riches, you must walk on your own legs, see with your own eyes, and know with your own head.

Perhaps the subject which will now occur to you as my next, is the general use of pharmaceutical education. I shall refrain, however, as it will be the subject of our next meeting, and my views have been expressed to the association in a former address. On one branch—namely, chemistry—I would offer a few remarks. We all claim the name of chemists, either pure, simple, or combined with "druggist." In the former case there is no need to speak of the necessity of the study of chemistry, scientific and practical; it is the business of our workday lives. But how far, in the other case, are the members of our association willing or desirous to abandon the title altogether, and as "pharmacists," or by any other name, drop the standing proof that at one time their predecessors were *the* chemists of the day? This should be done, if the knowledge of chemistry is to be thought a slight matter, or, indeed, anything but a primary requisite. You may fancy that I am guilty of the "nothing-like-leather" fallacy; that because it is important to me I think it must be good for everybody, but I don't think that I do.

I know that many who wish to become chemists wish to get the minimum of information which will just pass them, and avow their intention of then letting it drop. I fear the modern monomania among the heads of the scientific part of the profession for speculating on the hidden mysteries of a molecule, and the fearful pictures recalling the Chinese puzzles of our youth, are answerable for some of the distaste which seems growing. It is good to study these, as all theories with a sufficient basis give some help to an advanced student; but I confess to a sympathy with Professor Bunsen, who would not let his pupils use symbols for three or four months, and Gay-Lussac, who pursued the same course. Truly one may debate on the manner of expressing a fact until the fact itself sinks into comparative insignificance; and if students would remember that an intelligent knowledge of the facts of chemistry may be made a possession which will lead to the explanation of the theories if they wish, but which in itself is practically most valuable, they would cease to despise it. I strive when teaching to express the facts in the simplest possible form—H_2SO_4 for sulphuric acid involves no theory, and not until a student has mastered a fair portion of the field of chemical knowledge would I willingly put $SO_2 \left\{ \begin{matrix} Ho. \\ Ho. \end{matrix} \right.$ in his way. If there be any disposition to demand this abstract knowledge from pharmaceutical students, I would most strenuously oppose it, whilst any fair quantity of knowledge of chemical reaction or operations may be demanded as an absolute requirement. To turn from the subject to one to which I alluded last year, that of adulteration of food and drugs, I have no change to make in my faith. Another pottering with the question has occupied the attention of Parliament; and now, if a dealer says that an adulterated article is pure, and you can prove that he knew it was not, you can punish him. I do not know if you are in the habit of asking when you buy anything whether it is pure. I must own that I do not, and in getting a week's grocery, for example, it would be a pleasant operation to put the question in each instance. As far as regards the adulteration of drugs, our public analyst, I see, is left to his own discretion; and if he should think with one of our daily papers that he is bound to show a reason for his official existence, you may expect a descent upon you. My own experience would lead me to believe that he will not find much prey amongst pharmacists. Still

> "If there's a hole in a' your coats
> I rede you tent it;
> A chiel's amang you taking notes,
> And faith he'll prent it."

The past year, taking the period in its official sense, has not been marked with great pharmaceutical novelties. In scientific chemistry another great discovery has been made. By a scientific investigation, which for difficulty and complexity is almost unequalled, the colouring matter of indigo, indigotine has been added to the list of natural products now made artificially. Nitro-acetophenon, obtained by the action of nitric acid of acetophenon, itself a product from the dry distillation of benzoates and acetates mixed, only differs from indigotine by H_2O and O. By heating with soda-lime and zinc, small quantities of indigotine are produced. The process is in no sense commercial; but neither was that by which alizarine was first produced. The way being pointed out, probably improvements will be introduced, and indigo become a product of our own country. Benzoic acid is now made in quantity from naphthaline, a product of coal tar, so the new colouring matter is related to that exhaustless store of valuable chemical treasure.

On the other hand, conine, which was supposed to have been formed artificially, has eluded the chemist's grasp. The new product, though closely resembling the natural alkaloid, and having the same atomic constitution, is only isomeric with it and not identical.

A new process for estimating morphine in opium deserves attention. It depends on the well-known reaction of morphine on iodic acid, by which I is set free; the I is taken up by chloroform or CS_2, and the liquid compared as to colour with a solution of a known quantity of iodine or morphine treated in like manner. In conclusion, I would urge on the members more earnest interest in the association. Its success is in their hands, and they will reap the benefit. I hope to see the day when it will include on the roll the chemists of Liverpool as a body. There is no ground for jealousy; we make no exclusive claims or interfere with any man's private arrangements. No purely trade questions are discussed, but on the points common to all chemists we invite the fullest inquiry. In these days private claims are often overlooked; a large body alone is listened to, and its influence felt. In the past your association has done good work in upholding the interests of chemists, and in the future it will not fold its hands.

I ask your aid in fulfilling the arduous duties of your president. I promise my best exertions, and trust that this year will be one of unusual success.

Mr. J. Abraham, in moving a vote of thanks to the President, remarked that, concurring with all that he said, he felt there was rather a want of pupils than means of instruction; he hoped, however, that this state of things would soon be changed.

Mr. A. H. Mason seconded the motion, and said that the Council of this Association had provided, and would continue to provide, ample accommodation for pharmaceutical students, and for the instruction and interest of members at the general meeting. The motion was then carried.

Proceedings of Scientific Societies.

ASSOCIATION OF MEDICAL OFFICERS OF HEALTH.

RECENT SANITARY LEGISLATION.

On Saturday evening, October 19th, the Association of Medical Officers opened its session at the Hall of the Scottish Corporation, Crane Court, Fleet Street.

Dr. Letheby took for the subject of his Inaugural Address, "The Sanitary Legislation of 1872." He observed that foremost among the labours of the session was the Public Health Bill. He recapitulated the provisions of the Act, and pointed out that the appointment of sanitary officers was made compulsory, instead of permissive, and not the least important of these was the medical officer of health. The trust thus reposed in the profession demanded the most anxious consideration as to the manner in which it ought to be fulfilled; for although the Act merely directed that the medical officer of health should be a legally qualified medical practitioner, yet it was obvious that the duties of the office required something more than the mere knowledge of routine medical practice. He was very strongly of opinion that the medical officer of health should be entirely free from the conflicting interests of private medical practice, for it might well happen that the worst places in the worst districts would be the property of men who were the best patients of the sanitary officer. Too often, also, the owners of unwholesome tenements, or the managers of offensive trades, or the dealers in adulterated food, force themselves into Local Boards for no other purpose than to protect their own interests, and to check, as far as they could, the application of sanitary measures; and if the medical officer of health was dependent to any large extent on the income of private practice, he could not venture to be meddlesome. That difficulty was in some degree provided for by the 10th section of the Act, which gave the Local Government Board control over the appointment and dismissal of an officer of health, when any portion of his salary was paid out of money voted by Parliament. That kind of protection might, perhaps, be advantageously extended, although he was far from thinking that a central sanitary authority was as capable of managing the sanitary affairs of the country as the local authorities of the districts, and he should be sorry to see an excessive centralization in this respect. Another effort at legislation during the year was "the Act to amend the Law for the Prevention of Adulteration of Food and Drink and of Drugs." Its object was to amend the Act of 1860, which was found to be a dead letter, for the adoption of it by local authorities was entirely permissive and optional, and, even where it had been adopted, as in the City, it was wholly inoperative from the circumstance that the public, and not the local authority, were to put its provisions in force. Looking back at his own experience in the City, where for the last twelve years he had been the food analyst under the Act of 1860, he perceived that although every inducement was offered to the public by the Commissioners of Sewers for the effective working of the Act, as by distributing circulars among the citizens inviting them to put it into force, showing them how it was to be done, and even giving them discretionary power to make analyses for the poor without charge, yet in the whole of that time only 57 analyses of food and drink had been made, and he seriously believed that not one of them was called for for the purposes of the Act. That was rather disheartening, considering how sensationally loud had been the cry about adulterations during the whole of that time. In some respects the new Act was an amendment of the old, for it made the appointment of analysts almost compulsory, and it threw upon the legal authority the duty of conducting all proceedings under the Act. The 5th section provided that the City Commissioners of Sewers, the Vestries and district Boards of the metropolis, and certain local authorities in the United Kingdom might, and when required so to do by the Local Government Board, should, appoint for their respective districts one or more persons possessing competent medical, chemical and microscopical knowledge, as analysts of all articles of food, drink, and drugs purchased within their respective districts, paying them such salary and allowances as they might think fit. It no longer rested with the public to initiate an inquiry, for the inspectors of the district could procure articles of food and drink, or drugs, suspected to be adulterated, and deliver them to the analyst, who, if he found them adulterated, would instruct the inspectors to summon the offender before a justice of the peace. Any purchaser of such articles might apply to the analyst for an analysis and obtain it on the payment of a fee not exceeding half-a-guinea and not less than half-a-crown, and in cases of adulteration might institute proceedings against the dealers. But the question was—What is an adulteration? That was left in very nearly the same condition of doubt as it remained in the old Act. The third section, however, of the new Act made it illegal for "any person to sell any article of food or drink, or any drug, knowing the same to have been mixed with any other substance, with intent fraudulently to increase its weight or bulk, unless he declares such admixture thereof before delivering the same and no other." But who should decide, and how many analysts were there throughout the country who would agree as to what was and what was not injurious to health? Again, what was the exact meaning of the words "such admixture" in the clause he had just quoted? Already he had been made acquainted with the opinions of high legal authorities differing very considerably from each other in the interpretation of these words; for while some held that it meant a simple declaration of the fact that the article sold was a mixture, others were of opinion that it would be necessary to specify the substances of which the mixture was composed, and others again held that the exact proportions of those substances must also be stated. But it would be for the magistrates to decide this difficult question. Again, with respect to drugs, how was the case to be met when there was no adulteration whatever of the article sold, notwithstanding that it was absolutely worthless and inert, either from its having undergone decay, as in the case of roots and leaves, or from its having been grown in a country where its active principles were not developed, as with rhubarb, senna, etc., or from a fraudulent abstraction of those active principles, as in the case of cinchona bark, opium, etc.? It was evident that to meet those cases they ought to have a clear and comprehensive definition of the word "adulteration," and until that was given, as in the Seeds Adulteration Act, 1869, and the Licensing Act, they would not have a workable Adulteration of Food Act, which should protect the public from injury and fraud without interfering with the legitimate objects of trade. He thought it would be far better to refer the matter to some central authority whenever a dealer considered himself aggrieved by the report or certificate of a local analyst, and to let that authority decide definitely for the information of the magistrate. The penalties for adulteration were greatly enlarged, and they applied to persons engaged in the preparation of adulterated articles as well as to those who sold them. Imprisonment also might be given in second and subsequent offences, and the names and addresses and offences of the persons convicted might be published and advertised. There was a power of appeal to Quarter Sessions, and, in certain cases, to a higher court. The adulteration of intoxicating liquors was provided for by the Licensing Act of 1872. The schedule of deleterious ingredients which it was unlawful to mix with the liquors sold or exposed for sale mentioned cocculus indicus, common salt, copperas, opium, Indian hemp, strychnine, tobacco, darnel seed, extract of logwood, salts of zinc, or lead and alum, and the list might be enlarged at any time. Looking at the multitude of Acts of Parliament which dealt with questions of adulteration, and to the divided authority and jurisdiction of the matter, it was evident that what were required were a consolidation of the law and a very clear and explicit declaration of the thing to be dealt with as well as of the authority and its duties, powers, rights, and obligations. Dr. Letheby concluded by briefly referring to the Government inquiry recently made at Whitehall by Lord Methuen and other Commissioners into the regulations issued by the water companies under the Metropolis Water Act, 1871, remarking that it was to be hoped that when the constant service was in full operation in the metropolis, they would be able, under the provisions of the Act, to do away with the filthy butts of the poor and substitute for them a constant supply of water by means of a waste-water preventer external to their houses.

Dr. Tripe expressed an opinion that the medical officers of health should not undertake the additional duties of analysts under the various new Acts unless properly qualified assistants were supplied to them; and Dr. Stevenson, of Guy's Hospital, said his only fear as to the Adulteration Act was that it might fail for want of proper definitions. The Act, the latter gentleman observed, had already caused some excitement and apprehension among tradesmen, for he had been often solicited of late to testify as to the purity of articles sold, but he had, of course, declined to do any such thing. The discussion was principally as to whether the medical officers should accept, if they were offered them, the analytical work under the Acts, and this matter in the end was referred to a committee.

Lord Eustace Cecil, M.P., said the Adulteration of Food Act was carried through at the fag end of the session, and he had not previously expected for a moment that it would become law. But when he observed that the food question was not touched by the Public Health Bill, he determined to do what he could in his individual capacity to carry the Bill, which then stood in the name of Mr. Muntz. He only co-operated with that hon member on the understanding that the Bill should be compulsory and not permissive, and he at once changed the word "may," whenever it occurred, into "shall." Had that been allowed to stand the 5th clause would have made the appointment of analysts positively compulsory, and the local authorities would have been obliged to select the officers forthwith. He passed his amendment to that effect through the House at two o'clock in the morning, but next day he was informed by a member of the Government that the clause as it then stood would trench upon the question of local taxation, and that he must proceed more cautiously if he wished their support. He therefore put in the words "may, and when required so to do by the Local Government Board shall," appoint an analyst, and that alteration was assented to by the Government. On the question of the third reading, however, he was told that, unless he withdrew all his amendments, the Bill would not pass, and he did accordingly withdraw them. But he admitted that he used a little piece of stratagem to effect his object. He obtained the support of his brother, Lord Salisbury, who consented to introduce all his amendments in the House of Lords, where they were carried. The Bill came down to the Commons and passed, without alteration, in a House of about a dozen members. All the amendments, however, had previously been carefully considered by the Government, and if there had been anything wrong in legal phraseology, they had every opportunity to alter them. A definition of articles injurious to health was thought to have been sufficiently provided by the incorporation into the Act of the Pharmacy Act, which contained a schedule of poisonous ingredients; and as for adulteration, he believed the intention of Parliament was that anything done in the way of fraud in the adulteration of food should be considered as a breach of the Act. It appeared to him to be a small consideration what were the proportions of the ingredients, provided that something had been mixed with the article, and anything done to increase its weight or bulk was a sufficient adulteration. If there was any difficulty as to the interpretation of the statute, the best plan would be, at the first opportunity, to state a case for the decision of one of the superior courts. He must say that the words were submitted to lawyers at the time they were put in the Bill, and were said to include a fair and workable definition of adulteration, and he should be most disappointed if it proved otherwise. If any amendment of the measure was, after a trial had been given to it, found necessary, he would use his best efforts to secure it.

Parliamentary and Law Proceedings.

Suicide by Prussic Acid.

At the inquest to inquire into the death of Mr. Pickering, of Derby, reported last week* Mr. Burnham, druggist, Osmaston Road, spoke as to the deceased coming to

* *Ante*, p. 318.

his shop last Saturday evening, and asking for one ounce of prussic acid. He represented that he had a pig in an unsound condition, and wished to poison it and bury it in the garden without the neighbours knowing. Witness explained to him that half an ounce would be more than ample, and supplied him with that quantity. Deceased seemed quite calm and collected, and knew what he was doing. He signed a book as required by Act of Parliament. On the 9th of September witness supplied him with the same quantity of prussic acid. Mr. Iliffe, surgeon, having given evidence as to the cause of death, the jury returned a verdict "That deceased destroyed himself while of unsound mind."

Serious Charge against a Chemist and Druggist.

On Monday, October 21st, Edwin Eastwood, chemist and druggist, of Dukinfield, was brought up on remand before the county magistrates at Stockport, charged with causing the death of Ann Jones, at Marple, by administering to her a noxious drug for an unlawful purpose. The deceased, a domestic servant, in the early part of the year formed the acquaintance of the prisoner. In March she left her situation to live with a married sister, at Marple. It being discovered that she was *enceinte*, the prisoner was communicated with on the subject. Deceased complained of intense suffering up to the beginning of October, when Mr. Hibbert, surgeon, who was called in sent for Mr. Moore, another surgeon. The young woman had been in labour four days, and her life being in danger, a magistrate was sent for and her dying deposition was taken. She died a few hours afterwards. The prisoner made no reply to the charge. The effect of the deceased's testimony was that the prisoner had given her medicine several times. He gave her two bottles of stuff in his own shop; a bottle produced was one of them.

Evidence was given that sealed packets containing the medicine and the stomach had been handed to Professor Crace Calvert, of Manchester, for analysis.

The prisoner was remanded.—*Manchester Guardian.*

Double Suicide by Strychnia.

On Wednesday, October 23rd, Mr. Bedford, the coroner for Westminster, held an inquest upon the bodies of a man and woman, names unknown, who on Saturday last were found dead in their apartments in Golden Square, Soho.

Mr. Slight, surgeon, deposed that when he saw the bodies they had both been dead some hours. Upon the hearthrug was a small bottle with a label upon which the words "Strychnine—Poison" were written in pencil. The bottle contained several crystals. There was also a mug upon the mantelpiece containing several grains of crystals. The bottom of the mug was blackened as if it had been held over a candle to heat it. The analysis of the stomach had not been completed, but strychnine had been found.

Evidence was also given as to the finding of a paper in which the deceased stated that they had taken strychnine and that nobody was to blame. The inquest was adjourned to allow of the completion of the analysis, and also if possible the identification of the deceased.

Obituary.

FRIEDRICH WELWITSCH, M.D., F.L.S., etc.

Dr. Welwitsch, the well-known African botanist, died on Sunday last, aged 65 years. He was born in the Austrian Duchy of Carinthia, and in early life showed his great love for the study of nature. He dated his first lessons in botany from an apothecary, who seeing him pass his door with a bunch of flowers, engaged him in conversation, told him the names of the plants and instructed him in preserving them. This gave an incentive to his exertions, and every week found him in the good apothecary's company. When old enough, Welwitsch was sent to Vienna to study law, but this very soon became distasteful, and he entered himself for the study of medicine as likely to give him the best groundwork for the study of natural history. For this step his father for some time suspended his allowance, and young Welwitsch had to support himself by writing dramatic, musical and other critiques for the papers. His progress was rapid, and before he had obtained his diploma, he was appointed on a cholera commission to visit Savoy, etc. This high mark of distinction brought about a pleasing family reconciliation. It would be impossible in a notice like this to give a full account of such a varied and useful life, and we must content ourselves with a mere outline. While still young he was sent by a Society of Friends of Natural History (Unio Itineraria of Würtemberg) to collect plants in Portugal, etc., and afterwards he was appointed to the directorship of the Botanical Gardens of Lisbon. An offer being made to him to take charge of a nobleman's garden, he relinquished the royal gardens, as the new appointment would give him more time for examining the flora. He was also engaged in getting up collections for the 1851 Exhibition as well as those of 1862 and 1867. In 1853 he started to Africa in order to explore for the Portuguese Government their possessions on the west coast. There he remained till 1861 collecting and examining the flora and fauna of Angola, Benguela, etc., and on the magnificent results his fame will rest. His collections of critically studied plants are unique, and are undoubtedly the finest ever brought from West Tropical Africa; and the 'Flora of Tropical Africa' (two volumes of which have already been published) will owe much to his labours. In other departments of natural history his collections are no less valuable. In Entomology his collections are unrivalled, and in Zoology he enriched our knowledge amongst other things with a new species of *Hyrax* near to *H. Capensis*, and which has been called *Hyrax Welwitschii*. Amongst plants one can hardly particularize individuals. One he discovered, and named *Corinanthe paniculata*, has a very Cinchonaceous habit, and its bark is used by the natives for the same purposes as that of *Cinchona* is used. His name is preserved in a very curious and interesting Gnetaceous plant, which Dr. Hooker has fully monographed under the name of *Welwitschia mirabilis*. Since his return from Africa he has occupied himself in working up his collections, and during the whole time has suffered in his health from fevers, etc., enough to daunt an ordinary man from any work whatever. During the last few months, however, his friends clearly saw he could not last much longer, but he kept to his work as long as he had strength to hold his pen.

His explorations have been recognized by two or three decorations of knighthood and by many scientific societies.

His funeral took place on Thursday, the 24th inst., at Kensal Green, a number of botanists being present.

Notice has also been received of the following deaths—

On the 15th October, Mr. Mark Ward Cooper, pharmaceutical chemist, of Bridlington. Mr. Cooper had been a member of the Pharmaceutical Society since 1845.

On the 15th of August, Mr. John Newton, chemist and druggist, of Kennilworth.

On the 19th of October, Mr. Edward Hart, chemist and druggist, of Kegworth.

BOOKS RECEIVED.

Sanitary Science as applied to the Healthy Construction of Houses in Town and Country. By R. Scott Burn. Glasgow: Collins and Co. 1872.

First Principles of Human Physiology, and a few Applications of them, with Suggestions for Practical Work. By W. T. Pilter. London: Kempster and Co. 1872.

Correspondence.

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

Patent Medicine Licence.

Sir,—Under this head I observe in your leader of last week that you entirely coincide with the suggestion of a correspondent as to the desirability of fixing some uniform rate throughout the country for the above licence. I agree with you, and think the higher rate of £2 would be "conducive to the interests of the chemists and druggists throughout the country," for, as you truly observe, "it would tend to prevent the now very general sale of patent medicines by booksellers, grocers and hucksters, and transfer it to the hands of those who are legitimately entitled to deal in the potent drugs frequently contained in the preparations sold under stamp." In a small place like this we have no fewer than *five* dealers in patent medicines, there being but *one* chemist's shop. The last addition to the patent medicine vendor's stock is the harmless preparation Laudanum, which is now raised to the dignity of a patent medicine, and retailed throughout the country by grocers and hucksters, thanks to the Patent Medicine Licence and the Pharmacy Act. Whether the makers of this strange patent medicine intend running entirely through the Pharmacopœia I cannot say, but I shall not be at all surprised if before very long we are presented with such innocent preparations as prussic acid and strychnine in the form of patent medicines, and retailed by all patent medicine vendors, be they druggists, grocers, or hucksters.

As a country chemist, I would willingly pay the higher rate of £2; and I believe this is the opinion of most in the trade. I think this is more a matter for the whole trade to take up than one within the province of the Pharmaceutical Society; and I have no doubt if proper representations were made to the revenue authorities a remedy for this grievance would soon be found.

Alexander Ellis.

Skelton-in-Cleveland, Oct. 21st, 1872.

Examination Fees.*

Sir,—The exceptions which I ventured to take to some of the statements made by Mr. Vizer in his communication inserted in your number for August 31st,† are not in any way disposed of by the statistics and counter-statements contained in his rejoinder.‡

In the first place, statistics referring to a period prior to the passing of the Pharmacy Act, 1868, are of no value in the discussion between us. By the passing of that measure, the Society was so materially changed in character and constitution, that it has become to all intents and purposes a *new* Society; and therefore the only figures available are those of 1869, 1870, and 1871. Being comprised within a narrow period I do not, and did not, attach an exaggerated importance to them; but taking them as they exist, they do not bear out my friend's assertions.

I repeat then, that—disregarding 1869 as peculiarly exceptional—the proportion of pharmaceutical chemists who joined the Society in the two last-named years compared with the number who passed the Major examination was not *small*, as stated by Mr. Vizer, but *large*. It is not the fault of the present generation of Majors that the total numerical strength of Pharmaceutical Chemist members was less in 1871 than in previous years.

Again, as regards the numerical strength of the Society. On this point the table published by Mr. Vizer shows that the total number of members was, in

1869	2185.
1870	2384.
1871	2466.

And of associates in business the total number was, in

1869	22.
1870	82.
1871	161.

These figures do *not* prove his statement that our numerical strength as a "Society is decreasing, while that of outsiders is increasing;" but the contrary. Mr. Vizer, in his first letter, either ignored, forgot, or did not know of this rapidly increasing class of associates enjoying all the political privileges of members.

I am aware that the *unexamined chemist and druggist* class of members is annually falling off (notwithstanding that there are some thousands who have not yet applied for admission); but this difference, if not already balanced by the increasing number of *associates in business*—the corresponding class of examined men—will be so in another year.

I have not hitherto expressed an opinion one way or the other upon the scheme of fees proposed by Mr. Vizer. Some time ago, one very like it was discussed informally, either at the Council table or in committee, so that the subject has not come upon me altogether *de novo*. Allow me, therefore, to trespass further on your space by stating that I am in favour of making one change at the present time, and *one* only, viz., to increase the fee for the Minor examination to eight guineas, which, with two guineas for the Preliminary as heretofore, would increase the fee for obtaining the certificate of a chemist and druggist to ten guineas in all. I consider that this qualification, being the passport to a business of tangible value, is well worth that sum from a purely mercenary point of view, and that the chemist and druggist of the future ought to contribute in this way, as well as by payment of a yearly subscription, towards the maintenance and extension of the Society, which has literally created him, and from whose efforts and money expenditure he and he *mainly* will reap a decided pecuniary advantage.

It is premature to alter the fees for the Major examination or for the annual subscription. An experience of at least ten years from the passing of the Pharmacy Act, 1868, ought to be gained before dealing with this part of our fiscal arrangements. In my judgment it is *not* the fee which deters larger numbers from presenting themselves for the Major, nor the subscription which prevents *all* our Majors from joining the Society. I am sanguine enough to think that when a sufficient period has elapsed, those youths who have passed a good Preliminary examination before being apprenticed, will, in much greater numbers than now, present themselves for the higher examination, and afterwards enrol themselves in the Society as members.

Michael Carteighe.

* See Pharm. Journ., No. 117, p. 240.
† *Ibid*, No. 114, p. 179.
‡ *Ibid*, No. 119, p. 279.

Sir,—As the question of examination fees is likely to come before the Council at their next meeting, may I, through your Journal, ask for a slight concession to that numerous class of persons who have passed the "Modified."

Doubtless there are many of these men who regard this as merely a temporary qualification, and, when time and opportunity occur, will endeavour to obtain a higher standing in the trade. Now, in order to do this, they are at present compelled to go through the same course and pay the same fees as a beginner, no notice being taken of their connection with the trade.

The concession I ask for is, that when any such person wishes to compete for the Minor, the fee for him shall be one guinea less than that usually charged, being the amount he has already paid to the Society. As our aim ought to be to improve, I ask not any mitigation of the educational test.

Modified.

Too Much Light.

Sir,—The well-known action of light upon tinct. ferri perchlor., and, as all observant chemists know, upon most other preparations, suggests the adoption of some means to prevent so serious an alteration in the constitution of such drugs and preparations as are daily exposed on our shelves to the sun's rays. Bottles made of non-actinic glass might prevent such decomposition; but the objection would be the difficulty of observing the colour and appearance of the contents. No doubt the real cure would be an alteration in our present mode of building pharmacies. Windows should be constructed so as to admit a minimum quantity of light, and the shelves arranged to hold the bottles away from the direct rays of the sun. Modern fashion dictates enormous plate-glass windows, glaring open shops, and a show of as many preparations as possible in large clear glass bottles, so placed as to attract the eyes of passers-by. It is time such fashion changed. Light open shops are the inevitable consequences of combining a profession with trade; and as pharmacy is at present constituted, I fail to see a road out of the dilemma. Allow me to suggest to the secretaries of the Pharmaceutical Conference to include in next year's list of papers one on "The Proper Storage of Drugs and their Preparations."

M. J. Ellwood.

Leominster, September 30th, 1872.

Payment of Fees to Local Secretaries.

Sir,—As a local secretary, allow me, through the medium of your Journal, to thank Mr. Sutton for the motion he brought forward at the meeting of the Pharmaceutical Council, viz., payment of fees to local secretaries who have to superintend the examination of candidates for the Preliminary examination. Personally, I should consider it *infra dig.* to receive any such fees, but if the Society is in that prosperous state as to be able to pay our expenses to London to attend the Anniversary Meeting, I, for one, would hail with pleasure Mr. Hills' proposal.

A Local Secretary.

Pharmaceutical Education.

Sir,—I shall feel obliged if you will allow me to summarize the views which I expressed lately upon the educational question at a meeting of the Bristol Pharmaceutical Association, as they appear somewhat obscured in the report of my observations upon that occasion.

1st. The Legislature having adopted (wisely, as I consider) a lower standard of qualification for pharmaceutists than was proposed by the Society, the educational difficulty is greatly reduced.

2nd. Existing organizations (especially the Science and Art Schools directed from South Kensington under Government auspices) may be made sufficient to meet the educational demands called into existence by recent pharmaceutical legislation.

3rd. The Pharmaceutical Society should continue to promote that higher pharmaceutical education which is essential for the advancement of the science of pharmacy. (Its school might be ultimately restricted to this object by the adoption of a matriculation test representedby the Minor examination).

4th. The time appears to have arrived when some extension of this higher education should be accomplished, say by the establishment of a second Society's College in Edinburgh.

It will be seen that this system would have the effect of terminating the anomaly of the Society educating for the statutory examination which it is appointed to conduct.

Richard W. Giles.

Clifton, Oct. 21st, 1872.

A Dispensing Difficulty.

Sir,—As I cannot dispense the accompanying prescription to my satisfaction, perhaps some of your readers may be willing and able to help me.

T. A. Jeffrey.

Pittville, Cheltenham, Oct. 1st, 1872.

℞. Creasote . . . . . . ♏xx.
Pot. Chlor. . . . . . ℨss.
Rhei Pu. . . . . . . ℨss.
Ft. pil. xx in fol. arg. involv.

They are required to be small, hard, and round, and the full quantity of Creasote must be used.

[*** The addition of one grain of oil of theobroma will have the desired effect, and form a hard, compact mass. In all cases where creasote is ordered in pills along with dry powders, it will be found useful, as creasote and it are miscible. The above will require careful manipulation; on trituration, the oil of theobroma will soon become plastic, but the mass should not come in contact with the warm hand, or the pills be kept in a warm place. The silvering should be done by means of a little thin mucilage, in which the pills should be rolled in a gallipot, so as to get them well moistened and partially dried before placing them upon the silver leaf.—Ed. Pharm. Journ.]

Payment of Dispensers.

Sir,—The following advertisement recently appeared in one of the Birmingham papers:—

"Dispenser wanted, for the Hospital for Women. Salary £20 a year. Hours from 3 till 6 or 7 p.m.—Apply personally from 12 till 3 to Mr. Lawson Tait, 7, Great Charles Street."

I should like to know what sort of qualifications a man would be expected to possess who was to be remunerated with the handsome sum of 1*s*. for four hours' dispensing, exactly 3*d*. an hour!

Are not such things insults to pharmacists at large?

Indeed it seems to me a positive insult to offer an educated man such a salary as any little lad of 15 years old could easily obtain as a porter!

A. P. S.

Birmingham, October 9th, 1872.

T. H.—No.

J. R. C.—The only exception in the Pharmacy Act in favour of veterinary surgeons is that they shall not be prevented from dispensing medicines for animals under their care.

F. Abbott.—The office of the Society is at 9, Conduit Street, W., and the Secretary is Mr. W. R. Cooper.

A. D.—An article on the subject was published in the Pharm. Journ. 2nd series, vol. I. p. 471.

S. P. S.—The reply to your letter had been crowded out with others. Pereira's 'Materia Medica' would answer your purpose.

J. A.—The berry of *Physalis Alkekengi* (Winter Cherry) are said to be diuretic in their action, but are seldom prescribed. They enter into the composition of the Sirop de Rhubarbe Composé of the French Codex, and reduced to powder have been prescribed by Dr. Gendrin in 10 to 30 gram doses as a febrifuge. A bitter principle to which the name physalin has been given, obtained by treating an infusion of the plant with chloroform is described in the 'Journ. Pharm. et de Chimie' [3] xxi. 24. Dr. Wood ('Dispensatory,' p. 1584) says that six to twelve berries or an ounce of the expressed juice may be taken for a dose.

"*A Registered Assistant.*"—'Fair Play' has addressed a letter to the Secretary in which he appears to complain that that gentleman has not noticed in this Journal some previous assertions of the writer's. As complete ignorance exists respecting these assertions, and since '*Registered Assistant*' writes, "I cannot give my address has I am continually traveling," advantage is taken of his statement that he shall see the Journal to ask him what they were and what notice he requires, or whether the present notice will answer his purpose, but no further communications will be noticed unless they are accompanied by the writer's name and address.

A. P. S. (Birmingham)—Your communication was acknowledged at p. 300. You are too hasty in forming your opinions. We are always indebted to correspondents for any communications they may send to us, although in taking them into consideration we are obliged to adopt the ordinary rule, "first come, first served," at the same time having regard to the urgency of the question.

"*Forgetfulness.*"—Recipes for making colours for carboys will be found in vol. I. p. 516 of the present series.

B. P. and "Apprentice."—Apply to the Secretary for a copy of the pamphlet entitled 'Hints to Students.'

E. W. B.—We think not, for, taking the British Pharmacopœia as the law for pharmacists, you will find that rectified spirit is directed to be used for both preparations.

X. Y. Z.—As alum when present in bread is considered to be an adulterant, a baking-powder containing it would probably come under the penalties laid down in the Adulteration Act.

Alpha.—Cooley gives the following recipe for Red Ink:—Brazil wood (ground) 1 oz.; white wine vinegar (hot) 1¼ pint; digest for several hours in glass or well-tinned copper or enamel saucepan, then gently simmer for half an hour, adding towards the end gum arabic and alum of each ½ oz.

J. Leay.—Your letter has been handed to the Secretary.

R. Rees.—See Cooley's 'Cyclopædia of Practical Receipts' under the head "Infusions," and an article by Mr. Grundy in Pharm. Journ., 2nd ser. vol. VI. p. 259.

Communications, Letters, etc., have been received from Mr. Dymond, Mr, C. B. Bell, Mr. C. Umney, Mr. W. A. Powell, Mr. Claypole, Mr. Hodges, Mr. Harrison, Mr. R. W. Fowler, Mr. A. Ellis, Mr. Crampton, Mr. F. Andrews, Mr. R. Brierly, Mr. Lathbury, Mr. Parkin, Mr. G. P. Druce, V. P., W. F. C., A. P., "In Embryo."

THE MICROSCOPE IN PHARMACY.

BY HENRY POCKLINGTON.

(Continued from p. 302.)

SARSÆ RADIX.—The structure of sarsaparilla root differs widely from that of the roots I have hitherto discussed in these papers, where I have dealt chiefly either with roots of true exogens, where the characteristic concentric rings are found disposed round a central medulla (sometimes suppressed), and medullary rays proceeding therefrom; or with tubers, corms and the like, of herbaceous endogens, not possessing any true stem structure at all. But we now have to do with a class of structure which is essentially different from those other structures, and also with a structure which is on the face of it transitional, and unites the features of the other two. The structure of the aërial stem of Smilax is very different from that of the roots and rootlets, and is that (with slight modifications) common to all arborescent endogens. The structure of the root on the other hand, is approximated to that of the aberrant exogens lately mentioned. The chump or rhizoma unites the two classes of structure. In the aërial stem there is no medulla, there are no regular wood-wedges, or concentric rings, and no medullary rays. There is no true bark or separable rind. Whence it follows that the course I laid down early in the present series for the examination of roots and stems, must be supplemented.

In investigating the structure of fully developed endogenous stems (such as those of palms, bamboos, etc.) we shall find it of primary importance to dissect them longitudinally for some considerable distance, that the course of the vascular bundles may be followed as far as possible throughout. In palms, if a "vascular bundle be traced from the point of the insertion of the leaf backward, it is found that it runs in a curve, the convexity upward, to the centre of the stem; then in the neighbourhood of the centre runs down a certain extent deep in the stem, but soon again loses the direction parallel to the axis of the stem, gradually again approaching the surface till it lies beneath the rind, and there passes down the stem beneath it."*

All monocotyledons do not possess identically this same structure. Aloes is a notable instance of variation therefrom, as also the several members of the sub-class Dictyogenæ (Lind), of which Smilax and the easily procured *Tamus communis* are members. In Smilax, according to Henfrey, the bundles do not pass wholly into the leaves, as in palms, but run continuously through the structure. Henfrey also states, erroneously as regards some species at least, that the bundles stand in circles. In other respects, the stem structure of Smilax is endogenous, and examinations of its root and stem must severally partake of the plan recommended in the examination of exogenous stems, and that more applicable to endogenous.

I will take the stems first, as they will not occupy us long, inasmuch as they are not officinal, and it has unfortunately happened that I have not had opportunities of examining any large number of species, and none in a fresh state. It may be as well to remark here that slides of sarsaparilla, as sold by English dealers, are very commonly prepared from the aërial stem, and not from the root.

* Mohl, 'On the Structure of the Palm Stem.'—*Ray Society's Publications.*

My attention was first called to the structure of pharmaceutical botanicals by a "mounter's slide" of *S. syphilitica* given me years since by a west country friend, and found on examination to differ so widely from the usual diagnosis given in botanical books that I commenced an examination of the species. I then prepared one of our British Tamus, and presently concluded that the slide should go with my illustrations of stem, and not of root structure. I mention this lest beginners should be similarly troubled.

I select the stem of Mexican Sarsaparilla for description. The general appearance in cross section is that of a cane or bamboo. The vascular bundles are large and evenly distributed through the stem. In longitudinal section some are seen to proceed from leaf scars, but they run straight and are continuous down the stem as soon as they have assumed a direct course. Three classes of structure enter into the composition of the vascular bundles. First, large pitted vessels with oblong pits. Second, long, thin, walled cells. Third, liber or wood cells. The wood cells are of uniform size, but vary in shape, as seen in cross section, and are very porous. Their length is variable, and often considerable; their diameter about the 1-1000th of an inch. The vascular bundles are more or less circular in cross section, and stain intensely with magenta. A cross section judiciously stained and mounted in balsam forms a pretty object but is not equal to a similar section from the root. The vessels are septate, the septa (sometimes absorbed) are porous. The pitting is various, usually oblong as above stated; it is sometimes in the smaller vessels punctate. Some of the vessels have scalariform markings. The cellular tissue consists of subcylindrical cells containing great quantities of starch in compound granules (two to six) and with an indistinct punctate or radiate hilum. Special cells, apparently not porous, contain bundles of acicular raphides, such as are commonly found in this and some other natural orders.

The structure of the rind need not occupy us now. The connection of the vascular vessels of the stem with the root is not easily made out. In fact, it is a matter of very great difficulty when we have to deal with dried specimens only, and it is further complicated in sarsaparilla by the confused structure of the "chump." We shall better understand it if we dissect the root upward towards the chump, where we shall find that the vessels which surround the central cellular portion gradually spread out and apparently lose themselves amongst the vessels of the rhizoma, but may be traced with care into the stem. The central cellular portion of the root is lost sight of immediately we enter upon the rhizoma, but probably, as Mohl has shown is the case in the palm stem, it "penetrates the fibrous layers of the stem and spreads out on the outer layers of wood bundles."*

The structure of the stems of such other Smilaceæ as I have been able to examine, do not differ from the foregoing so greatly as to render their description desirable in this place, and I will in my next paper proceed to discuss the structure of the roots of the more common commercial varieties, and to describe as well as possible without woodcuts their distinguishing structural peculiarities.

* Mohl adds, "in the form of a disk" but I have not been able to satisfy myself of this in the case of sarsaparilla. One tuberous chump appears to point in this direction.

PEPSIN, BISMUTH AND STRYCHNIA.*

BY R. ROTHER.

(*Concluded from page* 323.)

The writer, adopting the syrup of pepsin acidified with the potassic tartrate as the basis, extended the series by adding the syrup of pepsin and bismuth, and the syrup of pepsin, bismuth and strychnia. Ammonio-bismuthous citrate, dissolved in four times its weight of water, will completely dissolve one-fourth its own weight of acid potassium tartrate. This concentrated solution slowly deposits a fine white powder, which remains suspended a long time after shaking the liquid, and is again readily and completely soluble in ammonia. If, however, only about one-third as much cream of tartar is added as before to a more dilute solution, no separation will occur. The bismuth solution then has an acid reaction similar to the solution of pepsin. A mixture of the two solutions retains its transparency, and acid reaction indefinitely and undisturbed, dissolving strychnia with facility. The syrup of pepsin and bismuth is prepared by macerating 256 grains of saccharated pepsin in 6 or 7 fluid ounces of water in the same manner as for syrup of pepsin, and filtering through cream of tartar. 256 grains of ammonio-bismuthous citrate is dissolved in one or two fluid ounces of water, with the addition of a few grains of cream of tartar, to ensure an acid reaction. This is united with the filtered pepsin solution, the measure, if necessary, made up to 8 fluid ounces, and 12 to 13 troy ounces of sugar dissolved in it, as above directed, without heat. The syrup of pepsin, bismuth and strychnia is prepared in all respects similar to the preceding, with the addition of 4 grains of strychnia to the above quantity. These syrups are permanent, and even when diluted with an equal volume of water containing a little alcohol, and exposed, no degeneration seems to take place in a moderate length of time. Therefore the writer believes that the above proportion of sugar can be advantageously reduced, and the syrup protected by a small proportion of alcohol. When treated with hydrochloric acid, a copious precipitate soon appears. This is again perfectly and permanently soluble in an excess of hydrochloric acid; but when separated from the solution it is insoluble in ammonia; whereas the precipitate, with nitric acid, under the same circumstances, is redissolved by ammonia. 20 grains of citric acid added to 1 fluid ounce of these syrups has no observable effect.

The ammonio-bismuthous citrate, employed in some of these processes, was prepared by a modification of the recent process of Mr. Wood. But the writer considers the proportion of citric acid unnecessarily large. It is also found that the basic nitrate does not yield an oxide of good appearance. This is always of a greyish or light brown colour and sandy character. However, the bismuthous oxychloride is much more easily prepared. Itself a very definite and permanent compound, it yields in every respect a physically superior oxide of a rich lemon-yellow colour. The writer believes that the bismuthous oxychloride and the anhydrous oxide, as well as the simple citrate, should be made officinal. By this change the two indefinite and unstable, difficult and circumstantial, preparations—the basic nitrate and carbonate—would be most completely superseded.

* Reprinted from the 'Pharmacist.'

Herapath has shown that fixed caustic alkali decomposes the insoluble bismuthous arsenate, with separation of pure bismuthous oxide and soluble alkaline arsenate. But the writer has found that bismuthous arsenate (resulting from the presence of arsenic in commercial metallic bismuth) is readily, completely, and abundantly soluble in a neutral or acid solution of ammonium chloride, and that the solution can be diluted to an enormous extent (1 to 7000) before the arsenate is reprecipitated. Therefore, to purify bismuthous oxychloride from contaminating arsenate, wash away the excess of hydrochloric acid resulting from the decomposition of the bismuthous chloride, decant as much water as possible, and to the residuary oxychloride add a moderate quantity of ammonium chloride and a sufficiency of water. After a short time remove the solution and supply a fresh portion. Remove this also, and separate the ammonium chloride complelely by washing. This procedure ensures an oxychloride absolutely free from arsenate, without any difficulty. A dilute alkaline solution readily decomposes the basic nitrate even in the cold, but a concentrated alkali is necessary to decompose the oxychloride. This may be effected by maceration in the cold, but much more rapidly with heat. The writer obtains ammonio-citrate by dissolving powdered metallic bismuth in chlorhydric acid with the application of heat and addition of sufficient nitric acid to oxidize the hydrogen of the hydrochloric acid, as seen in the subjoined equation:—

$$2(Bi)+6(HCl)+2(NO_3H)=2(BiCl_3)+4(OH_2)+N_2O_2$$

The resulting solution of bismuthous chloride is diluted by pouring into it a moderately large volume of water (about 30 of water to 1 of metal), whereby all the bismuth in solution is precipitated as dazzling white oxychloride in a very finely-divided state. The powder is very heavy, and subsides quickly and compactly, and can, therefore, be readily washed by decantation.

The change is explained in the following equation:

$$BiCl_3 + OH_2 = BiClO + 2HCl.$$

After several washings with large volumes of water, the powder is allowed to settle firmly; as much of the water poured off as possible, and to the residue an excess of potassium hydrate is added. The mixture is then boiled a short time, and the resulting yellow oxide washed by decantation.

This oxide is now boiled with acid ammonium citrate, resulting in the formation of normal ammonium salt and insoluble bismuthous citrate; which is then dissolved by a sufficiency of ammonia.

The British solution of ammonio-bismuthous citrate is treble the strength of that used in this country. It contains 3 grains of oxide in the fluid drachm, equal to 6 grains of the double salt. This solution is sufficiently concentrated to keep without the addition of alcohol, and therefore greatly preferable to the weaker solution.

The writer, however, prefers to prepare this salt and its solution directly from the simple citrate. But the methods for its production have heretofore been too troublesome, on account of the bulky magma, in the condition of which these processes always produced it. By the writer's method this is now obtained in a compact, heavy, crystallized form, can be expeditiously washed, and most rapidly and easily dried.

The production of crystallized bismuthous citrate is based upon the fact that it is but sparingly soluble in citric acid, or acid ammonium citrate. If, therefore, citric acid is added to a moderately dilute solution (about thirty of water to one of the oxide) of ammonio-bismuthous citrate, the ammonia is converted into acid salt, and the bismuthous citrate slowly separates in crystals. Rather more than two ounces of citrate are thus produced from one ounce of the oxide. The writer deems this process superior to all others at present known, as by it the metallic citrate can be easily and cheaply made in large quantities, for the preparation of all compounds into which this citrate enters, and, moreover, as it could be more extensively used in medicine directly by supplanting some of the less desirable bismuth salts. This process is rendered practicable by dissolving metallic bismuth in nitric acid, diluting the solution to about thirty times the weight of the metal by adding water, then introducing only the necessary quantity of citric acid to form metallic citrate, and then adding ammonia until a small portion of the precipitate which each addition causes remains undissolved, then set the liquid aside for twenty-four hours, to allow the salt to crystallize. Another small crop of crystals can be obtained by cautiously mixing more ammonia with the mother-liquor; or the ammonia can be first added to the concentrated solution, and then be diluted.

The citrate is readily and completely soluble in ammonia, in nitric and in hydrochloric acid, but separates in granular crystals when the nitric solution is diluted with water. A precipitation results when the hydrochloric solution is diluted, but this precipitate is not the citrate, as it is insoluble in ammonia. In this connection the writer finds it convenient to state that the officinal process for basic bismuthous nitrate does not by any means yield a preparation of the supposed composition. Becker shows that the curdy precipitate produced by adding water to a solution of the normal nitrate is the body which answers to that composition, and that if this be treated with water a much more basic salt is formed. If this be further treated with hot water, a dingy white residue remains, containing only one or two per cent. of nitric acid. The writer finds the best method for producing the medicinal nitrate in the form of a loose crystalline powder is to dilute the solution to about thirty times the weight of the metal, and then adding ammonia so as to leave the liquid slightly acid. After subsiding, the precipitate is transferred to a filter and washed with a moderate amount of water.

Mr. Scheffer considers it impossible to combine bismuth with pepsin in permanent solution. The writer finds that the syrup above prepared is permanent, but cannot vouch for the activity of the pepsin contained in it. That the pepsin originally introduced is still in solution is unquestionably certain, as no precipitation of any character whatever had taken place after the mixture of the two solutions was effected; and that these were of a decided acid reaction before and after the mixing is also a positive certainty; yet with all this, the writer has made the observation that the presence of bismuth utterly vitiates the method of assay by which the power of the simple pepsin solution is ascertained, and in this respect Mr. King is most grievously mistaken.

Mr. King attempts to show that in an alcoholic preparation, in the production of which a certain amount of a questionable quality of pepsin had been used, tbe pepsin could be determined by the amount of coagulated albumen it was capable of dissolving. But Mr. King did not exercise the necessary discretion to judge rightly between albumen actually dissolved and difference of weight caused by shrinkage. To exemplify this, the following experiments will suffice:—Firstly, let it be premised that dissolving albumen never shrinks, but, on the contrary, expands and becomes soft and pulpy as the solution progresses, and that solution results much more rapidly towards the last than in the beginning, because at the outset the albumen is more compact, and presents less surface. To facilitate the solution, and give the pepsin full scope, the writer introduces the albumen not in cubes, but in very thin slices or ribbons.

The writer, in the experiment with syrup of pepsin with little water, found that no apparent action of the pepsin could be observed, but, on the contrary, the albumen had considerably gained in weight, whilst preserving its compactness. But now 6 fluid drachms of syrup of pepsin and bismuth were acidulated with hydrochloric acid in sufficient excess to prevent precipitation, diluted with water to a little over a fluid ounce and 45 grains of coagulated albumen added, and a proper temperature maintained. During a digestion of twelve hours no impression appeared on the albumen. It was then removed, and found to have a hard and compact exterior. It had lost 15 grains of its original weight in opposition to the large presence of syrup. The writer does not hesitate to say that no albumen whatever was dissolved, but the loss was simply caused by the abstraction of water.

$1\frac{1}{2}$ fluid ounces of syrup of pepsin and bismuth was diluted with water to 5 fluid ounces, and acidulated with enough hydrochloric acid to prevent precipitation. 95 grains of albumen in cubes was digested with this for eight hours. A very considerable contraction occurred, but the firm exterior remained unyielding for a long time. The cubes were then crushed with a glass rod. The peculiar tenacity, differing from that of freshly coagulated albumen, was remarkable. The crushed albumen, after at least four hours' digestion, was carefully collected on a strainer, and dried between folds of bibulous paper, weighed 45 grains, showing that the original weight had sustained a loss of 50 grains.

Simultaneously with the preceding experiment, $1\frac{1}{2}$ fluid ounces of syrup of pepsin and bismuth was diluted with water to 4 fluid ounces, and acidulated with hydrochloric acid beyond the limit of precipitation, and 95 grains of coagulated albumen in cubes was digested in it for eight hours without rupturing the cubes. These had the identical appearance of those in the parallel experiment, and weighed exactly the same.

The residue of the first of these two experiments was washed with water, then thoroughly triturated in a mortar, and digested with 6 fluid drachms of acidulated water for four hours; as no change of appearance took place, an unfiltered hydrochloric solution of pepsin, representing 6 grains of saccharated pepsin, was added, and the digestion continued four hours longer. The insoluble residue was then carefully collected on a strainer, the superabundant moisture absorbed with bibulous paper, then scraped up cautiously and weighed. 15 grains out of the 45 was still left. This, however, was a purely white flocculent sediment. When boiled with diluted nitric acid it turned intensely yellow from the formation of xanthoproteic acid; and ammonium sulphide added to the nitric solution produced a voluminous brownish black precipitate of bismuthous sulphide. The moist mass applied to a bright surface of iron or zinc gave a copious black deposit of metallic bismuth. From this it is evident that the residue consisted mainly of bismuth albuminate, probably associated with hydrochloric acid. This result explains that the shrinkage in volume and weight is due to an exterior layer of bismuth albuminate, which, contracting, eliminates the absorbed water of the coagulated albumen, and that the non-action of the pepsin is owing to the immediate seizure of any exposed albuminous surface by the bismuthous chloride, as long as there is any of this salt in the solution. The writer finds that if the syrup of pepsin and bismuth is diluted with water, and the resulting liquid saturated with sodium chloride, the pepsin is completely precipitated. Hence, to assay this preparation by means of coagulated albumen, the bismuth must first be removed as sulphide.

From this accumulation of evidence the writer is convinced that the usual pepsin assay, when applied to solutions containing bismuth, is utterly unreliable.

THE CHEMICAL EFFICIENCY OF SUNLIGHT.*

BY JAMES DEWAR.

Of all the processes proposed to measure varying luminous intensity by means of chemical effects, not one has yet been expressed in strictly dynamical measure. This is owing to the very small amount of energy to be measured necessitating very peculiar processes for its recognition. The chemical actions generally induced by light are of the "trigger" or "relay" description; that is, bear no necessary relation to the power evolved by the transformation. There is one natural action of light, however, of a very different kind, continuously at work in the decomposition of carbonic acid by plants, necessitating a large absorption of energy, and thus enabling us to ascertain the proportion of the radiant power retained, through the chemical syntheses effected.

So far as I am aware, the following passage, extracted from Helmholtz's Lectures "On the Conservation of Energy," delivered at the Royal Institution in 1864, and published in the 'Medical Times and Gazette,' contains the first estimate of the chemical efficiency of sunlight. "Now, we have seen already, that by the life of plants great stores of enegy are collected in the form of combustible matter, and that they are collected under the influence of solar light. I have shown you in the last lecture that some parts of solar light—the so-called chemical rays, the blue and the violet which produce chemical action—are completely absorbed and taken away by the green leaves of plants; and we must suppose that these chemical rays afford that amount of energy which is necessary to decompose again the carbonic acid and water into their elements, to separate the oxygen, to give it back to the atmosphere, and to collect the carbon and hydrogen of the water and carbonic acid in the body of the plant itself. It is not yet possible to show that there exists an accurate equivalent proportion between the power or energy of the solar rays which are absorbed by the green leaves of plants, and the energy which is stored up in the form of chemical force in the interior of the plants. We are not yet able to make so accurate a measurement of both these stores of energy as to be able to show that there is an equivalent proportion. We can only show that the amount of energy which the rays of the sun bring to the earth is completely sufficient to produce such an effect as this chemical effect going on in the plant. I will give you some figures in reference to this. It is found in a piece of cultivated land producing corn or trees; one may reckon per year and per square foot of land 0·036 lb. of carbon to be produced by vegetation. This is the amount of carbon which during one year, on the surface of a square foot in our latitude, can be produced under the influence of solar rays. This quantity, when used as fuel and burnt to produce carbonic acid, gives so much heat that 291 lb. of water could be heated 1° C. Now we know the whole quantity of solar light which comes down to one square foot of terrestrial surface during one second, or one minute, or one year. The whole amount which comes down during a year to one square foot is sufficient to raise the temperature of 430,000 lb. of water 1° C. The amount of heat which can be produced by fuel growing upon one square foot during one year is, as you see from these figures, a very small fraction of the whole amount of solar heat which can be produced by the solar rays. It is only the 1477th part of the whole energy of solar light. It is impossible to determine the quantity of solar heat so accurately that we could detect the loss of so small a fraction as is absorbed by plants and converted into other forms of energy. Therefore, at present, we can only show that the amount of solar heat is sufficient to produce the effects of vegetable life, but we cannot yet prove that this is a complete equivalent ratio." This estimate is, strictly speaking, the mean agricultural efficiency of a given area of land, cultivated as forest; and, considering that active growth only takes place during five months in the year, we may safely adopt $\frac{1}{600}$ of the total energy of sunlight as a fair value of the conserved power, on a given area of the earth's surface in this latitude during the course of the summer. As chlorophyl in one or other of its forms is the substance through which light becomes absorbed and chemical decomposition ensues, it would be interesting to acquire some idea of the storage of power effected by a given area of leaf-surface during the course of a day, and to compare this with the total available energy. Here we are dealing with strictly measurable quantities, provided we could determine the equation of chemical transformation.

Boussingault's recent observations on the amount of carbonic acid decomposed by a given area of green leaf seem to me to afford interesting data for a new determination of the efficiency of sunlight. By experiments made between the month of January and October under the most favourable circumstances in atmospheres rich in CO_2, one square decimetre of leaf was found to decompose in one hour, as a mean, 5·28 cub. centims. of CO_2, and in darkness to evolve during the same period of time 0·33 cub. centims. of CO_2. In other words, one square metre of green surface will decompose in twelve hours of the day 63·36 cub. centims. of CO_2, and produce in twelve hours of the night 3·96 cub. centims. of CO_2.*

This quantity of carbonic acid decomposed does not represent the whole work of sunlight for the time, as water is simultaneously attacked in order to supply the hydrogen of the carbonhydrates. Boussingault, in

* Read before the Royal Society of Edinburgh, May 6, 1872, and printed in the 'Philosophical Magazine.'

* The rate at which the leaf functions is dependent on the luminous intensity. The relative amounts, therefore, of carbonic acid decomposed through the action of the different coloured rays are proportional to their luminous power; and the curve of assimilation is found to follow the curve of Fraunhofer. This proves that the judgment we form of equal luminous impressions is in reality due to equal mechanical effects associated with the different coloured rays. Professor Draper, of New York, in his recent paper "On the Distribution of Heat in the Spectrum," by dividing the spectrum into two portions of equal luminous intensity, obtained identical thermal effects by absorption. This does not prove that each ray has the same total energy, but only that in all probability those at equal distances on either side of the mean wave-length in the normal light-spectrum of the sun are identical.

summing up the general results of his laborious researches on vegetable physiology, says, "Si l'on envisage la vie végétale dans son ensemble, on est convaincu que la feuille est la première étape des glucoses que, plus ou moins modifiés, on trouve répartis dans les diverses parties de l'organisme; que c'est la feuille qui les élabore aux dépens de l'acide carbonique et de l'eau.—*Ann. de Chimie*, tom. xiii. p. 415. The fundamental chemical reaction taking place in the leaf may therefore be represented as follows:—

$$(1)\ CO,O + H_2O = CO,H_2 + O,O$$
$$(2)\ 6(CO.H_2) = C_6H_{12}O_6.$$

In the first equation carbonic acid and water are simultaneously attacked, with the liberation of a volume of oxygen equal to that of the original carbonic acid, together with the formation of a substance having the composition of methylic aldehyde. The second equation represents the condensation of this aldehyde into grape-sugar. The transformation induced in (1) necessitates the absorption of a large amount of energy; and if we neglect the heat evolved in the combination of nascent CO and H_2, which can be shown to be very little, the calculated result is made a maximum; whereas the condensation of (2), being attended with an evolution of heat, diminishes considerably the amount of power required. Happily, Franklin's direct determination of the thermal value of grape-sugar leaves no doubt as to the true equivalent of work done in its formation. Taking the following thermal values, $CO,O = 68,000$, $H_2,O = 68,000$, $C_3H_{12}O_6 = 642,000$, 1 cub. centim. of CO_2 decomposed as in (1) would require 6·06 gramme-units of heat, or its light-equivalent, whereas the complete change into grape sugar of the same amount of carbonic acid requires only 4·78 gramme-units. But, we have seen before, 1 square decimetre of green leaf functions at the rate of 5·28 cub. centims. of carbonic acid assimilated per hour; therefore, $5·28 \times 4·78 = 25·23$ represents the number of gramme-heat units conserved through the absorption of light in the above period of time. Pouillet estimates the mean total solar radiation per square decimetre exposed normally to the sun's rays in or near Paris per hour as 6000 gramme-units, so that $6000 \div 25·23 = \frac{1}{238}$ represents the fraction of the entire energy conserved. The estimate is by no means too great, as Boussingault has shown the leaf may function at twice the above rate for a limited time; and as both sides of the leaf are included in the measurement of the green surface in his memoir, we ought to double the fraction for a leaf exposed perpendicularly to the sun's rays, increasing the above number to the 120th part.

In connection with equation (1), above given, as representing the action of sunlight on the leaf, it is worthy of remark that, supposing the carbonic acid and water equally efficient as absorbing agents of the vibratory energy (although each has a specific absorption for certain qualities of rays), the decomposition of the two compound molecules may take place continuously side by side, owing to the equality of the thermal equivalents of carbonic oxide and hydrogen. We already know, from the laborious researches of Tyndall, how thoroughly aqueous vapour retains thermal radiations; and Janssen has further shown the same substance has a strong absorptive action on the rays of light of low refrangibility (just those rays that are in part selected by chlorophyl), producing the well-known atmospheric lines of the solar spectrum. The presence, therefore, of varying quantities of aqueous vapour in the atmosphere in all probability produces a considerable difference of rate in the decomposition effected by the leaf, and may in fact end in carbonic acid and water being attacked in another ratio than that given as the fundamental equation of decomposition. Thus the same plant in different atmospheric conditions may elaborate different substances.

ODOURS.*

BY M. FERNAND PAPILLON.

The subject of odours, considered in the light of recent discoveries in chemistry and physiology, has been recently discussed in an interesting memoir by M. Fernand Papillon. The paper is too long to be reproduced entire in these pages; we must, therefore, be content with extracting some of its more salient points. In doing so, we shall merely indicate the arguments in the physiological portion, giving to the physical and chemical portion the greater prominence that is in keeping with the object of this Journal.

The seat of the sense of smell is the pituitary membrane which covers the inside of the nostrils. It is a mucous surface in which a certain number of nerves terminate in delicate ramifications, and is kept constantly moist by a liquid which it secretes. The mechanism of smelling appears to consist in the contact of air-borne odoriferous particles with the olfactory nerve; if the passage of air be interrupted, the sensation is not experienced. The sense of smell varies very much in different individuals, being sometimes without any apparent cause absent altogether; in other cases there is insensibility to certain odours, analagous to Daltonism in the sense of sight. A close connection exists between smelling and tasting, and it has been shown that many tastes are the result of a combination of olfactory and gustatory sensations. In reality there are but four primary and radical savours, viz. sour, sweet, salt and bitter; and if a variety of sapid substances be tasted while the nostrils are closed, or while the pituitary membrane is out of order, it will be found that the tongue only perceives these four sensations.

In 1799 Prevost first pointed out that certain odorous substances, both solid and fluid, when placed upon a piece of wet glass or in a saucerful of water, act immediately upon the molecules of the liquid with which they come in contact, and in dispersing them give rise to more or less of a vacuum. In later years, these movements of odorous substances on the surface of liquids, have been studied by M. Liégeois. He found that the majority of these bodies execute various gyratory and other movements analogous to those of camphor upon the surface of water; but that while some, such as benzoic acid, succinic acid, and bitter orange peel comport themselves in an exactly similar manner, the movements of others cease more quickly, since they rapidly become surrounded by an oily medium in which they are imprisoned. It was found necessary to reduce them to powder to produce the same phenomenon. When experimenting upon liquid substances, M. Liégeois saturated very light, spongy and odourless seeds with them, and these when thrown upon water underwent the same movements. From a series of observations, methodically conducted, he came to the conclusion that these movements are not due to a disengagement of gas causing a recoil, but to the separation and rapid diffusion of odorous particles into the body of the water. The phenomenon depends exclusively upon the affinity of fluids for these particles, and also for those of fatty matter. For instance, M. Liégeois found that a drop of oil placed on the surface of water parts with an enormous number of microscopic particles without sensibly diminishing in volume, and that aromatic essences give the same result. However insoluble in water they have an energetic tendency to become diffused through it, and it suffices for water to receive the odorous principle in an extremely delicate proportion to acquire all its perfume. Thus it is that while the flowers are covered with the glistening drops of dew, or after a slight shower, they exhale the sweetest and freshest perfumes. So also in the phenomenon of smelling; the air carries the odorous particles into contact

* Abstracted from a memoir, entitled 'Les Odeurs d'après les Découvertes Récentes de la Chimie et de la Physiologie' (Moniteur Scientifique-Quesneville, xiv. 296 et seq.).

with the moisture of the pituitary membrane, which seizes them, and in the presence of the delicate nerve fibres gives rise to the most varied sensations.

The great diffusibility and divisibility manifested by certain odorous substances is worthy of notice. Ambergris freshly deposited upon a bank spreads a perfume which assists the collector in his search, and the sources of petroleum are to be smelt at a long distance. A single grain of musk will perfume an apartment during a year without sensible loss of weight. Haller records that he preserved for forty years some papers which had been perfumed by one grain of ambergris, and at the end of that time they still retained their odour. He calculated that each inch of surface had been impregnated by $\frac{1}{2691064000}$ of grain of ambergris, which had sufficed to perfume during all that time a layer of air at least a foot in thickness. It is impossible to conceive how small was the actual quantity of the odorous principle present in a given quantity of this air, and such examples are cited by physicists to illustrate the divisibility of matter. The presence of oxygen, as well as of the odorous principle, appear to be the express conditions of the phenomenon of smelling; but whether the oxygen exercises any chemical influence upon the particles, or even whether the sensation is due to a mechanical action or to a decomposition that takes place is not known. In a recent work, Mr. Piesse has shown considerable ingenuity in tracing a harmony of perfumes analogous to that existing between colours and between sounds.

(*To be continued.*)

PRESENTATION TO MR. HAMPSON.

The purpose for which the Chemists' Defence Association was instituted having been fully accomplished, and its labours brought to a successful termination, it was felt by the committee that before the association was finally dissolved, some acknowledgment ought to be made to Mr. Robert Hampson the late honorary secretary, whose unwearied exertions and untiring devotion contributed so materially to its success.

Subscriptions were accordingly solicited from the members, in order that a suitable testimonial might be procured; and sufficient funds having been collected, the committee decided to purchase a silver inkstand, with a gold pen and holder, as being the most appropriate articles for presentation to one whose pen is ever ready in the service of pharmacy, either to advance its interests or defend its cause.

It was originally intended that the presentation should be made to Mr. Hampson at a public meeting of the subscribers, but that being found impracticable, the testimonial was exhibted at the October meeting of the Manchester Chemists' Association, and afterwards forwarded to him, with an address on vellum, as follows:—

"To Robert Hampson, Esq., Pharmaceutical Chemist.

"Dear Sir,—The desire of a Government Department to apply to chemists and druggists vexatious and impracticable regulations upon the storage of poisons, shaped itself into the so-called Pharmacy Bill of 1871.

"Circumstances which need not further be recalled gave a dangerous probability to the passing of the measure, in spite of the indignant protests of those who were most nearly concerned. The largest of the various Defence Associations was fortunate in having you as its honorary secretary. To your earnest, incessant and self-sacrificing labours at this time, the success achieved by our cause was due to a very large extent. We desire to record our sense of the deep obligation thus incurred.

"We know that your action was founded upon a conscientious sense of the responsibilities of our profession, and was supported by an unflinching faith in your principles. Like ourselves, you endorsed the opinion of John Stuart Mill, who says, 'Speaking generally, there is no one so fit to conduct any business, or to determine how or by whom it shall be conducted, as those who are personally interested in it. This principle condemns the interferences, once so common, of the Legislature, or the officers of Government with the ordinary processes of industry.' Like you, we recognize a high sense of individual responsibility as being a better safeguard to the public interest than the addition of penalties to the Statute-book.

"We look back upon our late struggle as being accompanied by much that is for the good of pharmacy, besides the reward of success. The self-reliance of our body was never so fully developed, and many friendships have been established amongst those who worked together for a common cause.

"Will you do us the favour of accepting the accompanying silver inkstand, subscribed for by members of the late Chemists' Defence Association, as a small memento of their friendship and esteem, and as an expression of their gratitude for your great services to their cause.

"Signed on behalf of the late
"Chemists' Defence Association,
"W. S. Brown, *Chairman*,
"W. Wilkinson, *Hon. Secretary*.

"*Manchester, October* 21*st*, 1872."

To which Mr. Hampson sent the following reply:—

"205, *St. John Street Road, E.C.*

"My Dear Sirs,—I feel it very difficult to acknowledge as I wish the expressions of friendship and commendation, much beyond my due, which your very kind address conveys to me, and which I see reflected in the elegant gift accompanying it.

"There was no need for the committee or members of the late Chemists' Defence Association to single me out that they might thus mark the little work I did, when so many laboured for the good cause with an ardour equal to, if not greater, than that which I gave to it.

"But I must confess that I feel deeply your kindness, that I value your esteem, and the tangible memento I receive from you I shall treasure with genuine gratification. The friendships gained during our contention for principle will be to me a life-long pleasure, and have fully repaid any labour expended in the work. I only wish that I had had greater strength to devote to the cause.

"The battle of the 'Poison Regulations' is happily over, and we may fairly congratulate ourselves that we do not wear the trammels of unnecessary legislation. The words of John Stuart Mill, which you so aptly quote, give the pith and significance of the opposition carried on by the Chemists' Defence Associations.

"Now that the needful educational test is required, I believe that pharmacists will be so united as to be able successfully to oppose any interference which detracts from the sense of personal responsibility in the conduct of their business.

"Will you convey to the members of the late Chemists' Defence Association my sincere thanks for their useful gift, and for their many expressions of kindness.

"I am, my dear Sirs,
"Yours faithfully,
"Robert Hampson.

"*October* 24*th*, 1872.

"W. S. Brown, Esq., Chairman,
"W. Wilkinson, Esq., Hon. Secretary of the late Chemists' Defence Association."

On the inkstand the following inscription was engraved:—

"Presented to Mr. Robert Hampson by a few members of the Chemists' Defence Association, in recognition of his services as Hon. Secretary, and their successful result.

"*Manchester, October*, 1872."

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 2, 1872.

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

IMPORTS OF DRUGS, ETC., IN 1871.

THE much earlier publication of the annual statement of the trade of the United Kingdom with foreign countries and British Possessions for the year 1871, enables us to furnish an abstract of those articles most interesting to the chemist and druggist. But this earlier official publication is attended with some disadvantages, seeing that the return is shorn of many details and figures which were given in former years under the section of "other articles," in which were formerly enumerated the minor drugs and varieties of imports that are now omitted altogether. Thus, in previous years we were able to ascertain the official imports of aloes, annatto, arrowroot, balsams, unenumerated barks, berries, cardamoms, cantharides, cassia fistula, cocculus indicus, cubebs, various extracts, gentian, grains of paradise, miscellaneous medicinal gums, honey, ipecacuanha, jalap, leeches, manna, musk, myrrh, nux vomica, pomatum, quassia, quinine, sarsaparilla, seneka root, senna, mineral waters, and other articles, about which we are now left in the dark. And we consider this omission to enumerate the miscellaneous articles is but a false economy, which deteriorates from the value of the returns for statistical and commercial reference.

However, in the absence of the minor articles, we must be content with the return of the major ones. Glancing at them in the alphabetical order in which they appear, of alkali of various kinds the imports last year were close upon 100,000 cwt., valued at £143,741; bark for tanners' or dyers' use 415,528 lb., value, £166,529; extract of bark, or other vegetable substances, for the same purpose, £29,616 in value; Peruvian bark, 21,043 cwt., valued at £285,976; other sorts of bark, 29,525 cwt., valued at £76,483; sulphur, 935,131 cwt., valued at £303,663; chemical manufactures and products of the value of £851,757, of which Italy sent £353,724, France £203,246, and Germany £149,756; 55,429 cwt. of cochineal was received, valued at £719,624; cutch, 5339 cwt., valued at £111,140; drugs, unenumerated, of the value of £405,096; dyestuff of various kinds, 234,548 cwt., valued at £502,738; and dye-woods, 62,734 cwt., valued at £183,518; extracts, unenumerated, £27,490; farinaceous substances, such as arrowroot, tapioca, etc., to the value of £274,281; gambier, 25,207 tons, valued at £399,955; gums—Arabic, 76,136 cwt., valued at £250,088; lac, of all kinds, 60,665 cwt., value, £348,689; unenumerated gums, 95,426 cwt., value, £324,229; indigo, 106,307 cwt., value, £2,937,224; isinglass, 4266 cwt., value, £72,189; madder, munjeet, and garancine, 277,093 cwt., value, £865,592; myrobalans, 145,450 cwt., value, £100,695; naphtha, crude, 1,985,845 gallons, value, £72,030; Cubic nitre, 1,451,520 cwt., value, £1,131,700; oil nut 31,126 tons, value, £417,067; cocoa-nut oil, 190,492 cwt., value, £357,260; olive oil, 38,281 tons, value, £1,858,779; palm oil, 1,047,882 cwt., value, £1,820,698; seed oil of all kinds, 10,354 tons, value, £404,386; oil and spirit of turpentine, 178,615 cwt., value, £317,877; chemical and essential oils, 530,401 lb., value, £174,916; other oils to the value of £195,093; opium, 591,466 lb., of the value of £596,158, of which 514,860 lb. came from Turkey and Egypt; perfumery unenumerated to the value of £66,710; petroleum, refined and unrefined, value, £614,017; rosin, 736,942 cwt., value, £330,994; safflower, 15,333 cwt., value, £138,808; saltpetre, 329,561 cwt., value, £419,099; sumach, for tanning and dyeing, 16,481 tons, value, £206,617; ginger, raw, 32,723 cwt., value, £70,884; turpentine, rough, 6650 cwt., value, £2,698; valonia, for tanning, 27,999 tons, value, £448,458; wax, 16,736 cwt., value, £99,529.

Glancing from the above aggregate quantities to the imports from special countries, and taking those of the East first, we find that from India there is an increase in the value of unenumerated drugs. The quantity imported last year was of the declared value of £53,309, an increase of more than cent. per cent. in the last five years; for only £16,000 worth was received in 1867, and £29,000 in 1868. The value of the chemical products imported from India in 1871 was a little over £23,000, which is a decline upon the previous two years,—£52,953 having been received in 1869, and £33,620 in 1870, Of cutch, 90,210 tons were received from British India last year against 108,453 tons in 1870. In dye-stuffs there is a large increase, for although indigo keeps steady at about two million cwt. per annum (a little more or less), the unenumerated dye-stuffs imported in 1871, were 75,535 cwt., against 45,690 cwt., in 1870. There is a large decline in the quantity of galls received from India, which amounted to but 1457 cwt. in 1871, whilst in 1869, nearly 29,000 cwt. were received from there. The supply of East India ginger does not fluctuate much, the average import being about 28,000 cwt. Of gums, Arabic is decreasing, only 8548 cwt. were imported in 1871 against 19,178 cwt. in the previous year; but of lac of all kinds, and lac-dye, there is a very large increase shown: the imports in 1871 were 343,224 cwt. against 240,041 in 1870, and in 1867 only 160,239 cwt. were received. In unenumerated gums, there is no great progress shown, 45,000 to 50,000 cwt. being the average imports. The supply of myrobalans, for tanning, varies considerably; last year 98,604 cwt. was received, in 1870 but 29,000 cwt., in 1869, 124,243 cwt. The supply of cocoa-nut oil from India is decreasing rapidly, although that from Ceylon is steadily on the increase. Only 53,228 cwt. of cocoa-nut oil came from British India last year, against 108,403 cwt. in 1870. In seed oil there was shown an enormous increase, 55,737 tons being received in 1871. The demand for safflower appears to be extensive, judging by the import of 130,387 cwt. Saltpetre from India is also on the increase; the receipts last year were 373,198 cwt.

From the Straits settlements, chiefly through Singapore, we received last year 417,012 tons of cutch and gambier; 2612 cwt. of lac of various kinds; 45,214 cwt. of other sorts of gums and resins; 26,897 cwt. of isinglass, and 7475 lb. of essential oils. From Ceylon there came 76,913 lb. of essential oils, valued at £14,398, and 138,141 cwt. of cocoa-nut oil, valued at £257,641. From New South Wales 5565 cwt. of kowri resin was received, the produce of New Zealand, and 31,723 cwt. of cocoa-nut oil from the islands of the Pacific. From New Zealand 82,240 cwt. of kowri gum, valued at £149,287, chiefly used for varnish making, a very large increase on any previous year's export; 1237 cwt. of other gums were also received from that colony. 13,350 cwt. of extract of bark for tanning was received from Canada. From the West India Islands 8542 cwt. of ginger, and 1149 cwt. of wax were received.

This survey shows an aggregate import of articles of the value of £22,500,000, in which the chemist and druggist is more or less interested, and which add largely to the progress and prosperity of our chemical manufactures and other great industries. By a comparison with former years the imports are for the most part progressive; in the supply of very few raw materials is there any decline, the exceptions are perhaps galls, gums, isinglass, liquorice and a few others.

If we glance at the exports of the produce of the United Kingdom we find articles of the following value were sent away last year:—Alkali, £1,747,269; chemical products and preparations, £1,588,763; drugs and medicinal preparations, £720,830; painters' colours and materials, £1,019,243, being a sum of over £5,000,000 in these four enumerated items, independent of the various minor articles, the soap and candle trade, and the enormous home consumption.

SUNDAY CLOSING.

That the rapidly spreading movement in favour of shortening the hours of business in pharmaceutical establishments should originate some doubts and difficulties is only what might be expected. And on page 358, Mr. Slugg, of Manchester, gives utterance to one in his question, "What is meant by Sunday closing"? We believe that it is intended by the advocates of the movement to keep the shop entirely closed, but at the same time to have some one in attendance capable of dispensing or selling medicines when required. Some houses, with a large connection, are obliged always to have an assistant on duty in case of emergency; others have a notice stating at what hours medicine can be obtained, or, as in Edinburgh, where neither proprietor nor assistant resides on the premises, a notice is placed on the door informing the public where the manager or assistant can be found, and medicine obtained. It would be impossible to refuse to dispense or sell medicine on a Sunday, or at any other time, but the great object chemists and druggists should have in view, is to curtail the hours of business by closing their shops altogether on Sundays, and on other days at eight o'clock P.M. By so doing the public would be induced to send for their medicines earlier, as well as to anticipate (where possible) their requirements on a Sunday, and thus shorten the too lengthened hours of work.

THE GOVERNMENT SCIENCE CLASS SCHEME.

A statement made by a "Country Major Associate," in a letter printed on p. 100 of the present volume, that the Science Class Scheme of the Government had only just escaped a collapse, and reiterated in another letter on p. 257, where he also speaks of the Directory as a Blue Book got up to appease "My Lords," has caused Mr. G. F. Schacht and other correspondents to ask upon what authority these assertions are based. We have failed to obtain from "A Country Major Associate" any reply more definite than that he has drawn his inferences from facts that have come under his notice, therefore we think it but fair to give insertion to the following statistics, taken from the official returns in connection with the Science and Art classes, published under sanction of the Privy Council. According to the last Report, the total number of students under instruction in all subjects was 34,435, an increase of 7640 over the number in 1869. In the classes in Chemistry alone, there were, in January, 1871, 5942 students under instruction, whilst in 1869 they numbered 2,261.

The next Evening Meeting of the Pharmaceutical Society will be held on Wednesday next, when a paper on Tincture of Orange Peel will be read by Mr. A. F. Haselden, F.L.S. The chair will be taken at half-past eight.

Provincial Transactions.

NORTHAMPTON CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The first meeting of the winter session of this association was held on October 7th, 1872.

Mr. H. Masters, the President, announced that it had been thought best to alter the name of the association, so that in future it would be called "The Northampton Pharmaceutical Association."

The first business was to arrange the different class nights (the class teachers had been previously elected by ballot), and after some discussion it was agreed that the chemistry class conducted by Mr. F. Branson should meet on Monday; materia medica, Mr. H. Lester, on Thursday; pharmacy, Mr. O. Wallis, on Monday; botany and prescriptions, Mr. G. C. Druce, on Thursday.

The President then requested the Secretary, Mr. Druce, to read the report of the Council for the year just completed:—

"The Council have much pleasure in placing this their first year's report before the members. The satisfactory manner in which the association has been conducted, the estimation in which it is held, and the position it has attained, tend to make it imperative upon all assistants and apprentices in Northampton to become connected with what must necessarily be to them a most useful association.

"Classes have been held twice weekly during the winter, and once in the summer session, with, the Council are pleased to say, a much higher rate of attendance than many similar associations. The classes conducted have been chemistry, botany, materia medica, pharmacy, and during the summer, by the kind aid of the Pharmaceutical Society, they have been enabled to add one on practical chemistry. The Council take this opportunity of thanking the class takers for the efficient manner in which they have carried out their onerous duties; and give notice that they have under consideration a plan, which will be carried out if the funds permit, of giving prizes to the most successful candidates at the Christmas examinations.

"During the year two members have passed the Preliminary and one the Minor examination. The latter passed second in honours, and subsequently obtained the prize of books.

"The Council trust the members will make good use of the circulating library which has been recently formed.

"The Council offer their hearty thanks to the principals for the very liberal aid which they have rendered the association since its commencement, and hope that the general conduct of the association has met with their approval; also for the numerous presents they have received from pharmacists in other towns.

"Finally, the Council, in closing what cannot but be considered a very satisfactory report, have great pleasure in announcing that the association will in future be *self-supporting*. The Council thank most warmly the members for the support and confidence reposed in them."

The balance sheet for the year showed an income of £31. 7*s*. 6*d*. (including a grant of £10 from the Pharmaceutical Society), and an expenditure of £27. 17*s*. 10½*d*., leaving a balance in hand of £3. 9*s*. 7½*d*.

The following gentlemen form the Council for the ensuing year:—President, Mr. H. J. Masters; Vice-President, Mr. C. Hester; Secretary and Treasurer, Mr. G. C. Druce; Messrs. J. Tutton, A. J. Lance and A. Thomas; Librarian, Mr. J. Cross; Assistant Secretary, Mr. E. H. Cooke; Curator, Mr. Chibnall.

The President then delivered an address, in which, after thanking the members for the honour they had conferred upon him by again electing him as their President, he described the progress the association had made in less than twelve months as most gratifying to all who were connected with it, especially to those who had been the chief workers in bringing it to the satisfactory position it had attained. He said that arrangements would be made for nearly every member to fill some office, whereby each would feel that he was of use to the association as well as receiving benefit from it. He trusted the ensuing session would prove even a greater success than the past. He was happy to find that so long as their own resources were sufficient to supply the instruction required, so long would the association be self-supporting. But when it became necessary for them to have higher instruction, then of course they must look elsewhere for aid, and that he hoped they would find in the arrangements made by the Parent Society, when it had settled the now important question of pharmaceutical education. With regard to that question, he thought if the suggestions recently made by Mr. T. B. Groves, of Weymouth, and 'A Local Secretary' in the PHARMACEUTICAL JOURNAL, "that every youth should pass the Preliminary before being bound an apprentice; that he should be compelled to pass the Minor before being allowed to dispense, and the Major before entering business on his own account," were carried out, they would go far to raise the "status" of the trade, and he would be very glad to see them become law, although he himself would be affected by them. Another suggestion made by Mr. Groves he thought would be well for all parties if adopted; and that was, "let every assistant at present employed in dispensing be compelled to pass either the Preliminary, Modified, or Minor examination." The only objection to it that he could see was that Mr. Groves would give too long after the passing of the Act (two or three years), his own opinion being that any assistant, who is at present engaged in dispensing poisons, and could not pass either the Preliminary or Modified, or even the Minor by six months' application, had better for his own sake and the public safety, give up pharmacy and take to some trade where physical abilities are at a greater premium than mental. He then commented upon Professor Attfield's recently expressed views concerning pharmaceutical education, in terms of general approval, and said that it appeared to him that, as the "Minor" is now, only those who pass it in honours are worthy the title of chemists and druggists. He thought persons who could show that they had attended a recognized school for a certain period should be subjected to an entirely different examination to the one for those who could not do so, and, therefore, might be suspected of having been crammed. In reference to Professor Attfield's remark, "that the Bell Scholarships do good to all other professions except our own," the speaker asked would it not then be making a great stride in the right direction, if the Pharmaceutical Society engaged some of the Bell scholars to lecture in the provinces at schools like their own, where they would be only too happy to receive them, and pay for the instruction as far as they could afford? One lecture a month only would greatly assist provincial schools, would not be putting the Society to a very great expense, and pharmacy would retain some of her best talent which would otherwise be lost; besides the schools paying part of the expenses that would by that plan be incurred. He believed every chemist employing an assistant would also help, so that the expense to the Pharmaceutical Society would be scarcely anything appreciable except in small towns. He could not agree with Professor Redwood that the interest of the public seems to demand that there should be to some extent a gradation of qualifications amongst chemists and druggists. Surely the interests of the public would be better considered if the law compelled every one who had a shop for the dispensing of medicines to possess abilities of a certain standard, and that should not, in his opinion, be less than the "Major" qualification; there would be then quite sufficient gradation in men's natural abilities to suit the different conditions under which businesses are conducted. Besides, it seemed only fair to those who had gone to the expense and trouble of passing the Major examination that none but "Major" men should be able to open a *dispensing* establishment.

After the address a long and animated discussion took place. The points to which opposition was principally raised were a compulsory Major examination, and that part relating to the enforced passing of the Preliminary, Modified, or Minor examination by assistants at present in business before being qualified to dispense. The suggestion made that a candidate should be admitted to a shorter and different examination upon proving he had attended the classes of a school of pharmacy for a certain time, also met with disapproval.

The officers of the association having returned thanks for their election, the meeting terminated.

It is very gratifying to find that, with the exception of three, all the assistants and apprentices in Northampton have joined the association.

HULL CHEMISTS' ASSOCIATION.

The fourth winter course of lectures, under the auspices of the above association, was inaugurated on Wednesday evening, the 16th ultimo, at the Society's room at the Church Institute, Albion Street, by the Vice-President, Mr. Anthony Smith, who delivered the following address:—

In the absence of the President of the Hull Chemists' Association, the duty devolves upon me to open the fourth course of lectures on chemistry, materia medica, etc., which we have provided for you. It is a source of great gratification to myself and fellow-committeemen to be able to congratulate you on the very bright prospects the coming session presents. We have been fortunate, as you are aware, in securing the services of a gentleman as lecturer, who not only is possessed of great ability—as his position on the list of the successful candidates at a recent Major examination of the Pharmaceutical Society will show—but is enabled to impart to you a class of teaching which has the strong recommendation of being modern; and as fashion, even in education, is varying, the more recently the lecturer has been before the Board of Examiners, before which ere long you are destined to appear, the better chance he has of successfully instructing you. Far be it from me to infer for a moment that the gentleman who has been kind enough to place his services at our disposal for the three past sessions lacked either the qualification or disposition to impart the class of instruction which it is our great anxiety you should receive; his urgent professional duties alone have induced us to look elsewhere for assistance, and my estimate of human nature is very inaccurate if you do not find in your teacher Mr. Parson an earnest tutor and a friend. The prospects of those who are serving their apprenticeship, never since the business of chemist and druggist was established could present a more encouraging future; the number entering the trade will be reduced at such a ratio that the great competition of the present day that we are now contending against will gradually decline, and you will reap the benefit of the little extra compulsory studying to which you must necessarily give your attention. With the Pharmacy Act of 1868, in its entirety I do not agree, but of the educational part I am an enthusiastic admirer; it will not only raise your social status, but will prevent a class of men elbowing their way into the trade and styling themselves chemists and druggists, who know nothing of chemistry and little of pharmacy, and who sometimes have amassed large fortunes, whilst their more legitimate opponent has probably died comparatively poor. Though the result I have referred to may not become very apparent during the next fifteen or twenty years, I doubt not, when most of us now in business have passed from the commercial arena and you are in your business prime, it will have developed itself. If you require something to stimulate you to devote attention to these lectures, which it is our earnest hope you will give to them, let the success in life which I have referred to as being in store for you be the great incentive. With the exception of a few other large towns in the kingdom, apprentices have not the opportunity offered them of receiving the instruction we are enabled to provide for you, consequently I hope that you will not only be punctual in attendance, but most assiduous in your studies; and though there may be some amongst you to whom it is less easy to learn than to others, I will add, by way of encouragement to them, "the race is not always to the swift, or the battle to the strong," and in the friendly rivalry that will naturally be generated amongst you, I ask you all to take for your motto "Labor omnia vincit," or, like Julius Cæsar, rise to the summit of your ambition by being actuated by the spirit he termed "Incredibilia industria." Should any neglect to take advantage of the facilities offered by us, and then fail before a Board of Examiners, it will be useless their looking for sympathy, as their own negligence will have brought about their discomfiture, and they will occupy a situation similar to the man who, having murdered both his father and his mother, appealed to the court for mercy on the ground that he was an orphan. It is our intention as usual to offer Senior and Junior prizes in both chemistry and materia medica, and the earnest wish of the committee will be that the most deserving man may win, and that the unsuccessful will take courage from the thought that our hand has aided them in every struggle, and our heart sympathized in every care.

Mr. Parson then addressed the students, intimating his desire to be of use to them, and for them to look upon him more as a friend than a teacher, and trusted that at the close of the session there would be but one feeling, that he had done his utmost to teach them and they to learn.

Mr. C. B. Bell addressed to them a few words of encouragement, and pointed out the necessity of regularity of attendance and attention to their teacher, and concluded by proposing a most cordial vote of thanks to Mr. Smith for delivering the inaugural address, which was seconded by Mr. Parson, and carried amidst applause.

The Committee of the Hull Chemists' Association have announced that a winter course of twenty-six lectures, comprising elementary chemistry, materia medica, pharmacy, etc., will be delivered by Mr. H. J. Parson, in the Society's Room, at the Church Institute, Albion Street, on Wednesday evening, October 16th, at 8.15 precisely, and continued weekly at the same place and hour. Fee for the course, £1. 1*s*., due in advance. Intending students are requested to send in their names as early as convenient to the honorary secretary, Mr. C. B. Bell, who will furnish further information if required. The course of instruction will have special reference to the requirements of the Minor examination of the Pharmaceutical Society, which it is now incumbent on all chemists and druggists to pass before commencing or taking charge of a business.

At the close of the session it is intended to offer four prizes for competition, viz., senior and junior materia medica and pharmacy, and senior and junior chemistry.

LEEDS CHEMISTS' ASSOCIATION.

The tenth annual meeting of the Leeds Chemists' Association was held on October 22nd, when a company of 120 persons, composed chiefly of members, associates and other chemists and druggists partook of a substantial tea at the Trevelyan Hotel. After the tables had been cleared, the President, Mr. Edward Brown, took the chair, and called upon the Hon. Secretary, Mr. E. Yewdall, to read the Report of the Committee. The

Report expressed regret that the number of members had decreased during the past year, whilst a still larger decrease had occurred in the list of associates. At the meetings of the association, the following subjects had been introduced, viz., an Inaugural Address, by the President; Early Closing and Retail Prices, by Mr. W. Smeeton; A Retrospective Glance at Our Trade, by Mr. T. B. Stead; Dr. Black, and the Chemistry of His Time, by Mr. E. Thompson; The Germ Theory, by Mr. James Abbott; Oxidation, by Mr. S. Jefferson, F.C.S.; Provincial Education, and the Duties of the Pharmaceutical Society thereto. The attendance had varied, being sometimes numerous, and at others it had been but scanty. In the early part of the session, the committee were enabled to offer a series of prizes for the best essay upon each of the following subjects: Cinchona Barks, their history, preparations and derivatives; Iron, its officinal and non-officinal preparations; Rhubarb, its history and preparations; Magnesia, and its officinal preparations. There was a fair amount of competition excited amongst the associates, and Mr. Schacht, of Clifton, was so kind as to adjudicate upon the merits of the respective essays. The valuable additions of books to the society's library during the year were named, being chiefly due to a grant from the Council of the Pharmaceutical Society, and to a valuable donation of Gmelin's 'Handbook of Chemistry,' from Mr. T. Harvey. The financial statement of the Treasurer was read, showing a balance of £15. 14*s.* 4*d.* in favour of the association.

Mr. Smeeton moved the adoption of the Report, and urged upon young men to avail themselves fully of the advantages offered to them by the society.

Mr. S. Taylor seconded the motion, which was carried.

Mr. E. Thompson moved, and Mr. Horsfield seconded, a vote of thanks to those gentlemen who had contributed papers or donations of any kind during the past year.

Mr. R. Reynold proposed the thanks of the meeting to the retiring officers, which was seconded by Mr. Duckenfield.

The election of officers for the ensuing year having been conducted by ballot, it was announced that the following was the result:—

President, Mr. E. Brown; Vice President, Mr. S. Taylor; Curator, Mr. S. E. Payne; Librarian, Mr. G. S. Highmore; Honorary Secretary, Mr. E. Yewdall; Committee, Messrs. T. Day, Mr. W. Smeeton, R. Reynolds, F.C.S., Geo. Ward, F.C.S., T. B. Stead, and E. Thompson.

The President alluded in suitable terms to the pleasure which it gave him to welcome two gentlemen representing the Chemists' Association of a neighbouring town, viz., Messrs. F. M. Rimmington and R. Parkinson, Ph.D., from Bradford. He congratulated the association upon the very large attendance at that meeting, and urged all who had not yet joined their ranks to do so without delay. He also gave some excellent advice to the younger portion of the meeting.

Mr. Rimmington expressed his pleasure in being present upon that occasion. He could cordially endorse the advice of the President upon self-help. Even when the advantages of a chemist's apprentice were much inferior to what they now were, he could state from personal experience that the determination to use those means thoroughly, would lay up a store of information that was afterwards of great value. He had found this valuable information by making the best of his opportunities of studying Paris's 'Pharmacologia' and Brande's 'Chemistry.' This self-help, fortified, and directed by the opportunities for class-instruction afforded by most large towns, would give a foundation for the higher training offered by the School of Pharmacy at Bloomsbury Square. Mr. Rimmington referred to the present position of state medicine as a reason for pharmacists asserting their fitness and claims for the functions of analysts.

Dr. Parkinson spoke chiefly upon the subject of the forthcoming meeting of the British Pharmaceutical Conference at Bradford in 1873. The chemists of that town were taking such steps for organization as they hoped would ensure for the Conference a true Yorkshire welcome. One feature of this ought to be a very large addition of names to the roll of its members from all parts of the county, and especially from the West Riding. Now that its members received so ample a *quid pro quo* in the Year Book of Pharmacy, self-interest alone would dictate immediate membership of the Conference, in order to receive the new volume of the Year Book, which might be expected in the course of a few weeks.

The following were duly proposed and elected members: Messrs. E. Hollings and J. W. Longley; Associates: Messrs. Barraclough. E. O. Brown, Clough, Downing, Drake, Fisher, Forfitt, Greaves, Harrison, Kilner, Knowles, Laycock, Leete, Linscott, McTannet, Pearson, Scott, and Sunderland.

A cordial vote of thanks to the President terminated this pleasant and successful gathering.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL ASSOCIATION.

The first general monthly meeting for the winter session was held in the Rooms on Wednesday evening, October 23rd; Mr. H. Horncastle, vice-president, in the chair.

The opening address was delivered by the President, Mr. W. V. Radley, as follows:—

Gentlemen,—Since the formation of this association it has been the custom for its president, at the commencement of the winter session, to make a few introductory remarks, and in conformity with this regulation I appear before you on the present occasion.

If my observations should seem too discursive or commonplace, I trust you will give me credit for sincerity of purpose, and peradventure in some mind, at least, a stimulus to thought and action may be given, which hereafter may result in personal advantage.

Allow me, in the first place to remark that no business presents so many reasons for union of effort and interchange of thought and opinion, as that of a chemist and druggist. There are great and varied interests to promote, uphold, and defend; there is further the most watchful vigilance required in reference to propositions yearly coming before Parliament, as well as to the Acts of our Legislature which have already become law, for which, as in times past, so also in the future, it is well to be prepared by a strong trade organization. Also, the altered position of our apprentices and assistants, renders it needful that those who have the responsibility of masters, should take counsel together and unitedly adopt the best means to secure their advancement in those branches of knowledge which it is imperative they should study. To this end, an agreement to shorten the hours of business seems to me a desirable thing for all parties concerned, and I cannot see any valid reason why uniformity throughout the town should not be sought.

Not only the wide-spreading progress of education in general, but the rapid advances which are taking place in chemistry, pharmacy, therapeutics, and the allied arts and sciences, should, I think, stir us all up to activity, and lead us to recognize the absolute necessity of using every means within our reach to keep abreast of the times, and maintain a leading position amidst the growing intelligence of the age. I may say, without fear of contradiction, that no other business has undergone greater changes during the last twenty years than that to which it is our privilege to belong.

The objects contemplated at the formation of our association are still as pressing, important, and desirable as ever; and although we cannot congratulate ourselves on the attainment of all we set before us, yet we have some degree of satisfaction arising from the fact of having attempted to do good, and help forward a better state of things; the general feeling of mutual esteem and respect which has been enkindled amongst us as a body, and also the number of our young men who have successfully passed the Preliminary, Minor, and Modified examinations aided by this association, are the silver linings to any discouraging clouds that may occasionally darken our horizon.

Time passes on apace, and leaves its mark behind. Great will be the consolation to those who have during a long period freely contributed both time and money for the purpose of defending the trade from injurious legislation, and raising the educational and scientific status of chemists and druggists, to find that as they have to retire from the more active duties of life, their places are taken up and more efficiently occupied by the younger members of the trade; it is to those who have passed the required examinations that we look for a vigorous maintenance of the good work which we have inaugurated. I hold that it is the duty and interest of all registered chemists in this town and neighbourhood to rally round the standard of this association, but more especially do I think it incumbent on the junior men to come forward and throw their energies and intellect into its operations.

The greatly advanced prices of chemicals, and indeed of most articles in which we deal, together with the increased cost of all kinds of labour and merchandise, have, no doubt, produced in many of your minds a strong argument for raising in self-defence our scale of charges. Perhaps we are not yet sufficiently united throughout the town to attempt a local price-list, such as obtains in the midland counties and some other parts of the country; yet the necessity being so pressing, I hope it may not be too much to ask and expect that each of our members will endeavour in every possible way to accomplish this desirable object. Thus our mutual endeavours financially will tend to strengthen our feeling of union; and the small subscription we contribute will yield us far better interest than any other investment we can find.

Allow me to draw your attention for a moment to the Pharmaceutical Society and its Benevolent Fund. Whatever views any gentleman may entertain respecting one or more clauses of the Pharmacy Act, it must be regarded and treated as a reality more or less affecting every one of us. It seems to me, therefore, very desirable that country chemists in great numbers should obtain membership in that Society, in order to have a vote in the election of Council, and also a right to take part in the proceedings of its annual meeting. Politically, we find men regard it as a very important thing to have a vote for a member of Parliament or town councillor, and will frequently subscribe large sums of money to promote the opinions of a party in which their personal interests are very remote; but how much more important is it to the chemist that he should be able to exert a direct influence on questions continually cropping up which affect him personally to a very serious extent! The outlay is but small when we deduct from the annual subscription the price of the Journal, which all should possess, for it is a kind of microcosm, embracing in its pages a synopsis of the thousand-and-one things with which it is necessary every man engaged in the business should be familiar. Besides, each member is entitled to a vote for annuitants on the Benevolent Fund. The objects of this fund are so good and its charities so beneficent that, amidst the differences of opinion on other matters, I have never heard a word of censure or disparagement of the operations of this noble institution; its advantages are not confined to members of the Pharmaceutical Society (as we have in this town a proof), but its sympathies embrace the whole trade; and wherever a case of destitution and distress is found worthy of commiseration, it is proposed as far as possible to administer succour and relief. The benefits of the fund are available also for the widow and orphan.

I am happy to be able to congratulate you that we have had no reappearance of the obnoxious Poisons Bill, which last year gave us so much trouble; but in consequence of the numerous cases of criminal poisoning by vermin killers which have taken place, and the continued complaints and threats of coroners from various parts of the kingdom, the subject has been brought before, and fully discussed by, the Council of the Pharmaceutical Society, and it recommends that all vermin killers containing poison in No. 1 schedule shall be sold under the same regulations as apply to the articles named in No. 1. This will entail considerable additional trouble on chemists in registration, and probably do away with the sale of the smaller-sized packets; but it is hoped this recommendation will be duly observed, lest those in authority should have a pretext to visit us with a more stringent law.

During the last Parliamentary session a new Juries Bill was brought forward, which, on the one hand, excited the hopes of the chemist and druggist that he might be privileged with exemption from service; and, on the other, the fears of the pharmaceutical chemist lest his freedom should be curtailed; in consequence of the press of other business the Bill was withdrawn, but in all probability it will reappear next session. Both parties will do well to keep an eye on this movement. The Adulteration Act is one of the measures of the last Parliamentary Session, and as drugs are included in its range, it may be regarded as of considerable importance to us. Very much depends upon the mode and spirit in which it is administered; if judiciously, we may hope for good results both to ourselves and the public; if otherwise, it may be made the occasion of much vexation, annoyance and expense. I have not a word to say on behalf of the man who willfully stoops to the adulteration of medicines, on the proper action of which perchance a human life may depend. The practice where it obtains is reprehensible in the highest degree, and merits not only our contempt, but any penalty the law may inflict; however, it is well known by those who have had an opportunity of forming a correct judgment, that for many years past there has been a steady improvement in the quality of drugs, etc., sold by chemists, and at no former period was there displayed amongst us a higher tone of sound moral principle in trading. An ambiguity in the wording of this Act in reference to one of the needful qualifications of the analyst, occasioned some uneasiness amongst chemists, but through the prompt action of the Pharmaceutical Council in obtaining the opinions of the Attorney-General, the Solicitor General and Mr. Langley, all doubt and uncertainty must be for ever set at rest.

I would now call your attention to one clause of the Pharmacy Act (viz. the 16th), which has, I think, been misunderstood, and, I am told, been the occasion of much anxiety and pecuniary loss to certain widows whose husbands have died intestate. It has been supposed that in such a case a widow cannot carry on the business, not even with a legally qualified assistant, but is bound to dispose of it at any sacrifice. Now, what I wish to say is this, a widow may take out letters of administration to her late husband's estate, and thus come within the provisions of the law, and who is there to say when her office ceases? If so, who is there to prosecute? I think I may speak confidently of the Council of the Pharmaceutical Society, that not a man of it would take such a step, and I doubt if any one else could do it. This view of the case has, I confess, been a relief to my own mind, and I offer the same to your notice.

In my intercourse with the members of this association, I have frequently heard murmurings that the Pharmaceutical Society had not taken active steps to enforce the Pharmacy Act, by more frequently prosecuting persons who, to such an injurious extent, are illegally retailing poisons. Perhaps it would not have been quite dignified or liberal to have shown hot haste in bringing offenders under the lash of the law; but now, after so long forbearance, the time for action seems to have arrived, and I believe the authorities in Bloomsbury Square are prepared (after giving due warning) to take up and prosecute any clear case of infringement of the law. It rests with those who feel aggrieved to make and substantiate their complaint.

I am sure you would think this address incomplete, were I to omit to mention the subject of provincial education, which for years past has been of absorbing interest to us. I think you will agree with me when I remark that the leading idea in the formation of this association was not personal advantage to ourselves as masters, but that we might thereby afford increased facilities to our young men in the acquisition of suitable knowledge, to enable them to pass the examinations required by the Pharmacy Act, and get a fair start in that progressive course of acquirement to which a higher education leads. Our desire was to emulate and further the aims of the metropolitan school; like that establishment, we soon found the need of a little subsidiary aid, and should have been glad of a few crumbs from the rich man's table That, however, was denied us; our lectures in consequence had to be suspended, and our youth, to a great extent, left to seek preparation at the hands of grinders. It was not to be expected that the young men would all at once realize their new position, and all take advantage of our arrangements. Although for a time thwarted in our purposes, yet we still indulge the hope that in a few years we shall again be able to resume our classes, and lay a suitable foundation for a noble superstructure of sound knowledge, which shall in part remedy that system of cram which is so much complained of in high quarters.

In conclusion, I desire to congratulate my young friends on the movement which they have set on foot for mutual instruction and improvement; let me assure them it will yield the Council the highest satisfaction to render them assistance, and any suggestions they may make from time to time will have the most careful and favourable consideration. Let me advise you in the pursuit of knowledge to be careful to lay the foundations broad and deep, get firmly implanted in your minds the elementary principles of the things you study, try to understand the rudiments of science, cultivate habits of observation and patient research. Do not carelessly pass over the difficulties that present themselves, but seek to get at the philosophy of common things, aim at discharging all your duties in the best manner possible, and then the feeling of drudgery will give place to that of pleasurable interest. I hope none of you will look forward to passing the examinations as the *summum bonum* of your career, as the goal at which you may rest, but that you will consider them as only the portals to a still wider sphere of attainment and usefulness, honourable alike to yourselves and your profession. Let me commend to your careful perusal and study the address of Mr. Stoddart given to the students at Bloomsbury Square on the 2nd of the present month; it is rich in wise counsel, and fraught with valuable instruction, to which you will do well to take heed.

I think I cannot better close than by reminding you of the lectures that are kindly promised during the coming winter; the ability of the lecturers, as well as the interesting subjects chosen, ought surely to command a numerous audience.

An interesting discussion followed on various subjects remarked upon by the President; after which a vote of thanks, proposed by Mr. E. Wilson, and seconded by Mr. Horncastle, was unanimously accorded to Mr. Radley for his able and comprehensive address.

Several specimens of new medicines, etc., were placed on the table for inspection, for which the contributors were duly thanked.

Proceedings of Scientific Societies.

AMERICAN PHARMACEUTICAL ASSOCIATION.

(*Concluded from p.* 317.)

The fourth session was held on Thursday morning.

Mr. O. Eberbach, of Ann Arbor, Michigan, read a paper on elixirs, in answer to a query in which he gave the results of a number of examinations of various elixirs in market, showing quite a diversity in the medicinal values of elixirs called by the same name, but prepared by different manufacturers. After detailing his experiments, he suggested the following formulæ:—

SIMPLE ELIXIR.

Fresh orange-peel	120 grains.
Star anise	30 „
Cardamom	20 „
Alcohol	
Water, each	6 ounces percolate.
Simple syrup	6 ounces.
Caramel	10 grains.
Mix.	

ELIXIR OF CALISAYA.

Unbleached alkaloids of cinchona	48 grains.
Citric acid	12½ „
Simple elixir	16 ounces.
Mix.	

FERRATED ELIXIR OF CALISAYA.

Elixir calisaya	16 ounces.
Pyrophosphate iron	128 grains.
Mix.	

FERRATED ELIXIR OF CALISAYA WITH STRYCHNIA.

Ferrated elixir calisaya	16 ounces.
Sulphate strychnia	2 grains.
Mix.	

FERRATED ELIXIR OF GENTIAN.

Gentian root, liquorice root, each	1 ounce.
Fresh orange-peel	120 grains.
Star anise	30 „
Cardamom	20 „
Alcohol, water, syrup, of each	6 ounces.
Pyrophosphate iron	128 grains.
Mix.	

ELIXIR OF VALERIANATE OF AMMONIA.

Valerianate of ammonia	256 grains.
Simple elixir	16 ounces.

Water of ammonia to neutralize the acid.

After the paper was read a discussion occurred upon it, and the views and feelings of members were freely expressed. The annoyance of the many various manufactures in the market, and that medical men will one day designate one manufacturer, and at another time some other maker will be preferred, obliging pharmacists to keep a great variety of the same professed article, was alluded to, and the members described their modes of meeting this trouble.

Dr. Squibb stated that he opposed the whole class of elixirs as wrong in principle and practice. It presupposed a "case" for which a certain formula was devised, a popular name is now given to it, and the elixir is to be the cure-all for all ages, classes and conditions.

Professor Moore said that he kept no elixirs but those of his own make, and dispensed them invariably when elixirs were ordered, no matter what name might be designated.

Mr. Shinn thought that the intention of the physician should be regarded and his views carried out.

Mr. Hancock said he kept all the different manufacturers' elixirs, and dispensed which ever kind was directed, believing if he followed the direction of the physician he had done his duty in the matter.

Dr. Squibb said every man was a law to himself, and no man could lay down absolute laws to which all could be expected to conform. The physician was a law to himself, and if he chose to order things of a certain manufacture because he had confidence in their character, he had a right to do so. If the pharmacist thinks he can produce an article as good or better than that specified, let him show it to the physician and persuade him to use it, but otherwise he should give the kind ordered.

Mr. Procter said, to him the case was very plain; the prescription designated a certain article of a certain make; the pharmacist's duty was to give that and no other; adhere to the prescription or decline to prepare it.

A special session was held on Thursday afternoon.

A volunteer paper by Mr. B. Lillard, of Nashville, Tenn., on the "Culture of the Poppy and Production of Opium in Tennessee," stated that imported seed was planted in the spring of 1871 with good success, large and vigorous plants being the result, while the flowers and capsules were unusually large. The seed is sown about the same time as oats, in soil prepared as for cotton. It is planted in drills, the young plants are thinned out to from four to six inches apart, and cultivated similarly to cotton. Soon after the flowers drop off (this year it occurred in June), the capsules are cut horizontally *on one side*, early in the morning. (The knife used resembles a cupping lancet.) The milky exudation coagulates rapidly—becoming first pale red, and then a rich brown soft mass. The next morning it is scraped off and dried in the sun, and the following morning the other side of the capsule is similarly scarified. Great care must be taken that the knife does not penetrate the capsule, destroying the production not only of the opium, but also of the seed. By this process a yield of opium was obtained averaging from thirty to fifty pounds per acre.

The opium shown with the paper was of a smooth texture, tenacious, firm, dark brown colour, rich odour (resembling the odour of Egyptian opium).

An analysis of the opium gave 17 per cent. of moisture, 11 per cent. of insoluble matter, and 10 per cent. of alkaloids.

Mr. George C. Close sent a paper on "Japan Wax," in which he stated that it presents no advantages over beeswax for pharmaceutical purposes.

Professor Maisch read an exhaustive paper on the "Cantharis in all its Species," with especial reference to the vesicating properties of the Chinese variety lately introduced. Having examined them for the purpose of determining the amount of cantharidin they yield, he compared it with the published results of those who have examined the ordinary cantharis in use, and states that the yield in his experiments were two and a half times greater than the previous records, and nearly twice (1·78) as much as the best yield heretofore recorded. He has not finished his examinations, but expects to report further next year.

A paper by Professor Edward Parrish, on the preliminary education for young men who expect to qualify themselves for the business of druggist and pharmacist, and what preliminary examination, if any, should be required by the Colleges of Pharmacy, was read by Mr. William Procter, jun. This paper was one of exceeding interest, especially at this time, owing to the agitation of this question, both in the United States and abroad. It is felt to be a fact patent to all, that there is much room for improvement in many of the pharmaceutists of the present age, while many of the young men who are aspirants for the calling are unfit for it. The true remedy is preliminary education, and sooner or later the colleges of pharmacy must compel a preliminary examination before admitting students to their lectures.

A paper by Charles W. Grassly, of Chicago, Ill., on "Seidlitz Powders," and how far those in the market agree in quantity and quality with the formula of the U. S. P., was read by W. Procter, jun. The paper created no little merriment by some of its personal allusions and sarcastic remarks, and disclosed the fact that (in many cases intentionally—in most cases from want of proper care), nearly all the samples of seidlitz powders examined, fall below the weight of the U. S. P. standard. It was stated that in the majority of stores the powders are put up by measures which are inaccurate, or soon become so. Even with the most careful persons, it is impossible to fill these measures uniformly, and if the measures were originally correct, they soon, by attrition, wear away and lose their accuracy. Weighing, and giving just weight, was, therefore, the only remedy. Another source of error in measuring is, that various lots of seidlitz mixture may vary a little, owing either to fineness of powder, moisture, or compactness of the powder. No ingredients were found as adulterants. It was stated in the discussion that in London many years ago, under the name of "Improved Seidlitz Powders," it was customary with certain stores to add one grain of tartar emetic to each box of powders, and that in a very few stores in this country the same practice was observed.

Dr. Squibb read an exceedingly interesting volunteer paper on "A Modified Process of Percolation," which had been perfected by his son. Without an illustration it would be useless to attempt to explain it in the brief space at our command. We can only state the percolator is simply a jar of glass, conical-shaped, and supported by a foot, without any opening at the lower extremity. The material having been previously brought to the proper state of fineness, is moistened and placed in the percolator, which has been previously prepared as follows: a glass tube a little longer than the interior height of the percolator, and about half an inch internal diameter, has tied over the lower end a piece of filtering paper and muslin cloth. A glass tube of 1-16th inch internal diameter of sufficient length is bent twice at right angles, having one leg as long as the larger tube, a connecting length a little longer than the upper diameter of the percolator, and the other leg is to be long enough to bend up the lower end about half an inch or so, and leave the two legs of the siphon thus formed of an equal length, so that it forms a self-supplying siphon. The plain leg of the siphon has a narrow piece of india-rubber tubing around it at the lower end, so that it will fit quite loosely in the larger tube; while near the upper part of the same leg, rubber tubing has been slipped upon it to keep it firmly in its place when in use. The material being now within the jar, it may be covered with the menstruum, when the denser liquid which percolates the mass will filter through the paper and cloth into the interior of the larger glass tube, and finally find its level. When maceration has been continued long enough, the siphon tube is introduced, and the flow is induced by suction. As soon as the flow is established, the siphon is raised in the tube nearly to the upper portion of the liquid, and after the first few minutes the flow should only be by drops.

At the fifth Session, held on Friday morning, it having been reported that an album containing one hundred and forty-four portraits of members of the Association had been obtained, a resolution was passed authorizing the Secretary to take charge of it, and also the album presented by Mr. H. B. Brady on behalf of the British Pharmaceutical Conference. Directions were also given that they should be produced at future meetings for inspection.

Several papers were read. Amongst others one by Dr. E. R. Squibb on Aloes, in which he discussed briefly the characteristics of the several varieties of this drug, and insisted that the socotrine variety alone should be used in the medication of the human family. Allusion was made to the impurities, accidental and otherwise, and a choice specimen of animal and vegetable matter, sand, and other articles was shown, which had been separated by straining from some specimens of socotrine aloes. He also exhibited a goatskin bottle, made after the fashion of the *goat itself*, which had been found in a case of aloes, and also a curiously shaped knife, probably used in cutting the plant, which had been imbedded in the aloes.

In giving some statistics about aloes, Dr. Squibb stated that socotrine aloes lost from 5 to 10 per cent. in straining; and if dried and strained, from 15 to as high as 27 per cent. During the past year 22,000 lb. of the various grades of aloes were entered at the custom-house of New York.

Dr. Squibb read a volunteer paper on "Ammonic-Citrate of Bismuth." This salt is not uniform in its solubility, which it is asserted is caused by the loss of ammonia in heating it to obtain the product in scales. Dr. Squibb suggested that it will readily crystallize, and in that way a more uniform and soluble preparation can be obtained. Dr. Squibb read still another paper, the subject being "Triplex Pill," originally introduced by the well-known Dr. Francis, of this city. The original formula was afterwards modified, and as prepared for Dr. F. in his later years, was as follows:—

Socot. aloes, in powder.
Powdered virgin scammony.
Blue pill, each one troy ounce.
Croton oil, twenty drops.
Oil caraway, one drachm and a half.
Tinct. aloes and myrrh, q. s. To make 400 pills.

Considerable discussion ensued as to the next place of meeting, and it was at length decided that the Association should at its rising adjourn to Richmond, Va, where it should reassemble on Tuesday, September 18, 1873.

A list of thirty-nine queries, and the names of gentlemen who had undertaken to supply answers was then read and approved of; as was also a list of subjects yet unaccepted.

Professor Robert Bentley, of London, England, and M. Stanislaus Martin, the President of the Paris Société de Pharmacie, were elected honorary members.

Various votes of thanks were then passed, and the proceedings terminated.

During the continuance of the meetings of the Association the galleries of the building in which they were held, were appropriated for the exhibition of articles pertaining to pharmacy, and presented a very interesting and showy appearance.

Parliamentary and Law Proceedings.

Serious Charge against a Druggist.*

Edwin Eastwood, chemist and Druggist, of Dukinfield, was on Thursday, October 24th, brought up at the Stockport court, on remand, charged with causing the death of Ann Jones. The deposition of deceased was put in evidence, in which she stated that prisoner had given her medicine to cause a miscarriage, and identified a bottle produced as one of two that he had given her. The sister of deceased deposed that, in consequence of something deceased said, she had taken two bottles from her about five months before her death. Deceased vomited very much every day until the bottles were taken from her, but not afterwards.

Professor Crace-Calvert said that he had examined the contents of a bottle produced and found it to contain a quantity of the essential oil of savin, and of the extract of the leaves of savin, together with sulphate of magnesia, sulphate of iron, and chloride of iron.

Mr. Moore, surgeon, who had previously stated that death had resulted from puerperal fever, said that, in his opinion, such a mixture taken in June last might have produced the state of body which would have rendered the person susceptible of puerperal fever.

The magistrates decided upon committing the prisoner for trial at the next Chester assizes on the charge of wilful murder.

At the coroner's inquest held upon the body, the jury also returned a verdict of wilful murder.

* See *ante*, p. 338.

The Alleged Poisoning by Arsenic.

The trial of Ellen Kettle, for the murder of the former wife of her husband by poisoning, which was adjourned from July last* in consequence of the prisoner having been delivered of a child, was resumed at Chelmsford on Thursday, October 24th, and resulted in an acquittal. As a report of the evidence for the prosecution has already appeared in this Journal, it will suffice to recapitulate the chief points.

The prisoner, who is now only about twenty-one years old, is the daughter of a small farmer living at Great Bromley, near Manningtree. She appears to have conceived a passion for a middle-aged labourer, employed by her father, but who was already married; and whilst the wife was yet alive alluded in pretty plain terms to her early death. On the 5th of October, 1871, the deceased was in the fields with her children, where they had been eating sloes, when the prisoner brought them some beer in a bottle. After drinking some they all suffered from sickness; but the woman, who had previously been unwell, took to her bed, and five days afterwards she died, having previously fallen through weakness and cut herself severely. The doctor, in his certificate, stated that death resulted from "liver disease and exhaustion;" but, being informed of the accident, gave his opinion that death was caused by syncope and loss of blood; an opinion he reiterated in evidence upon the trial. At the beginning of December prisoner was married to the widower, and on the 16th of July last was delivered of a full-grown child. Meanwhile, the prisoner's hasty marriage and some remarks that she made had caused considerable excitement in the neighbourhood; the body was ordered to be exhumed, and the prisoner and her husband were taken into custody, the husband being afterwards discharged. In the body was found five grains of arsenic. At the trial it was proved that the prisoner had had access to arsenic, but it was arsenic mixed with verdigris and hogs' fat.

Respecting the arsenic found in the stomach, Dr. Stevenson, Lecturer on Chemistry at Guy's Hospital, said that he had found slight traces of copper in the viscera; that from one portion,—three-fourths of the liver, weighing 12 oz.,—he only extracted one-fifteenth of a grain; but from the other portion he got "no indubitable proof" of the presence of copper. In cross-examination he said that he had found tea in the stomach, in which there were sometimes traces of copper, and copper was sometimes found in various articles of diet. Reminded that in his report he had said that "the entire freedom from copper of the particles of arsenic found in the stomach, while not entirely negativing, does not tend to support the hypothesis that the arsenic had been mixed with verdigris," the witness admitted this to be so, and also admitted that he could not say he was satisfied that the arsenic in the body came from the bottle containing the verdigris mixture. He thought it possible, and even probable, but could not say more. In a mixture of arsenic and verdigris, the taste of the verdigris would predominate, arsenic being nearly tasteless. It would be difficult to conceive of such a disgusting mixture being taken in food without being at once rejected.

Mr. Serjeant Parry, for the defence, urged that the question the jury had to answer was not whether the prisoner was innocent, but whether she was guilty.

* See *ante*, p. 55.

There was no evidence that poison was present in the beer given to deceased by the prisoner, or to connect her in any way with the arsenic found in the stomach of deceased. The sayings attributed to the prisoner, he said, might be unintentionally coloured by the witnesses.

The Judge in summing up pointed out that, according to the evidence, there was undoubtedly more than sufficient arsenic found in the stomach of deceased to account for death, but he considered the prosecution had utterly failed to show how it came there, or that the prisoner had anything to do with it. The case was surrounded by very suspicious circumstances; but unless the jury were satisfied that death resulted from poison, and that the prisoner administered that poison, they must give her the benefit of the doubt and acquit her.

The jury, after a few minutes' consultation, returned a verdict of "Not Guilty."

Double Suicide by Strychnine.*

On Monday, October 28th, Mr. Bedford resumed the inquiry respecting the deaths of two unknown persons in Soho. Dr. Slight said he had made an analysis and found a very large quantity of strychnia in both stomachs. He had not the slightest doubt as to the cause of death. The police reported that they had been unsuccessful in their attempt to discover the names of the deceased. A verdict was returned that the deceased came by their deaths from strychnia, but how or under what circumstances it came into their stomachs there was not sufficient evidence to show.

Since the inquest a paragraph has appeared in the 'Times' stating that the deceased had been identified by several persons as Captain and Mrs. Douglas, of Richmond.

* See *ante*, p. 338.

Review.

A Treatise on the Origin, Nature and Varieties of Wine: Being a Complete Manual of Viticulture and Œnology. By J. L. W. Thudichum, M.D., and Auguste Dupré, Ph.D. London: Macmillan. 1872.

The consultation of two hundred works upon a certain subject by an intending author would not always qualify him or leave him in a fit condition to write another on the same topic. But when it is stated that four hundred others were left unconsulted, strong grounds exist for doubting the likelihood of anything very original being said; at any rate it would be fresh proof of the wisdom of Solomon when he said that "of making of books there is no end." And yet, it must be acknowledged that the effects of recent legislation have given a wider interest to the history of wines which certainly justified Drs. Thudichum and Dupré in attempting to supply a good English manual of viticulture and œnology.

That on the book before us a vast amount of labour has been spent by the authors is very evident, and that they have brought together a great deal of information —much of it being the result of personal investigation in many lands—cannot be denied; but, probably, before it will be able to take its place as the standard work upon the subject, it will require considerable modifications. At present some parts, except as they assist in qualifying the reader for the better comprehension of certain special sections, seem to have little in common with œnology, and appear to have undue prominence given to them; whilst information that would be of special service under present circumstances is almost entirely wanting. For instance, the section on the optical methods for the estimation of sugar in wines is introduced by a treatise several pages long on polarization of light, which, however good in itself and appropriate in a work on physics, gives a *soupçon* of bookmaking to one on wines, while, on the other hand, little is said towards correcting the ignorance in this country respecting the characteristics of good wine; such ignorance, to wit, as gives rise to the brandying of wines destined for this country on the plea of suiting the English palate. In fact, we are not sure but that in one place at least the authors assist to disseminate a very false taste.

As might be expected, the book opens with a dissertation upon the origin of the various vines. The opinion formerly held that all European vines were derived from one particular species, *E. vinifera*, a native of Asia, which had been introduced into Europe in prehistoric times, is, after a review of the adverse evidence, discarded by the authors, the conclusion at which they arrive being that "all those European countries which possess the climatic conditions have in their flora many species of the genus *Vitis* in a wild state, with such botanical characters as leave no doubt that the plants are indigenous, produced by natural selection, and not derived from imported cultivated races of vines, or degenerated by natural selection from previously cultivated races."

In the section on the mineral constituents of the vine we are told that the soluble portion of the ash obtained by combustion comprises potassium and sodium, combined with carbonic and sulphuric acids and chlorine; the insoluble portion contains calcium, magnesium, iron and manganese, combined with carbonic, phosphoric and silicic acids, the proportions of these bases varying considerably according to the soil; but it is somewhat doubtful science to state that it has been proved that where the vine cannot find a particular kind of base which it ordinarily wants for its development, it takes another instead, substituting a chemical equivalent of that which happens to be available for that which it cannot have, the sum of the oxygen combined with them being always the same or undergoing but slight variation.

The second chapter deals with the general principles of viticulture. We must content ourselves with noticing a curious calculation as to the amount of manure required by the vine. We are told that if five litres of dung be yearly dug into the soil round a six-year old plant, it will be maintained in sufficient strength to produce every year twenty grapes of at least fifty grams weight. Who will say after this that agriculture cannot be included among the exact sciences?

Perhaps in no other instance has there been such a tendency to *stare super antiquas vias* as in the manufacture of wine. It is astonishing that in these days of machinery, the grape in many places is still crushed by the foot of man in the same rude manner that it was thousands of years ago. There is nothing more repulsive in the manufacture of the West Indian "piwarrie," which is the fermented saliva in which cassava bread has been masticated, than is to be met with at the present day in the manufacture of Burgundy wine. In that district the crust formed on the top during fermentation is mixed with the wine beneath by men who get bodily into the wine and work it thoroughly in all directions for half an hour; "perspiring freely, not only from the intense labour they perform, but also from the poisonous effect of the carbonic acid gas exhaled from the fermenting mass," while the favourite "luting" is a mixture of loam, clay and cowdung.

However, it must not be supposed that there is nothing novel in the wine manufacture, for in 1852 M. Petiot appears to have discovered that a liquor could be produced by adding to the expressed grape juice an equal volume of sugar and water, or by exhausting the squeezed husks even to the fifth time with successive quantities of sugar and water, which he claims to be "wine in the full sense of the word." On the whole, the authors appear to agree with him, for, although in summing up the results, they speak of the product as a "beverage," they generally term it a wine. In this manner Petiot obtained 285 hectolitres of "wine" from the quantity of grapes which ordinarily yielded only 60 hectolitres. But then Dick Swiveller's "Marchioness" knew how to make wine without any grapes at all.

The chemistry of wines is elaborately dealt with in a series of chapters. Commencing with a description of the physical characters of alcohol and the elementary constitution and chemical character of alcohol and its homologues, the different methods of alcohol determination in wines are next described. Then follow the acids in wine, the ethers in wine, the varieties of sugar and methods for their determination, and afterwards the fatty, colouring, albuminous, astringent, extractive and mineral constituents of wines, and a series of analytical tables. In this section there is an evident desire to meet the wants of various classes of readers, for, while one with but little scientific knowledge will find nearly a page of elementary description of dialysis, the more advanced student is furnished with percentages calculated to six places of decimals, and such specific gravities as 999·99! Some idea of the intricacy of the subject may be formed if it be remembered that "by the influence upon each other of the alcohols and acids known to be present in wine a considerable number of compound ethers may be produced. Supposing five acids and five alcohols to be present, they might produce twenty-five compound ethers, some or all of which might be present and contribute their share to the flavour, such flavour altering as one or other ether predominated. All these ethers occur in wine in extremely minute quantity, and almost entirely elude ordinary analysis."

Where there is so much that is valuable, it may seem trivial to criticize minor details; but there are several points of orthography in this division against which we much protest. The old dispute between "oxide" and "oxyde" has now almost universally been decided in favour of the former; there seems, therefore, no sufficient reason for continuing such forms as "suboxyde," "binoxyde," "oxydizing," etc., especially in the same book as "oxidizing" is used. Neither are we aware of any rule that prohibits a final "e" to "mannit" and "dulcit," and yet allows of its use in "aldehyde." "Baryum" and "chromealum," too, are, to say the least, unusual. There are also one or two cases where the omission of a figure has rendered a formula incorrect. And in a book where almost everything is explained, how is it that we meet with such a word as "hydrothion?"

There is, however, one subject alluded to in this section in a manner that appears open to justifiable criticism. After describing the ordinary operation for the making of vinegar, and the part which *Mycoderma aceti* plays in acetous fermentation, the authors say, "If the alcoholic liquid employed in the vat is free from albuminous matters, it is converted into vinegar by simple oxidation, without the intervention of the mycoderma, and even in the course of twenty years of constant use, no fungus is deposited on the wood shavings in the vat. If, however, the alcoholic solution contains albuminous matter, the *Mycoderma aceti* makes its appearance." Now this is in direct opposition to the view entertained by M. Pasteur, who, in a recent debate in the French Academy, said that he did not believe there existed in any country a single drop of wine acidified spontaneously in contact with air without the previous presence of the *Mycoderma aceti*. He backed up his opinion by two challenges; first, that if Baron Liebig would obtain some of the beech shavings referred to, dry them quickly in a stove, and send them to Paris, he would engage to demonstrate the presence of the mycoderms on their surface; and, secondly, that if a vat in work were filled for half an hour with boiling water, no more vinegar would be produced until sufficient time had elapsed for a fresh growth of mycoderms to appear on the shavings. Now, Drs. Thudichum and Dupré may be right, and M. Pasteur may be wrong; but the statements of the latter will not be disproved by simply ignoring them. Although controversial matters would be out of place in the present book, opinions that have been put forth with such ability and supported by many high authorities appear at least worthy of notice in "a complete manual." Moreover, there is the fact—also not noticed by the authors—that vinegar is now made in France by the direct sowing of the mycoderm on the surface of the wine. This method, while it does not prove that acetic fermentation never takes place without the mycoderms, is based on M. Pasteur's theory; and it has been reported by M. Breton-Langier,* who has worked it practically, to offer many advantages, a very suggestive one being that vinegar is produced at the end of ten days; the time required by the old method to put in work a fresh *mère* being from two to three months.

The latter half of the book is taken up by descriptions of the principal wine districts and the pecularities in cultivation and manufacture. There is much here to interest the ordinary reader, but it appears to be a vast store of information for the œnologist. We must be content with culling a few sentences here and there. One of the problems for the scientific viticulturist of the future to solve occurs in the Médoc and other districts where the "variation of the soil causes a great variety in its products, so that the best and most inferior vines grow frequently side by side. As the vines are the same and the cultivation identical, the soil alone can explain the difference; but the special conditions of this difference are yet wrapped in mystery." The soil appears also to affect the duration of the vine, which in some places has to be replanted every twenty or thirty years; in others it lives sixty or seventy years. Indeed, a sketch is given of a vine at Malines which produced seventy-three branches of grapes when upwards of one hundred years old. Another vine, which in M. Brouner's vineyard at Wiesloch had overgrown a pear-tree, brought a harvest that took two men two days to cut down.

We get one glimpse of the "good old times," when we are told that a most potent agent towards the perfection of vinification in the Gironde has been the liberty which the Girondese won in the great revolution to gather their own grapes when they pleased; and another in the law existing in Portugal so late as the year 1833, which subjected a person adulterating wine in any manner, or a farmer possessing an elder tree on his land, to transportation for life. This is rather further than our modern anti-adulteration legislators would go, and probably would require an increase of penal settlements. There is ground for hope, however, that the day may come when a pure wine may be had for a moderate price, through capital and science being brought to bear in the development of comparatively unproductive districts. For instance, an excellent Dalmatian wine is sold at $1\frac{1}{5}d.$ per litre, while yet the culture of the vine in Dalmatia is confined to the neighbourhood of the sea in consequence of the want of means of transport.

Here, however, we must close this interesting book, which is got up in first-rate style; the illustrations are excellent, and the paper and printing very superior.

Obituary.

Notice has been received of the following death:—

On the 25th of October, Mr. David Mennie Anderson, of Kirriemuir, Forfarshire.

BOOK RECEIVED.

Health and Comfort in House Building. By J. Drysdale, M.D., and J. W. Hayward, M.D. London: E. and F. N. Spon. 1872.

* 'Repertoire de Pharmacie,' vol. xxvii. p. 201.

Correspondence.

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

Payment of Local Secretaries.

Sir,—I am glad to see the above subject is beginning to attract attention, and as I am not now a local secretary, I feel that I can speak the more freely upon the propriety of paying local secretaries for at least some part of their services. I need not enter into detail regarding the duties of the office, but may state generally that a secretary who studies the constitution and interests of the Society is of great value, and renders services which it would be impracticable to repay in money, but which may be considered to be met by his own consciousness of doing good, by the status (small though that may be) which his office gives him, and by any acknowledgment on the part of the Society, such as that Mr. Hills proposes, *i.e.*, paying his railway fare to and from London on the occasion of his attending the annual meeting. I do not think that there is any fear of the meetings being inundated in consequence of such an arrangement; most provincial chemists are too much tied to their counters to think of spending a day or two on a journey to London, simply from having their railway fare paid by the Society.

But as regards examinations, or any other definite work which is required from local secretaries, I think it is only just that it should receive a fair remuneration. The Board in London receive pay for their work, and I am not aware that any one outside of the Board grudges them their well-earned fee, nor do I suppose that any on the Board feels it *infra dig.* to accept it. I once received a guinea for six or seven hours spent in the Board-room (I believe the fee is now two guineas), and though I acknowledge that the work was more laborious and responsible than that of superintending the writing of papers by a student or two, it was also occupation of a much more interesting character, and one to which more honour was attached. If superintendents of Preliminary examinations are in future to receive a fee of half a guinea (or five shillings a student when there are more than two), I have only to regret that in most cases the payment will be so small, considering that the day and hour are fixed, without reference to the individual convenience in each case. I would rather see the whole subject of local secretaries reconsidered and their duties rearranged and defined. Looking over the list of towns at which examinations were held (page 331), we find there were fifty-eight in which one student only was present for examination.

I do not know any reason why the single student in Gateshead should not have walked a mile to be examined along with the three in Newcastle, and so economize the examining power. Nor do I think there is any reason why those at Shields, Sunderland, and Durham, should not also have come to Newcastle, in which case the examiner in the latter town would have had ten students under his superintendence, and might reasonably have received a fee of a guinea and his expenses if he required to hire a room, etc. When in office I repeatedly had candidates from small towns twenty or thirty miles distant, and if it is practicable for them to travel so far, I think it would be equally practicable, and in many respects advantageous to arrange that all within a certain radius should meet at some convenient centre. The secretary at Leeds, whose time was devoted to two unsuccessful candidates, might just as well have had those from Ripon, Harrogate, Knaresborough, and perhaps some other towns. Five-and-twenty or thirty large towns might be selected in England that would afford all reasonable facility to candidates for the Preliminary. A fee of a guinea per examination to the secretaries in these towns would put the Society to only a trifling expense, and if perchance any of these gentlemen should feel, like your correspondent this week, that it was *infra dig.* to receive money he had earned, there is always the Benevolent Fund ready to relieve him and profit by his dignity.

Barnard S. Proctor.

Newcastle, October 28th, 1872.

Sir,—As one of the local secretaries of the Pharmaceutical Society, may I be allowed to enter a protest against the kindly-intended suggestion of Mr. Sutton, that "The secretaries should receive some remuneration for their services." I think the proposition would be favourably entertained by very few of those now holding office.

Mr. Hills' proposal would, however, I think, be generally acceptable, and would be a courteous and sufficient recognition of their services.

I believe, too, that the local secretaries' presence at the anniversary meetings would be found useful to the pharmaceutical body, as many suggestions might be offered by them of a practical and instructive character.

I do not think the Council need to fear that too many would accept the invitation; we all know the compulsory tie that binds every pharmaceutist to his business, so that, even under such a persuasive call to Bloomsbury Square, a large majority would be compulsory absentees.

Thos. Witherington.

Worcester, Oct. 28th, 1872.

Sunday Closing.

Sir,—In regard to the present agitation in favour of early closing, what is meant by "Sunday closing?" I see that some of my friends in this city, in the neighbourhood of Broughton and Cheetham Hill, include the latter in their programme. Is it meant that not even medicine is to be supplied on Sundays, and no attendance given at any time during the day for that purpose expressly? It would be a very delightful thing to me if I could dismiss my young men to their friends every Saturday evening, and enjoy a day's quiet repose in the bosom of my own family, without the dread of that *eternal bell;* feeling as entirely untrammelled with regard to shop duties as my neighbours Smith the greengrocer, and Jones the shoemaker. The very thought of such a state of bliss makes one's mouth water. But I can't see how it is to be done. Here is a family who are regular customers. A member of it is dangerously ill, the doctor attends every day, and every day for a week, I have supplied the medicine prescribed by him; Sunday comes, the patient is worse, and a new prescription is written and sent to me. What is to be done? Is the patient to wait till Monday, or may I expect my customer will send to some other chemist who does not close on a Sunday, and then return to me on the Monday? I should be glad to see my way clear as to this matter, and respectfully ask what is meant by "Sunday closing."

J. T. Slugg.

Manchester, October 25th, 1872.

Patent Medicine Licences.

Sir,—I cannot agree with either of your correspondents relative to the amount they would recommend as an uniform rate throughout the country. Where I am in business, 5*s.* is the price of the licence. The idea of raising that to £2 seems a monstrous proposition, and I am sure your correspondent, Mr. Ellis, is mistaken if he thinks "most of the trade" would agree with him. I differ also from him in supposing that the amount, if even raised to £2, would deter our grocers and others from selling patent medicines. An uniform 10*s.* would not be objected to by the country, if it were intended as a relief to the town chemists, but beyond that, I trust no suggestion will be made to the Chancellor of the Exchequer, who does not need stimulation to put on the screw.

An old Country Pharmacist.

Sir,—With your permission, I will state my objections to raising the licence to £2, as proposed, and offer another course for consideration.

If, instead of the three present rates of charges, we had an uniform one of 10*s.* for retailers, it would relieve our London friends; and those who pay 5*s.* now would not complain. By raising all the licences to £2, you might, perhaps, benefit a few chemists by diminishing competition in their particular neighbourhoods, but it would not affect our worst competitors, the co-operative stores. Supposing the advance of £2 took place, I believe you would soon find that those people who discontinued their licences would push the sale of Dinneford's, De Jongh's, Möller's, Condy's and Goddard's preparations, and everything that was not stamped. It is also a question whether they would not open packages of Holloway's and other Pills, Steedman's Powders, etc., to sell them out in small quantities, and so evade the licence.

Should any alteration take place, I propose two separate licences. A £2 licence for wholesale dealers, and a 10*s.* one for retailers.

Vendors who sell both wholesale and retail to take out both licences.

This would tend to check the local chemists supplying the small shops in many parts of the country.

I would make an exception in favour of proprietors of stamped articles, who supply only their own *bonâ-fide* manufactures to the trade, and let them come under the head of retailers' licences. If the licences and stamps were entirely abolished, as proposed in the 'Medical Times and Gazette,' my idea is that such a course would only have the effect of increasing quackery as well as competition.

GEORGE BROWN.

Sandown, I. W., Oct. 28th, 1872.

EXAMINATION FEES.*

Sir,—Paper wars are generally unsatisfactory campaigns, and but seldom secure the desired end. My original object in writing upon this subject was, not to provoke discussion on the numerical strength of the Pharmaceutical Society as regarded members in the aggregate, but, to urge the importance of devising means by which to increase its strength in that particular class of members which the Society desires to encourage, viz., pharmaceutical chemists, *i.e.*, men who have passed the Major examination.

Mr. Carteighe on the other hand has taken hold of a single statement in my letter, and, having separated it altogether from the context, has been led into an entirely false line of argument, having no reference whatever to the main subject. He is arguing the numerical strength of the Society in its broad sense as a corporate body; whilst my statement refers to it in the more limited view, as a Society of Pharmaceutical Chemists; entirely and purposely ignoring both chemist and druggist members, and associates in business, not through ignorance either of their existence or privileges, but because they did not represent that phase of the Society which I desired to bring into prominence.

That this is correct will, I think, be evident to any unbiassed reader of my letters. In my first, *educational qualification* will be found the pith of the whole; whilst in my second, although reference is of necessity made to other points in order to meet the assertions of my friend, yet the gist of the whole is as before, examination and membership flowing therefrom.

Regarded from this point of view the statement to which exception has been taken will, I venture to repeat, prove correct, that whilst our strength, *as a society of pharmaceutical chemists* is decreasing (or at best but very, very slowly inclined to increase) the numerical and therefore political strength of outsiders, *that is those who simply pass what the law compels them to*, is largely increasing. That this is borne out by facts is, I think, clear, when we see that in 1871, out of 566 associates of the Society, only 67 had qualified themselves for membership as pharmaceutical chemists by passing the Major examination, whilst 262 were satisfied with the Minor qualification, and will doubtless in due time help to swell the number of associates in business, for whom your correspondent seems to have peculiar affection. On the other hand, as regards the strength of the Society in pharmaceutical chemists we see that whilst in 1870 the aggregate number was 1802, in 1871 it was but 1797, showing a *decrease* of five in that year.

Having, I hope, sufficiently proved the accuracy of my position, I do not think it will be necessary for me further to discuss this point, preferring by far that some of your readers personally interested in the future examinations and the welfare of the Society should, in anticipation of the subject shortly having to occupy the attention of the Council, be induced to give expression to their views as to the best means of securing a larger number of candidates for the Major examination, and their direct union with the Society as the result of such examination.

Thanking you for your courtesy in giving space to our somewhat lengthy correspondence.

EDWIN B. VIZER.

63, *Lupus Street, Belgravia South, October 26th*, 1872.

Sir,—As no one from this district (except our councillor Mr. Frazer) has ventured to express an opinion on the above subject, I beg to offer a few remarks, considering, as I do, that Scotland has been too backward in expressing her views on matters of such vital importance to the welfare of the Society and the trade at large.

My first thought, Mr. Editor, is, that in the question of Examination Fees will be solved the broader, and consequently much more difficult, problem of pharmaceutical education. I have come to this conclusion, from the intimate connection I have had with our local society here since 1868, as well as from a careful study of the various theories that have been promulgated within the last few years on the question. I am of opinion, however, that the solution of the problem will not be in Mr. Vizer's scheme for raising the fees, as given in the Journal of August 31st, nor even in the modified proposal of Mr. Carteighe's in to-day's Journal. The raising of the Examination Fees may suit the ideas of some of our high-class London pharmacists, but I venture to say that such a proposal will receive but little support from the members of the trade throughout the country. I sympathize very much with some of Mr. Vizer's motives in bringing forward his proposal. It is no doubt a great anomaly, that a body of men which are numbered by the thousand, should be under the control of a few hundreds of the same class in many respects. Some maintain it is the fault of those outsiders, in not taking the advantages offered by connection with the Society; but whether it is their fault or not, I would decidedly say, let the present members of the Society show their anxiety for having a united trade and a united Society by adopting some broad and liberal policy, not only towards those at present in the trade and outside of the Society, but that will induce intending pharmacists to make it their first anxiety, after passing the examinations, to become connected with the Society. Of course I approve of Mr. Frazer's motion which was discussed at last Council meeting, and published in the Journal of October 5th; and here I must take exception to a remark of Mr. Vizer's regarding it. He says (PHARM. JOURN. No. 114, p. 179), "Whether the resolutions proposed by Mr. Frazer do not go too far, and would not be fraught with untold difficulties and inconveniences to the Board of Examiners, I seriously doubt; to say nothing of the almost pauper class implied by the conditions suggested." And further on he says, "My earnest desire is to see the whole trade as far as possible united into one body, each member as such holding a responsible position, to be used for the benefit of the whole. It has been with this desire that I have ever advocated a liberal policy towards those we are in the habit of regarding as outsiders, and it is for the furtherance of the same object that I desire now to see a radical change brought about in the Examination Fees."

There seems to me something strangely inconsistent in these two expressions. He wishes a "liberal" policy adopted, and a "radical" change made, yet he would fix the examination fees at such a high rate that they would debar a certain class (whom he terms the almost pauper class) from entering in. But what is the effect of the present scale of fees that they should be reduced? I can only speak for Glasgow, but while doing so I believe I express the experience of many other large towns. It has been impossible for us to get a class of twenty students together in either of the pharmaceutical classes we have attempted, although we offered the double advantage of reduced fees, and text-books at a reduced rate, simply because our young men are looking quietly about for something better, and I do not exaggerate when I say that not more than forty per cent. of the present apprentices and assistants in this city, will attempt to pass the pharmaceutical examinations. Mr. Frazer has already given instances of young men having left the trade, no doubt to better themselves both now and hereafter, but I can point to others who are sacrificing both time and money at present to gain the higher profession of physician, not to speak of numbers who have left and intend leaving the country altogether for America and elsewhere, where the prospects are better, who, I am sure, would not think of doing so if the examination fees of the Pharmaceutical Society were a little more reasonable; the result of this is, that assistants of the right sort are not to be had at present. And the only way in which I can see this state of matters can be rectified is by adopting Mr. Frazer's proposal at once; and if adopted, I venture to predict that the education question will be comparatively easily settled afterwards. If our young men were settled upon remaining at the business, it would be a comparatively easy matter in large towns to establish schools of pharmacy. No doubt some assistance from the Pharmaceutical Society would make these all the more efficient, and for this purpose I would cordially support Mr. Frazer's motion regarding the distribution of the surplus funds of the Society. Mr. Schacht's scheme, I think, is far too elaborate for our present wants, and I am inclined to think, that if adopted, it will be as much

* See PHARM. JOURN., present vol., pages 179, 240, 279, 339.

a dead letter as Mr. Reynolds's. I would be more inclined to support, in conjunction with Mr. Frazer's motion, that proposed by Mr. Giles in to-day's Journal, viz., the establishment of another School of Pharmacy for higher pharmaceutical education in Edinburgh. I am convinced these are the only practical schemes that have yet been proposed; there has certainly been too much theorizing on the question of pharmaceutical education; as a friend of mine here said the other day, "There has been too much talk about how to cook the soup, while the much more important matter of how to catch the hare, has been almost entirely neglected." I trust the country members will speak out on this matter of increasing the examination fees. It is so mixed up with the question of education that I fear it must be settled first, and if they do not let their voice be heard in support of a reduction from the present scale, an increase will in all likelihood be resorted to, which to my mind would be a sad calamity to the business of pharmacist in this country.

J. M. Fairlie.

17, *St. George's Cross, Glasgow,*
October 26*th*, 1872.

Medicines Afloat!

Sir,—In glancing over your leader on "Physic Afloat," the thought struck me that some "practical" difficulties experienced by me might be useful to illustrate the point in question.

In the first instance, I received an order for the ordinary forty-man Board-of-Trade chest. Happening to be away from home before it was shipped, I received a telegram saying that additional medicines were required for from 80 to 100 passengers, as the steamer was chartered for the Cape of Good Hope passenger traffic; and further, that the arrangements were to be completed forthwith, as she had to be on the berth in London on a very short date from that time. I was not long in getting to business, and now my troubles began. Naturally enough, I supposed that for a steamer which had to be specially surveyed and licensed by the Board of Trade, to see that her hull was seaworthy and properly supplied, when the souls on board were increased at once from 40 to 140 or more, there would be some provision made for their well-being—something to stem the tide of disease, mayhap some malignant epidemic; but I was woefully mistaken. My first step was to apply at the shipping office, but I came away as wise as when I entered. I next went to the Custom House, where the same fate awaited me. The officials were polite, and did their best to find anything to help me; but all was blank. I then wrote up to the Board of Trade, and in due course received one of their characteristically laconic epistles written on any amount of paper; but still the same result. "There is no provision made for such cases as you describe." Lastly, I applied to "Her Majesty's Emigration Commissioners," when I did get two lists and a very polite note, saying that they hoped I should find what I wanted in the enclosed lists. Now I do not consider the Board of Trade list for seamen all that could be desired in that line, but compared with the lists of "Her Majesty's Emigration Commissioners," it is simply perfection. For example, for 100 passengers for 100 days and upwards, they order, amongst other things, acid. hydrocyan. dil. ½ oz.; chloroform, 2 oz.; po. borax, 1 oz.; morphiæ mur. 1 dr. Then the other list for 600 men for 100 days and under, argent. nit. 4 drs.; quiniæ sulph. 1¼ oz.; cer. cetacci, 8 oz.; and lint 14 oz., etc.

I managed to extract some wheat from the chaff, and after a good lot of planning, and with the assistance of one or two medicals who understood such matters, I got it fitted up and stocked, and in this my maiden attempt I flatter myself I succeeded moderately well, as the surgeon who joined her (at Gravesend) was so far satisfied on his return that he could only suggest some six or eight articles that were wanting.

My next order was for a steamer going to India, "*viâ* Suez Canal," upon which I set to work at once, as I knew from experience what I had to rely on from extraneous sources. But I hope and trust that now the Board of Trade have taken it in hand, we shall ere long have a thoroughly useful and comprehensive list for voyages of the longest description, and for any number of passengers.

There is one most important matter I should like to touch upon, and that is concerning the survey of ships' medicine-chests. A most salutary law exists regulating the purity of the drugs employed, but, unfortunately for the benefit that ought to accrue to the sailor, it is in most ports a dead letter; and I hesitate not to say that there is not one case in five hundred where a chest is opened by an inspector. What is wanted is a skilled inspector attached to every shipping port in the kingdom, a thoroughly practical pharmaceutist, whose duty it should be to examine every chest that leaves the port; pay him well, but let one of the qualifications for the office be that if elected he himself shall not fit a chest during such time as he holds the appointment. This would deal a death blow at the cheap and nasty compounds that are put into the box and sent to sea as medicines "of the finest quality only," and give the upright conscientious pharmaceutist a chance not only of getting a remunerative price for a genuine drug, but would tend to uphold the credit of British pharmacy.

Sunderland, Sept. 23*rd*, 1872. David B. Sharp.

Pharmaceutical Examination.

Sir,—It will perhaps satisfy 'Quærens' if I remind him that admission has been publicly made that, by a system under which candidates, "no matter how backward," are prepared for the Minor in about a month, no less than one hundred and thirty have been annually passed since 1868.

I do not think, as 'Quærens' seems to insinuate, that the examiners are ignorant of their business; but I do think that they have not time to carry on their business properly. More time is required, greater change in the mode of examination, and, if possible, in the examiners; the practical portion should be much more extended, and a certificate of apprenticeship of at least three years' duration should be required. For affording any further information in support of the statements contained in my letter, I should be glad of an opportunity of communicating personally with "Quærens."

Frederick Andrews.

23, *Leinster Terrace, W.*,
October 15*th*, 1872.

J. Winn, A. B. and J. Richardson.—Your letters, with enclosures, have been forwarded to the publishers, Messrs. Churchill and Co.

A. P.—A species or variety of *Veronica*, probably *Veronica Hendersoni*; but specimen arrived much shrivelled.

H. W. Harris.—(1) *Ground Pine* (*Ajuga Chamæpitys*, Sm., from Gr. *chamai*, ground, and *pitus*, pine), so called, according to Prior, from its terebinthate odour. He says also that it was the forget-me-not of all authors till the beginning of this century. It is found in the chalky districts of Kent and Surrey. (2) White oxide of antimony, prepared by heating metallic antimony in a vessel freely exposed to the air, and furnished with a cool surface for the condensation of the oxidized vapour, is termed "Flowers of antimony." (3) Dr. Hassall's is the best-known book upon the subject.

G. L.—See the regulations respecting Naval Dispensers printed in the first volume of the present series of the Journal, pp. 44 and 828, and also in the Society's Calendar.

"*A Registered Student of the Society.*"—There is no rule prohibiting the admission of such specimens as you describe; but in awarding the prize, the degree of perfection in the specimens would undoubtedly be taken into consideration.

"*In Embryo,*" *and G. C. Bunn.*—Apply to the Secretary for copies of the pamphlets entitled 'Hints to Students,' and 'Regulations of the Board of Examiners.'

J. L.—We do not quite understand your question. If the new Adulteration Act be referred to, we do not think it would interfere with the sale of the article you refer to for the purpose specified.

W. R. H.—We do not think the opinions you express are well founded, or that your letter generally is suitable for publication.

C. Crampton, Coventry.—Your letter does not contain anything calculated to convince us that the necessity of passing the 'Preliminary examination' is to be regarded as a hardship for any one desiring to carry on the trade of a chemist and druggist with credit to himself and benefit to the public. But we feel sure that if our correspondent's energy were directed into a proper channel, the ordeal of the 'Preliminary' would have no terrors for him, and that he would agree with us in ceasing to sympathize with those 'unfortunates' who regard it with dread.

B. B. B., "*Zarefi,*" "*Pharmaceutist,*" *and A. P. S.* are referred to the rule respecting anonymous correspondence.

Communications, Letters, etc., have been received from Mr. Parkin, Messrs. Howard and Sons, Mr. W. A. James, Mr. J. Leare, Mr. Daniel, Dr. J. L. Soubeiran, Mr. Goodfellow, Mr. J. B. Clarke, Mr. J. D. Alkmann, W. R. H., W. D. S., A. B., M. P. S., "An Assistant."

TINCTURE OF ORANGE-PEEL.

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

Tincture of orange-peel has often furnished a topic for conversation, but I do not remember seeing any written communication upon it published in our Journal, hence one reason why I have thought it worthy of being brought to your notice this evening; secondly, whilst the Pharmacopœia directs the dried peel to be used, there are pharmacists who consider that the fresh peel, or peel cut in England, and not allowed to dry, is to be preferred in point of flavour. Again, there are others who admit the superiority of the fresh peel when the tincture is unmixed, but consider it a matter of secondary importance, in the eyes of their patrons, when mixed with other ingredients, as in tincture of quinine, or when added to other things in prescriptions, the supposed delicate flavour of the fresh peel is inappreciable. Again, there are pharmacists who look upon the peel cut, dried abroad, and imported into this country for the purpose of tincture, equal to that cut and dried here, although the Pharmacopœia describes orange-peel as "The dried outer part of the rind of the bitter orange, Citrus Bigaradia, Risso, 'Histoire Naturelle des Orangers,' plate 30." From the ripe fruit imported from the South of Europe I can hardly imagine it would exclude the same, because it was cut and dried abroad.

"*Characters.*—Thin, of a dark orange-colour, nearly free from the white inner part of the rind, having an aromatic bitter taste and fragrant odour." As regards colour, the foreign-cut peel I have generally met with is darker than the English cut, but not so thin. Upon the table are five samples of tincture, four of which were prepared by maceration (B.P. proportions). Maceration was chosen as being less liable to the little accidents which sometimes attend percolation, and they could all be prepared at the same time, without requiring four percolators of the same size, and one was prepared by percolation.

To those who hitherto have not paid attention to the subject, it may be interesting to know that the fresh peel cut here, not being as thin as I wished it, upon being recut by myself, lost just one-fourth of its weight, that is, I removed one fourth of the white inner part of the rind; secondly, this, upon drying, lost two-thirds of its weight, *i.e.*, eight ounces out of twelve, and even then was not as dry as the commercial article. This, dried by myself, cost 5*s.* per lb., the commercial dry English peel costs from 2*s.* 2*d.* to 3*s.*, and the foreign from 9*d.* to 1*s.* Of these five examples, the one by percolation was made with foreign imported dry peel; of the others, one with foreign, one with the English commercial dry peel, one with the peel recut and dried by myself, and one with the fresh peel recut; of this last six ounces were required as an equivalent of two ounces dry. In preparing the tincture with fresh peel, I made one oversight. I tell you this because non-success is sometimes as useful as success. The oversight was this: although I calculated the quantity of the fresh peel required as an equivalent for the prescribed quantity of dry peel, I omitted to calculate the amount of moisture, and that I should require less water to make the spirit proof. However, I do not think that that circumstance has at all interfered with the flavour of the article produced. The specific gravity of each has been taken, and there is considerable variation, running thus:—·944, ·938, ·936, ·926, and ·922. This I shall be happy to explain presently, as in my opinion it does not affect the odour or flavour which is the point which I should be glad if you could decide this evening; and that I may in no way bias your opinion, I refrain at present from giving my own. I feel that it may be difficult to taste or smell one after the other without being in some measure confused, but we expect as much sometimes in our examinations; at any rate, any great difference either in colour, fragrance or flavour, I may naturally expect to be readily detected.

[*The discussion upon this paper is printed at p.* 369.]

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, November 6, 1872.

THE PROPOSED "UNIVERSAL PHARMACOPŒIA."*

BY PROFESSOR REDWOOD.

One of the questions submitted to the "International Congress of Pharmaceutical Associations and Unions," at the meeting held at Vienna on the 9th and 10th of September, 1869, was as follows:—

"What should be done to effect the greatest possible uniformity in the strength and composition of the remedies used in all countries?" A continuation of the universal codex question.

When this question came before the Congress, Mr. Waldheim, of Vienna, stated that the Société de Pharmacie of Paris was then engaged in preparing a small work which would contain the remedies most generally used in all countries, and especially the most important and powerful remedies, such as hydrocyanic acid, tincture of opium, Fowler's solution, the mineral acids, etc. The formulæ for the preparation of these medicines would be given according to the principal pharmacopœias, and questions put as to the reasons for having different forms, and for preferring any one of these to the others. He said the work would in a short time be ready for publication, and would as soon as published be sent to the different pharmaceutical corporations with a request that it might be circulated among medical men and pharmaceutists, and their remarks made on blank pages with which it would be interleaved.

This announcement appeared to the Congress to dispose of the subject, at least for the time, very satisfactorily, and accordingly a resolution was passed thanking the Société de Pharmacie of Paris for having undertaken the work, and encouraging them to proceed with it and get it finished as soon as possible.

Although three years have now elapsed since that announcement was made, I am not aware that any further information has been published with reference to the promised work, nor do I know what progress has been made towards its completion.

In the current number of the 'Chemist and Druggist,' a notice appears headed, "Universal Pharmacopœia," in which it is stated that Dr. Phoebus, of Giessen, conjointly with some other chemists and pharmacists of high standing, privately undertook,

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, November 6, 1872.

in 1869, to draw up an international pharmacopœia, the object of which would be to establish uniformity in pharmaceutical preparations all over Europe. Among the active workers in this enterprise are mentioned Signor Cantini, Naples; Herr Flückiger, Berne; M. Planchon, Paris; Herr Schneider, Vienna; Dr. Thudichum, London; and M. Trapp, St. Petersburg. The notice further states that the work is progressing, but is not yet finished.

When I first read this statement I thought it might possibly refer to the work that was brought under the notice of the Congress at Vienna, and I applied to Dr. Thudichum for further information on the subject.

Dr. Thudichum has kindly consented to attend here this evening, and to explain the general character of the work on which he is engaged. There are two or three questions connected with the preparation of such a work which appear to possess sufficient interest to members of the pharmaceutical body to justify their introduction here. Thus, for instance, it would be interesting to us to know what language the work is intended to be published in; how the question of weights and measures is to be dealt with, whether quantities are to be represented by reference to specified weights, or simply by the use of proportional numbers: and whether the book, when ready, is in any way to be used in the manner proposed by the Société de Pharmacie of Paris, with the view of eliciting the opinions of medical men and pharmacists as to the best processes for the preparation of medicines.

The primary idea involved in the proposition for having an universal pharmacopœia is that all medicines bearing the same names should be of the same strength and composition in whatever country they are used. This is the first and most important object contemplated. But there are other objects which are more immediately susceptible of accomplishment. While the medicines used in different countries differ, a work describing them all, and comprising formulæ for the preparations included in the various authorized pharmacopœias, would afford a comparative view of the pharmacy of different nations, the study of which would be beneficial to those using the work. Such a work would also afford to pharmacists the information they require in dispensing foreign prescriptions. The two last named objects may be realized at once, while that first named can only be carried into effect by slow degrees.

I believe we are entitled in this country to the credit of having made the first successful attempt to abolish the anomaly of the co-existence among people of the same nation, of authorized processes for the preparation of medicines bearing the same names but differing in strength or composition. Germany has recently followed our example by establishing one uniform standard in the place of several standards for the composition of medicines used in that country. Sweden, Denmark and Norway have gone even a step further, and have attempted, although as yet with only partial success, to effect the assimilation in strength and composition of the officially authorised medicines of the three nations, thus establishing a sort of international standard.

All this evidently tends toward the adoption of a universal pharmacopœia with the primary object realized; and although it may be a long time before the difficulties in the way of superseding our national pharmacopœias by such a work can be overcome, if they can be at all, the adoption of the means best calculated to bring about that result appears to present collateral advantages which ought to insure its being put into operation.

No doubt can be entertained as to the desirability of having such a work as that described at the Vienna meeting in 1869, and if the work now announced, and of which Dr. Thudichum is one of the editors, has similiar objects, and is likely to supersede the other, we should be glad to have some more definite information with reference to it. It is with a view to the attainment of that result that I have introduced the subject here this evening.

[*The discussion upon this paper is reported at p.* 370.]

LORD GRANVILLE AND THE BISHOP OF WINCHESTER ON THE OXFORD LOCAL EXAMINATIONS.

The distribution of prizes and certificates in connection with the Ramsgate centre of the Oxford local examination, took place on Tuesday, October 29th. The report showed that 44 candidates out of 99 were entitled to certificates and 8 to prizes.

After the distribution, in the course of some remarks, Lord Granville said that of late years he had been intimately connected with the London University, and he was proud of the progress that institution had made both as regards numbers and in extending the curricula of education in this country. He could not forget, however, that he had spent two very pleasant years of his life in the older University of Oxford, where he graduated at nineteen, perhaps too early. It was most agreeable to him to assist at a distribution of prizes consequent upon the examination instituted with such success by that old university upon a system which at the time he was an undergraduate would have been difficult, if not impossible. If they looked at the report, at the number of subjects included in the examinations, and at the names of the candidates, who, he was informed, belonged to almost every possible creed in that district, they would see the liberal manner in which the examinations were carried on, and that they owed a debt of gratitude for the course the old university had taken. He believed that these examinations were of use in almost every possible way. They gave a great stimulus to the interest taken by parents in the education of their children, enabled them to form a judgment as to how and where their children could be best educated. With regard to the teachers themselves, he believed they would all agree with him that in their work of teaching they received most valuable lessons from the examinations, as they showed them the faults of their modes of teaching. It was the examination which taught a boy to know his own deficiencies and when he succeeded better than anything else could do. Unless they brought these things to some sort of test, they were not sure whether they had knowledge or not, and there was no test more sure than that of being examined by capable and intellectual men, thoroughly versed in the subjects, who did their best to ascertain, not whether a boy was merely crammed, but really understood what he had studied.

The prizes given by the committee of the local centres for London, Finchley, Streatham Hill and Southwark were distributed on October 30, in the Theatre of the London University, by the Bishop of Winchester. His Lordship, after expressing the pleasure he experienced in distributing the prizes, said if the great universitiee of the land were to do the work for which they were founded, they must reach the different ranks of society and of education to an extent which of late years these never have reached. If they merely educate those who give themselves for life to professions which depend entirely upon absolute brain-work, such as the law, medicine, and divinity, and also the class above these, who need not resort to a profession for their existence, they will fall vastly below the idea of their founders, and they would fall vastly below the reasonable expectation of the age in which we live. And yet it was a problem to know how they were to reach all the rest of the thinking part of the community. It was quite evident that the necessary expenses of a regular university career could not be met by numbers to whom God has given talents, natural and intellectual gifts, and also the higher desire which is above those gifts, to use them well. It was evident that it was impossible, because of the necessary expense of a complete university curriculum, that that curriculum should be opened to numbers of those who yet might come under the influence of a university education, and it was one of the happiest thoughts of these later times, which has, through these local examinations, united our ancient universities with all the young blood of England; not of those only who can reside for a regular time in the colleges of the universities, but of those who are to fill up the vast area of places and employments which in this great country require intellectual education and the formation of moral habits. He was convinced that, in giving to those classes the advantages of a searching examination, the universities had imparted a great part of their benefit. After all, education, for a great number of those educated, will have its high level fixed by the examinations which now and then test it. The benefit of that examination was that it possessed all the elements which make examination really valuable. In the first place, it was very real and searching. The examination of this year lasted four days and a half for the juniors, and for the seniors seven days and a half. Therefore, the first element of this examination is that it was very searching. It had this further element, that, from its very breadth and width, it must be a very fair examination. An examination conducted in a very small place, upon a very few people, before few examiners, upon a very narrow scale of examination, was very much like the point of a needle pricking the skin of a man—it does not scarify the whole creature thoroughly; but this examination, applied to the whole country, administered by the two great universities themselves, with every one of their leading men taking a part in it, and each having a rub at the poor examined creature, does scarify the whole intellectual and moral being of the poor wretch subjected to it in a way which undoubtedly makes it a very fair examination. Those who are examined know very well that no little tricks will do, that there is no possibility of getting out of the way of the scarifier, as they might get out of the way of a single needle, and that they will be caught somewhere, held fast, and well scrubbed till it appears what their real mental condition is and what it is when they are subjected to this very perilous analysis. Therefore an examination so complete is nationally educating; it does really test what is in those who come up to be examined; and it is, upon the whole, a most useful, a most enlivening, and a most enlightening process. Of those who do fail, far more fail in the necessary subjects than fail in the optional subjects; indeed, scarcely any fail in the optional. That showed that there would be still fewer failures if more attention were given to that which is expressively spoken of as grinding in the necessaries and less to the optional subjects. It must be a disagreeable thing, of course, to grind and to be ground. But the process is very necessary; there is no coming to any good result without it. You cannot get imperfectly ground flour to make fine bread. I say again, then, grind more upon the necessary than upon the optional subjects; that will have a further effect. The percentage of passes to the total number examined is 67; in the London district it is 62.

JOHN CARGILL BROUGH,

For Ten Years Editor of the 'Chemist and Druggist,' and the First Appointed Editor of the "Year Book of Pharmacy."

It is proposed to raise by subscription a fund for the maintenance and education of the five children who have been left unprovided for, by the untimely death,—at the age of thirty-eight,—of this well-known representative of Science and Pharmaceutical Literature.

The late J. C. Brough commenced his career, while yet a boy, on the staff of the 'Illustrated London News," on which journal his father held an appointment. He was subsequently engaged as a writer for the daily press, and was the author of a large number of articles, stories, essays, and scientific papers, for various popular magazines and periodicals.

Among the best known of these earlier works is a delightful volume, entitled 'Fairy Tales of Science," which is still regarded as one of the most charming examples of his peculiar ability to impart scientific knowledge to the young. He, at the same time, devoted himself to scientific pursuits and inquiries, in which he always took a lively interest, and eventually became the editor of the 'Chemist and Druggist,' as well as editor, and indeed, originator, of the 'Laboratory,' a weekly journal of physical and chemical science, which was held in high repute by leading scientific men both at home and abroad. In August, 1869, Mr. Brough, in conjunction with two friends, produced 'Exeter Change,' and was appointed sub-editor of 'Nature' at about the same time. He was also engaged in the preparation of new editions of Cooley's Encyclopædia and other standard works for above ten years.

In July, 1870, he was appointed Principal Librarian of the London Institution, an office for which both his literary and scientific acquirements, and his geniality of disposition, eminently qualified him. In 1867 he had lost his wife, and shortly afterwards a widowed sister, whose two orphan children he and another sister adopted, and continued to support. He was thus left with five children dependent on his exertions. Although the serious illness, which was ultimately the cause of his death, had begun to affect him painfully during the last year of his life, he, through all his weakness and pain, fulfilled the duties of his office in a most exemplary manner. The managers of the Institution in their annual reports, bear ample testimony to his indefatigable energy and ability.

In July of this year he went to stay for a time at Esher, in the hope of rallying his strength, but became rapidly worse, and finally sank on the 7th of September. The orphan children on whose behalf this appeal is made are:—

Bennett Hooper Brough, aged 12 years.
John Watkins Brough, aged 9 years.
Mary Elizabeth Brough, aged 5 years.
Mary Chilton, aged 10 years.
Arthur Chilton, aged 8 years.

Committee.

Abraham, Jno., Liverpool.	Howden, R., London.
Atkins, S. R., Salisbury.	Hills, T. H., London.
Attfield, Prof., London.	Ince, Joseph, London.
Barron, F., London.	Mackay, Jno., Edinburgh.
Bentley, Prof., London.	Matthews, H., London.
Betty, S. C., London.	Paul, Dr. B. H., London.
Brady, H. B., Newcastle.	Reynolds, R., Leeds.
Bremridge, Elias, London.	Sandford, G. W., London.
Brown, W. S., Manchester.	Schacht, G. F., Clifton.
Carteighe, M., London.	Schweitzer, J., Brighton.
Deane, H., Clapham.	Stanford, E. C. C., Glasgow.
Francis, G. B., London.	Stoddart, W. W., Bristol.
Frazer, D., Glasgow.	Sutton, Fras., Norwich.
Greenish, T., London.	Tilden, Dr., Clifton.
Hanbury, D., Clapham.	Wade, Jno., London.
Haselden, A. F., London.	Williams, Jno., London.

NAVAL DISPENSERS.

The following Order in Council has been issued, containing New Regulations for the appointment of Dispensers at Her Majesty's Naval Establishments, a copy of which has been forwarded to the Editor of the PHARMACEUTICAL SOCIETY by the Director-General of the Medical Department of the Navy:—

AT THE COURT OF BALMORAL,
The 15th day of October, 1872.
Present:
THE QUEEN'S MOST EXCELLENT MAJESTY IN COUNCIL.

Whereas there was this day read at the Board a memorial from the Right Honourable the Lords Commissioners of the Admiralty, dated the 9th of October, 1872, in the words following, viz.:—

"Whereas we have had under our consideration the pay and position of dispensers in your Majesty's Naval Hospitals at home and abroad:

"And whereas we are humbly of opinion that it would be for the advantage of your Majesty's Naval Service to cancel the regulations affecting these officers now in force, dated the 24th day of June, 1870, and to improve their position by granting, in certain cases, increase of pay, and by placing them on the list of civil salaried officers.

"We do therefore beg leave to submit that your Majesty will be graciously pleased by your Order in Council to establish the following regulations for the appointment, pay, and allowances of dispensers in your Majesty's Naval Hospitals at home and abroad, in lieu of those now in force, and to direct that the establishment of such officers to whom the said regulations shall apply shall be as follows in the various Naval Hospitals:—

Haslar	3	Cape of Good Hope	1
Plymouth	3	Jamaica	1
Yarmouth	1	Bermuda	1
Haulbowline	1	Ascension	1
Chatham	1	Hong Kong	1
Malta	1		

"*Proposed Regulations.*

"1. Candidates for the office of dispenser must make a written application to the Director-General of the Medical Department of the Navy, and, as vacancies occur, they will be ordered to attend at his office at the Admiralty.

"2. The age of dispensers on entry shall not be less than 20, or more than 25 years.

"3. Candidates must be in good health, and of good character, and must possess certificates of either the Major or the Minor qualifications of the Pharmaceutical Society of Great Britain. Those who are entered, possessing only certificates of the Minor qualification, will not be permitted to receive the allowance for the charge of stores named in paragraph 9 of these regulations, until they have obtained the Major qualification.

"4. Candidates will be required to obtain certificates from the Civil Service Commissioners, in accordance with the terms of the Superannuation Act of 1859, and of the Order in Council, dated 4th June, 1870, published in the 'London Gazette' of 7th June, 1870. The Commissioners will satisfy themselves as to the age, health, and character of the candidates by personal communication; their physical fitness will, however, be determined by examination at the Medical Department of the Admiralty, where certificates of fitness will be granted for the information of the Civil Service Commissioners, who will also accept the certificates of the Pharmaceutical Society in proof of the candidates' knowledge and ability, without further examination.

"5. Dispensers will be required to serve in any of Her Majesty's Naval Hospitals to which they may be appointed, either at home or abroad.

"6. Dispensers will be included in the list of salaried officers with all the advantages pertaining thereto, and will be entitled to Superannuation under the Act of Parliament of 1859.

"7. Dispensers will be paid at the following rates:—

	Daily Rate. s.	d.
Under 5 years' service	5	0
" 8 "	5	6
" 11 "	6	0
" 14 "	6	6
" 17 "	7	6
" 20 "	8	6
And for each additional year of service after 20 years, 6*d*. a-day extra, until the maximum is reached, namely	10	0

"8. Dispensers will be provided with quarters, and will be granted an allowance of 6*d*. per day in lieu of fuel and lights.

"9. Dispensers in charge of stores will be granted the following additional allowances, viz.:—

	Daily Rate. s.	d.
At Haslar, and at Plymouth Hospitals	2	0
At any other hospital at home or abroad	1	0

"10. Dispensers serving at the following stations abroad, will be paid a further allowance to meet the increased cost of living, viz.:—

	Daily Rate. s.	d.
At Malta, and at the Cape of Good Hope	2	0
At Jamaica, Bermuda, and Ascension	3	0
At Hong Kong	4	0

This allowance, however, will not be included in the pay and emoluments on which civil superannuation will be granted.

"11. Dispensers serving at home will be granted twenty-eight days' annual leave, exclusive of Sundays, subject to such arrangements as the Public Service may require. Those serving abroad are to be allowed the same annual leave, with liberty to reserve it from year to year, so as to obtain a lengthened period of absence; such reserved leave is not in any case to exceed six calendar months, and arrangements must always be made for carrying it into effect without putting the public to any expense in providing substitutes.

"12. In cases of sickness, dispensers will not be permitted to remain absent on sick leave more than twenty-eight days in the aggregate in any year, without the sanction of the Lords of the Admiralty, who will grant an extension of leave in such cases as they may think fit, but not exceeding a total period of twelve calendar months. When sick leave has been granted, full pay will be allowed for six calendar months from the first day of absence from duty on account of sickness, after the expiration of which time, half-pay only will be granted, except when the dispenser would, if superannuated, be entitled to a higher amount, in which case he may be paid at the superannuation rate.

"13. Dispensers now serving, who entered the Naval Service before the Superannuation Act of 1859, and who since their entry have served continuously, shall be entitled to the benefits of these regulations without being required to obtain any qualifications of the Pharmaceutical Society. Those who entered subsequently to the passing of the Act, must qualify themselves in accordonce with these regulations, if serving at home, within twelve months from the date hereof, or if serving abroad, within twelve months after their return to England. Those who do not so qualify, will be superseded by others who are qualified.

"The Lords Commissioners of your Majesty's Treasury have signified to us their approval of this proposal."

Her Majesty having taken the said memorial into consideration was pleased, by and with the advice of Her Privy Council, to approve of what is therein proposed. And the Right Honourable the Lords Commissioners of the Admiralty are to give the necessary directions herein accordingly.

EDMUND HARRISON.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 9, 1872.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

DEODORIZERS, DISINFECTANTS AND ANTISEPTICS.

So much has been written on the genuine or assumed merits of agents professing to possess deodorizing, disinfecting and antiseptic qualities, that we are not surprised to find in them, as in other matters, science and commerce joining hands, and working somewhat too closely for the benefit or convenience of the general community. Chemists have been endeavouring for many years, assisted to a greater or lesser extent by the practical experience of doctors, to find out an innocuous and efficient destroyer of bad smells, a neutralizer of the baneful products of decomposition, and an arrester of that process, but with comparatively ill-success. Our leading medical and chemical authorities appear still to give carbolic acid the first place, for though highly poisonous, safety ought to exist in its smell. For, in spite of the accidents recorded, we take it that none but drunkards or lunatics would ever think of swallowing it, and as Mr. DISRAELI observed, "it is impossible to legislate for the unaccountable eccentricities of stupidity." The solution of chloride of zinc has lately got into disfavour among the "patent safety" organizers, as it is not only poisonous, but colourless, and comparatively inodorous. The permanganates and the perchloride of iron are good in some respects, and convenient, but are costly; and chloralum, chloride of calcium, the "marvel" fluid, the "Eureka" fluid, the "chlozone disinfecting fluid," and, for aught we know, many more, are still untried, but are all being pushed into the market with marvellous persistency and assiduity. Meanwhile, we have been favoured with another (a very lengthy) communication from "One of the Laity," who demurs to the editorial remarks appended to his letter that appeared on the 28th of September, and again attacks the official scale of the Board of Trade. He is probably ignorant of the fact that the amiable rulers at Whitehall, doubtless with a view of conciliating as many "deodorizers" as possible, have (wholly unmindful of shipowners' pockets) ordered three varieties of purifiers to be carried, viz., Condy's fluid, carbolic acid, and chlor-alum. This, which may be called the C process of disinfection, affords the charm of variety to the bewildered captain, and should afford at the same time consolation to our discursive correspondent. But, in spite of asseverations to the contrary, we find, as a result of much practical experience afloat, that carbolic acid is still generally used. Our correspondent says that "carbolic acid has caused the death of more people in the last seven years than chloride of zinc has occasioned since the time (now many years ago) when Sir WM. BURNETT was permitted to foist his fluid on the Royal Navy, much after the style wherein carbolic acid has since been foisted on the public by certain occult pseudo-scientific influences." We cannot, in the absence of categorical proof, accept the first statement as gospel. We neither know, nor care to know, the particulars of "foisting" so successfully pursued by the late Sir W. BURNETT. But if "One of the Laity" can suggest some harmless and efficacious variety of carbolic acid, "occult pseudo-scientific influence" will not be required in order to foist it on the public.

THE JOHN CARGILL BROUGH FUND.

WE have much pleasure in directing attention to the announcement respecting this subject, which will be found elsewhere. Mr. BROUGH'S many literary and scientific claims to our respect need not be mentioned, as they are sufficiently well known. To Mr. BROUGH we are largely indebted for the exercise of influence over those, once called "outsiders," whom by his example and his writings he persuaded to advance the general good, and to unite with one heart and soul in promoting the interests of pharmacy. In healing the unhappy disputes which then prevailed, Mr. BROUGH had no minor nor inconsiderable share. He was the originator of those monthly written examinations on chemistry which have so effectually aided the progress of the pharmaceutical student: and he would have been formally numbered in our ranks, had not constant ill-health and pressing occupations hindered. The influential names on the Committee are sufficient guarantee that the fund may be cordially supported. Probably no one in his lifetime was more eager to help others to the utmost of his ability than Mr. BROUGH: he was indeed conspicuous for his daily kindnesses. We feel sure that the five children who were dependent on him for support will not be left unprovided for by that large circle of pharmacists to whom the late JOHN CARGILL BROUGH was so much endeared, and amongst whom his name was a household word.

THE number of candidates entered for the Cambridge University Local Examinations in December next is 3075, being an increase of 242 as compared with last year. The examinations commence on Monday, December 16, and are held at 44 centres for boys, and 34 for girls.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

November 6th, 1872.

MR. A. F. HASELDEN, F.L.S., PRESIDENT, IN THE CHAIR.

MR. W. SCOTT BROWN, VICE-PRESIDENT.

Present—Messrs. Atherton, Betty, Bottle, Frazer, Greenish, Hampson, Hills, Owen, Radley, Sandford, Savage, Schacht, Shaw, Stoddart, Sutton, Urwick and Williams.

The minutes of the previous meeting were read and confirmed.

North British Branch.

Mr. Frazer reported that the furnishing of the offices of the North British Branch was being proceeded with under an estimate which he considered very moderate.

The President reported that the coroner of Norwich, who had been communicated with, in accordance with the resolution passed last month, had acknowledged the receipt of the Secretary's letter, and stated that he had no power to direct the prosecution of any person for such an offence as that alluded to, unless a verdict of murder or manslaughter were returned by a jury.

The letter was ordered to be entered on the minutes.

Appointment of Analysts under the New Adulteration Act.

The President submitted the opinion of the Attorney-General, the Solicitor-General and Mr. A. G. Langley on this subject, which has already appeared in this Journal at p. 293.

Appointment of an Examiner.

The President said the next business was to elect an Examiner in the place of Mr. Bird, whose retirement was previously reported. Five gentlemen having been nominated, a ballot was taken, resulting in the election of Mr. William Martindale, of University College Hospital. It was then resolved that Mr. Martindale's name be submitted to the Privy Council for approval.

Three members of the Society having paid their arrears of subscription, together with the subscription for the current year, were, upon payment respectively of a nominal fine of one shilling, restored to membership.

A former associate was also restored on payment of arrears and a fine of one shilling.

Election of Members.

The following Registered Chemists and Druggists were elected Members of the Society:—

James, Kirby .... Beverley.
Priest, Edward Raven .... Cromer.

In addition to the above, the name of a lady was proposed by Mr. Hampson, and seconded by Mr. Urwick, for election to membership of the Society, she being a registered chemist and druggist.

Mr. Bottle asked under what section of the Act or what clause of the bye-laws it was proposed to elect a lady to membership.

Mr. Hampson said he considered that the 18th section of the Pharmacy Act, 1868, made the applicant eligible as a member. The word "his" in that clause, as in many others, evidently was synonymous with "her." A lady applied for membership and was refused three times in 1869, on the ostensible ground that she was not in business on her own account at the time she applied. He thought it very desirable that this matter should be definitely settled; the lady whose name he had proposed was on the Register; he understood she was in business, she had been mentioned to him by a medical man of some standing, and she had been properly proposed and seconded, and he conceived it was their duty to elect her as a member. Having already decided on admitting lady students to the lectures, it was very probable that they would hereafter pass the Major examination as pharmaceutical chemists, and seek to become members, and therefore he wanted the Council to be consistent and admit those whom he considered properly qualified to membership.

Mr. Sutton inquired if this lady was really in business.

Mr. Williams said she was not. She was dispenser to a hospital for women.

Mr. Hampson said he had understood she was in business; at any rate she was on the Register.

Mr. Sandford said that as Mr. Hampson had referred to a former case, he begged to say that it was not entirely on the ground that the lady in question was not in business, that her application was rejected; but because there was a feeling amongst the members of Council that they did not want ladies as members. The non-election of a lady to membership would be no reason at all why ladies should not be registered as pharmaceutical chemists. This was a private Society, entirely apart from the Register, and it was for them to decide as a Society whether they wished to admit lady members or not; and in fact whether a lady should occupy the presidential chair. For if ladies were admitted to membership, they could of course be elected as members of Council.

Mr. Hampson: Certainly.

Mr. Sandford said he should oppose the election of ladies, for the reasons he had given.

Mr. Owen thought the Council ought to be consistent. They had just passed a resolution to admit ladies to the lectures and classes, and he did not see how they could deny them the privilege of becoming members.

Mr. Savage said that on the previous occasion to which reference had been made, he had certainly voted against the election of the lady, simply on the ground that she was not in business on her own account. At the same time, while he did not object to ladies receiving the educational advantages of the Institution, he saw no necessity to elect them to membership.

Mr. Betty said this this was a matter which required very careful consideration. He could not compete in gallantry with Mr. Hampson, and was not prepared on such short notice to decide on so important a matter. Theirs was a voluntary Society, and they could elect whom they pleased; and he feared they might find themselves in a false position if they adopted this principle. The Edinburgh University had admitted Miss Jex Blake to some of the privileges of the University, and now they could not get rid of her.

Mr. Williams suggested that the decision of the question should be postponed for the present.

Mr. Brown thought they ought to know for certain whether this lady was in business or not. In the absence of any definite information, he should advise the postponement of the question.

Mr. Williams said there was no doubt that the lady was not in business for herself.

Mr. Brown remarked that in that case he should vote against her election.

Mr. Savage said he should take the same course, and for the same reason.

The President said he remembered the case before referred to, when he voted against the election of the lady on the ground that the founders of the Society never contemplated the admission of ladies to membership, nor did the framers of the Pharmacy Act, or the words "or her" would be inserted after the word "his" in the various clauses.

Mr. Schacht also advocated a postponement of the matter in preference to a decided rejection of the claim at present, which seemed likely to be the case if the vote were pressed. He did not think the matter should be treated in a jocular spirit, nor did he see any reason for alarm if ladies were elected to membership. It did not at all follow that they would be elected to the Council table or the presidential chair; though if the majority of the members desired to confer that honour upon them, he saw no reason why they should not be elected. There was no possibility of this being the case at present, and he thought that was all the answer such an argument deserved. The question was one of abstract right. If a lady had a right to occupy the position of a chemist and druggist, it certainly seemed rather small on their part to deny them the privileges and great advantages of belonging to the Society if they wished. He would suggest to Mr. Hampson to withdraw the name for the present, and perhaps when the matter had been more looked into, it would be seen that it was not so alarming a proposal as some gentlemen seemed to think.

Mr. Hampson said he would accept this suggestion, hoping that the matter would be reintroduced before long.

Mr. Urwick acquiescing, the motion was withdrawn.

Election of Associates.

The following gentleman having passed the Modified examination, and being in business, was elected an Associate in Business of the Society:—

Platt, William..............Stonycroft, Liverpool.

The following gentlemen, having passed their respective examinations, were elected Associates of the Society:—

Minor.

Capstick, John William ......Lancaster.
Culverwell, John Sayer ......Windsor.
Cunnington, Richard Elliott ..Bristol.
Davidson, William ....Edinburgh.
Dymott, Frank ....Southampton.
Farr, Joseph ....Peterborough.
Flinders, Matthew Tom ......London.
Kershaw, Joseph Henry......Manchester.
King, Horatio Alfred ....Norwich.
Lester, Henry ....Northampton.
Lindsay, George William ....Sunderland.
Litten, Henry ....Sittingbourne.
Marjason, John Morriss ......Dublin.
Norton, Thomas ....Stafford.
Parrott, John ....Norwood.
Smith, Thomas Henry........York.

Modified.

Barton, Septimus William.....Manchester.

Election of Apprentices and Students.

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

Collier, Philip Davies ....Reading.
Gibbons, George ....Adwy.
Gilling, John Thomas........Ripon.
Hitchcock, James............Whittington Moor.
Sainsbury, Allan Fox ....London.
Stables, William Skilbeck ....Scarborough.

Finance.

The report of this committee was received and adopted, and sundry payments, including £100 for furnishing the new premises of the North British Branch, were ordered to be made.

Benevolent Fund.

The report of this committee was received and adopted.

The result of the election of annuitants on the fund, which took place on the 25th ultimo, was reported to be as follows:—

Henson	2557
Wilkes	1811
Kennett	874
Informal Votes	118

The Treasurer was directed to pay the two annuitants recently elected their annuities to Christmas.

A grant of £10 was made to a registered chemist and druggist at Hamilton, Scotland.

A similar grant was made to George B. Kennett, of Clapham, the unsuccessful candidate at the last election of annuitants.

Library, Museum and Laboratory.

The report of the Library, Museum and Laboratory Committee was received. The following books were ordered to be purchased:—

Wagner's 'Chemical Technology.'
Simmonds's 'Science and Commerce.'
Cooley's 'Cyclopædia of Practical Receipts.'
'Jahresbericht über die Pharmacognosie,' 1871.
'Pharmacopœa Rossica.'
'Farmacopœa Española.'
Ferrand's 'Aide Mémoire de Pharmacie.'

Appointment of Curator of the Museum.

It was resolved that the salary attached to this office be £150 per annum, and that the duties be as follows:—

"Hours nine to five, continuously. Saturdays, nine to two.

"To arrange the Museum, and keep the same in good order.

"To be responsible for the securing and safe keeping of all the specimens.

"To mount all specimens which the Committee may direct.

"To clean and label the bottles, drawers, etc., and renew the specimens as often as may be required.

"To examine the specimens for the students, and to keep them in proper condition.

"To prepare and maintain in full efficiency a catalogue for the museum."

"To form and keep in order an Herbarium of medicinal plants.

"To be present at the evening meetings, and assist as far as possible in preparing for them, in conjunction with the Professors.

"To report monthly to the Committee upon all matters connected with the museum."

Three gentlemen who had been selected by the Committee out of a large number, were then called successively into the council-room, and after a few questions had been put to each by the President, a ballot was taken, which resulted in the election of Mr. Edward Morell Holmes, of London, pharmaceutical chemist, to the office.

Jacob Bell Memorial Scholarships.

The following were the recommendations of the Committee appointed to consider this subject:—

"1. Eligibility. — Candidates must be Registered Students or Apprentices of the Society under twenty-one years of age, and have passed not less, or been engaged for not less, than three years in the pharmacy of a Registered Pharmaceutical Chemist or Chemist and Druggist.

"2. Subjects of Examination.—*Latin*:—Virgil; the three first books of the Æneid; Latin prescriptions; translations of Latin into English and English into Latin; translations from any Latin pharmacopœia, and parsing. *French* or *German*. *English*:—Composition and parsing. *Arithmetic*:—The four first simple and compound rules, fractions, and decimals; the British and metrical systems of weights and measures. *Elementary Chemistry*, *Pharmacy* and *Botany*.

"The examinations to be wholly in writing, and in the case of any candidate unable to attend No. 17, Bloomsbury Square, to be conducted under the same conditions as the 'Preliminary,' and such safeguards as the Council may from time to time deem expedient, and that the papers written by the candidate be numbered, *not named*.

"The examination to be conducted by two members of the Board of Examiners, and the award made (subject to the approval of the Council) by a Committee of the President, the Vice-President, and the two said examiners."

Mr. Stoddart said he supposed those who were eligible for these scholarships must have passed the Preliminary examination, and be registered as apprentices or students.

The President said that was so.

Mr. Atherton did not think these regulations necessarily excluded persons who had passed the Minor examinations.

Mr. Williams said they were intended to do so, and he believed had that effect.

The President said that French or German had been added to the subjects of examinations since the recommendations were formerly before the Council, and also Elementary Pharmacy and Botany.

Mr. Savage rather objected to the age being limited to twenty-one; many were apprenticed at sixteen for four years, and would then be in a position to compete, but if they thought they would have a year in which to prepare, it might lead to idleness during their apprenticeship. He should prefer not limiting the age, but simply providing that no one who had passed the Minor examination should be eligible.

The President said the regulation only provided that the candidates should not be over 21. It did not say how much under they might be.

Mr. Williams said a man might not pass the Minor examination until he was 24, or even later, but it was not desirable that men of that age should compete with those under 21, for whose benefit the scholarship was intended.

Mr. Schacht said the Board of Examiners were about to propose that the Minor examination should not be passed under the age of 21. He suggested that students should not be compelled to enter on their studies at once, because in some cases they were not out of their apprenticeship.

Mr. Urwick said many young men now entered on their apprenticeship late, so that it did not expire until they were 21, when they would be unable to take advantage of this Scholarship.

Mr. Hills said they could not keep the Scholarships open, because a vacant bench was left in the laboratory for the scholars, and the next session it would be wanted for some one else.

Mr. Williams thought the regulations in this respect could not be altered. If a young man were not able to avail himself of the Scholarship, why should he compete for it?

Mr. Sandford suggested the addition of the words "No person who has passed the Minor examination shall be eligible to be a candidate" to the first paragraph.

Mr. Frazer did not at all agree with the recommendations of the Board of Examiners as to age, for he began his apprenticeship at the age of 10, and he had assistants now in his employ who were thoroughly qualified at 20 for their duties, and he thought such men should have an opportunity of passing the Minor examination.

Mr. Schacht said he saw no necessity for the addition of the words suggested, which he thought would be tautology, inasmuch as the first part of the paragraph stated that candidates must be registered students and apprentices of the Society, and they would cease to be such on passing the Minor examination.

Some discussion ensued as to whether this was really the case, but as it appeared on reference to the bye-laws, sec. xi. clause 3, that on passing the Minor examination a registered student was immediately taken out of that class, Mr. Sandford withdrew the suggested amendment.

The recommendations of the Committee were then unanimously adopted.

Parliamentary.

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

Mr. Hampson proposed the motion of which he had given notice:—

"That the names of the voters for or against any resolution submitted to this Council be published in the Journal reports of the proceedings."

He thought that as the members of the Council represented the Society and the whole trade, it was a necessity that the members at large should be made acquainted with the way in which the votes were given, in order that they might form an opinion as to the character of their representatives. He could scarcely believe that any gentleman present wished his vote to be concealed, and he therefore brought forward this resolution.

Mr. Betty seconded the resolution, saying he believed it was already the rule that the name should be published, and if it had been omitted on one or two occasions, he supposed it was done inadvertently.

Several members of Council expressed their thorough concurrence with the view of Mr. Hampson, that where a division took place the names should be published, and that where this had not been done, it was simply a matter of pure inadvertence. But as it seemed the general opinion that it might prove inconvenient to lay down a rigid rule, it was suggested that the resolution should be withdrawn, to which Mr. Hampson assented.

Report of the Board of Examiners.

October, 1872.

ENGLAND AND WALES.

Examination.	Candidates. Examined.	Passed.	Failed.
Major	7	3	4
Minor	71	35	36
Modified	45	30	15
Preliminary	258	173	85
	381	241	140

Certificates received in lieu of the Preliminary Examination:—

Society of Apothecaries	2
University of Durham	2
" " Cambridge	2
" " London	2
" " Oxford	1
College of Preceptors	1
Incorporated Law Society	1
	11

SCOTLAND.

Examination.	Candidates. Examined.	Passed.	Failed.
Major	1	1	0
Minor	9	6	3
Modified	4	4	0
Preliminary	24	17	7
	38	28	10

General Purposes.

The report of the General Purposes Committee was also received, but, owing to the lateness of the hour, was not discussed.

The President reported that a letter had been received from Mr. Dymond containing a suggestion for securing a greater interest in local associations. The matter was referred to the Provincial Education Committee.

Two applications from chemists' associations at Aberdeen and Leicester for grants were also referred to the Provincial Education Committee.

Lady Students.

The Secretary said he had received a letter from Mrs. Garrett-Anderson and two or three other ladies, requesting to know whether at the end of the session lady students would be permitted to compete for the usual sessional prizes.

Mr. Brown suggested the consideration of this matter should be postponed until next month.

Mr. Williams said he saw no reason why they should not be admitted.

The further consideration of the question was deferred.

PHARMACEUTICAL MEETING.

Wednesday, November 6th, 1872.

MR. A. F. HASELDEN, F.L.S., IN THE CHAIR.

The following donations to the Library were announced, and the thanks of the Society were voted to the donors:—

Transactions of the Clinical Society of London, Vol. V., from the Society; St. Bartholomew's Hospital Pharmacopœia, 1773, MS., with notes, etc., and Haslar Hospital Pharmacopœia, 1777, MS., both from Mr. J. Fisher, through Professor Attfield; Thesaurus Zeylanicus Burmanni, from Mr. W. Young; Statistical Tables of Patients, 1871, from St. Bartholomew's Hospital; University College Calendar, 1872–3: from the College.

Mr. Hanbury called attention to some leaves of *Rheum officinale*, Baillon, a plant recently described in the Pharmaceutical Journal as the source of the true Chinese rhubarb.

Messrs. Hopkin and Williams exhibited fine specimens of Monobromo-Camphor and Carbazotate of Ammonia. Mr. Williams said, Monobromo-Camphor has lately been brought prominently before the medical world by Professor Deneffe, of Ghent, and quite recently to the notice of pharmacists by Professor Maisch, of New York; it is produced by replacing one atom of hydrogen in camphor by an atom of bromine. The body was first discovered by Perkin, and originally made by the action of bromine upon camphor under pressure in a glass tube; for bromine at ordinary temperatures simply forms the so-called bromide of camphor, which is not a substitution product. At about 130° Cent., however, bromine replaces hydrogen in camphor even at ordinary temperatures, and the product of the reaction dissolved in petroleum oil, as recommended by Professor Maisch, or in hot benzol, deposits the bromo compound as it cools, retaining the unaltered camphor in solution. Two or three recrystallizations from alcohol yield the new product in beautiful crystals, and perfectly pure, although still possessing a smell resembling camphor. It is, medicinally, a new sedative, and has been recommended in delirium tremens, and various other disorders, in doses of two grains frequently repeated.

The Carbazotate of Ammonia, Mr. Williams said, had lately been recommended as a substitute for quinine. It is intensely bitter, but, from the results of experiments made many years back upon a corresponding salt, the carbazotate (or picrate) of potash, he thought it somewhat doubtful if it would be found to be of great value. He also pointed out that care should be taken in manipulating it, as, under certain circumstances, it was violently explosive.

Mr. Bland called attention to a specimen of adulterated cochineal, remarking that such samples were common enough in commerce years ago, but it was many years since he had seen any of it adulterated to anything like the extent of that before them. The cochineal in this instance was loaded with about 20 per cent. of foreign substance, consisting principally of sulphate of barium.

Mr. Greenish drew attention to a very beautiful study of the common foxglove, which had been photographed and presented to the Society by Mr. Frank Good, the son of a member. Specimens of Gill's 'Triangular Poison Bottle' were exhibited, and also some asthma pastilles, presented by Mr. Hustwick, of Liverpool, and prepared from the following formula:—

Asthma Pastilles.

Pasteboard, broken down with hot water, 4 oz.
Nitrate of Potash, 2 ounces.
Belladonna.
Stramonium.
Digitalis.
Lobelia Inflata, all in powder, each 20 grains.
Myrrh and Olibanum, of each 2 drachms and a half.

Incorporate all these with the paste, divide the mass in shape little pastiles. Burn them in a saucer in a well shut room.

Tincture of Orange Peel.*

The President (Mr. A. F. Haselden) then read a paper on "Tincture of Orange Peel."

[The paper is printed at p. 361, and gave rise to the following discussion.]

Mr. Sandford, referring to a specimen of the tincture made by himself, said he had used fresh peel, cut extremely thin. He had not used rectified spirit but proof spirit, and had allowed it to macerate for a long time to get the fine colour it presented. The specific gravity of the specimen before them was ·935. He certainly thought that this was very much better than any tincture made from the dried peel. It had been objected that the tincture made in this way changed by keeping, but he had kept some of it for a long time, and never found any appreciable difference between the old and the new. He did not think there was any loss of tincture at all.

Mr. Groves said he had made experiments with fresh peel, peel recently dried, and old peel, and he found in the case of the fresh peel that in making a vinum quiniæ there was a precipitate formed, and after that had been taken off, there was in a day or two another precipitate, which was white. At first he had some suspicion that it was derived from some impurity in the quinine. He examined the quinine, and then went back to the tincture, and he found that that which was made from the undried peel contained a soluble salt of lime, which when mixed with the quinine became deposited. There was another objection against the use of fresh peel. He dried his fresh peel, ascertained exactly the quantity of water, and then made allowance for that amount in the proof spirit. He found that in cold weather this tincture threw off a considerable quantity of essential oil, and was rather unmanageable on that account. The result of his experiments was that recently dried peel was better than either fresh or old peel.

Mr. Sandford mentioned that if they bought the oranges, and cut the peel themselves they should be very particular to get the true Seville oranges. He was once deceived by some Palermo oranges, which were like Seville oranges in appearance, but made a very different tincture, and left an after taste in the mouth something like that of quassia.

Mr. Williams asked whether there was any distinctive mark or method of distinguishing between the two sorts.

Mr. Sandford said they could hardly tell except by tasting the peel, when they could distinguish directly the Palermo oranges by the peculiar bitter taste.

Mr. Greenish remarked that in some continental pharmacopœias a much stronger proof spirit was recommended than that used in this country for making tinctures, and double the quantity of peel.

Mr. Umney asked Mr. Haselden whether he could give them any idea why fresh peel was discarded in the Pharmacopœia of 1836, whilst it was ordered in that of 1824. Mr. Greenish had asked what would be the loss of spirit in making the tincture. If tincture of lemon made from fresh peel be taken as an example, then a gain rather than a loss might be expected. The objection to the foreign dried peel was, he believed, its adulteration with sweet orange peel, and the taste was the only means by which one could be distinguished from the other. Referring to specific gravities, he should expect there would be great difference with a tincture prepared with spirit strictly proof and a spirit diluted with such variable proportions of water as would be contained in fresh orange peel. He imagined that the compilers of the Pharmacopœia had discontinued the use of fresh peel merely on account of the difficulty there was at all seasons in obtaining the peel. Seville oranges were not always to be had at any time of the year, whereas dried peel could be always procured. After making the tincture from the fresh peel for a period of forty years, the house in which he was engaged had, upon his recommendation, discontinued the use of the fresh peel on account of complaints that had reached them that the tincture from the fresh peel, when diluted with water, had a much more milky appearance than that made from the dried peel. They now prepared tincture from dried peel as directed in the British Pharmacopœia.

Mr. Haselden, in reply to Mr. Umney, said he believed that the reason dried peel was ordered in the B. P. was out of regard to convenience, as it could be purchased at any time of the year. His object in bringing forward the paper was not to support any opinion of his own, but merely to show what his results had been in preparing samples from dried peel and from fresh peel. He appeared to have been unfortunate in the fresh peel he obtained, inasmuch as he believed it would be decided against the tincture from the fresh peel which he had made. He could not imagine how Mr. Sandford in making his tincture did not get rather more tincture when finished than the amount of proof spirit he commenced with.

Mr. Sandford repeated that there was no loss whatever, but rather a gain.

Mr. Haselden said that in making the tincture from the fresh peel, he really obtained two ounces in the pint more than he ought to have had, the moisture in the peel having produced that result; whereas, in the tincture made with the dried peel he lost about two ounces in the pint. That accounted in some measure for the difference in the specific gravities. The tincture made with the fresh peel was ·944; that made with the fresh peel dried by himself was ·936; whereas that made from the dried peel was only ·926 from the English cut peel, and only ·922 from the foreign cut peel. The specific gravity of that made from the dried foreign cut peel by percolation was ·938, exactly the same specific gravity as that which Mr. Stoddart mentioned in his paper at the Pharmaceutical Conference. He (Mr. Haselden) could only account for its going up to ·938 from the fact that in percolation, when they displaced by water, they got some of the water mixed up with the spirit, whereby the specific gravity was altered.

Mr. Bland said they were apt to overlook the fact that tincture of orange peel was desirable on account of two distinct properties. One was its fine aromatic perfume, and the other its bitter, which caused it to be regarded as a slight tonic. If they wanted a fine aromatic flavour, he was satisfied that fresh peel must be used, and not only that, but rectified spirit. A single drachm of the tincture made with rectified spirit from fresh peel would give as much of the aromatic flavour as a couple of ounces of tincture made with proof spirit from the dried peel. If they wanted a light bitter, then dried peel and proof spirit were the things to use.

Mr. Brown said he had had some considerable experience in making tincture of orange peel for flavouring purposes, and he entirely differed from the statement just made—that rectified spirit with fresh peel made a better flavour than dilute spirit. He should assuredly prefer dilute spirit as taking more of the flavour from the peel than the rectified spirit, and as being more manageable afterwards. He endorsed what Mr. Sandford had said, that the peel must be fresh, and must be cut most carefully so as to remove the white without injuring the vessels containing the essential oil. It required a considerable length of maceration, much longer than most other tinctures. Generally speaking, he had not found that a satisfactory result had been obtained in less than a month or six weeks.

The Proposed Universal Pharmacopœia.

Dr. Redwood read a paper on the proposed Universal Pharmacopœia.

The paper is printed at p. 361. After it was read—

Dr. Thudichum said the proposal of publishing a European pharmacopœia originated entirely with Professor Phoebus, of Giessen, in 1869, although it had been communicated to him (Dr. Thudichum) in 1867; so that the proposition made at Vienna was subsequent to the initiation of the enterprise. In speaking on this subject, he should have the advantage of referring to a memorial, which Professor Phoebus in the course of last year handed to the Commission appointed by the Imperial Government of Germany to perfect a general German Pharmacopœia. The first great reason for having a universal pharmacopœia was that there might be introduced into medical literature a uniformity of statement as to the medicines which were used by various physicians in different parts of the world. The second reason was, that the dispensing of medicines and prescriptions which had been carried from one land to another, frequently caused even to the most accomplished pharmacist great difficulty and loss of time; often loading him with a responsibility for which he was not prepared. In the third place, physicians sojourning in various parts of the world, were called upon to treat strangers and sojourners who congregated in climatic and hygienic places, such as those on the borders of the Mediterranean. In those places a great variety of people from all nations were brought together, and required that the local physician should administer to them medicines, and frequently aid them in getting the prescriptions properly dispensed which they carried with them from their native places. Under these circumstances, great difficulties often arose, because the physician of the locality was unable at first sight, and without great preparation, to appreciate the purport of the prescription which the patient brought with him. These three classes of difficulties caused misunderstandings and mistakes, and the patient might to some extent suffer in consequence of them. A careful selection of the most necessary items to be received in the European Pharmacopœia had numbered above two thousand, and it was utterly impracticable for a man to command any knowledge of two thousand drugs. So, too, when a physician went from one country to another, and found a different pharmacopœia, he could not immediately follow the footsteps of his predecessor. The differences of remedies in the different countries were in most cases justified by no practical necessity. Certainly from his (Dr. Thudichum's) point of standing as a physician, he could say, that so far as he was concerned, he would adopt any of the various formulæ which were given in the pharmacopœias if he could attain uniformity. It was not a question of great scientific moment which formula they adopted, so that they had uniformity throughout the whole of the pharmacopœias. During the last 200 years many men had tried to realize the idea of a general pharmacopœia, and the most frequent experiments had been made by single physicians and single pharmacists, each of whom had endeavoured to carry out his own idea in his own way, without any sort of co-operation with others. The first was Nic. Lemery, who wrote a Pharmacopée Universelle, and published it in the year 1697. There was further, Triller's Dispensatorium Pharmaceut. Universale, published in 1764; then Spielmann's in 1783; then Reuss in 1786; Mayr in 1798; Swediaur in 1803; Roeber in 1803; Brugnatelli, an Italian pharmacist, in 1807; and then Von Mons in 1821-2. In these most remarkable works the authors confined themselves to the collecting of various formulæ from different countries. They did not make any selection, nor indicate remedies which might be more or less worthy of recommendation. Only the latter one amongst the works he had mentioned had made such an attempt, and that only in the slightest degree. Jourdan's Pharmacopée Universelle, published in 1828, began to make a selection. All these works had a remarkable success, most of them passing through several editions, or were published in various countries in translations. Some of them reached four editions. In 1835, Geiger commenced the Pharmacopoea Universalis at Heidelberg, but dying before its completion it was finished by Mohr. The authors of this work made a selection of articles, and described the value of them by means of three classes of type. The most valuable medicines were printed in large type, the less valuable in smaller type, and the useless medicines in still smaller type. The same principle was adopted in the Baden pharmacopœia. The articles which were selected by the Commission of Baden being distinguished by particular signs, so that the Baden pharmacists had a sort of universal pharmacopoeia to refer to. The next important treatise that appeared was the Codex Medicamentarius Hamburgensis, in the year 1835, which stated that from international reasons, which had particular value at that great trading place, it offered a rich selection of remedies to its readers; and therefore this Hamburg pharmacopœia might in some measure replace a general pharmacopœia. In 1846, the idea of a general pharmacopœia was taken up in Italy, but it came to nothing. In 1847, the pharmacopœia for the kingdom of Würtemberg appeared, and this was distinguished by a great selection of remedies, many of which it had taken from the Codex Hamburgensis. It distinguished the value of remedies by differently sized letters in the printing, but it had not had any influence upon pharmacists out of the country. In 1864, there appeared a General Pharmacopœia by an author of the name of Strum, who merely collected, and entirely resigned all criticism. They had, then, in this country in 1867, the most excellent British Pharmacopœia, which effected a great simplification in this kingdom. In Germany a similar desire for this simplification of the various codexes led to the appointment of a Commission, which elaborated a Pharmacopœia Germaniæ in 1865; second edition, 1867. This pharmacopœia was no doubt a considerable progress upon what had formerly existed; and he believed it was now introduced as the Imperial Pharmacopœia in Austria. The Danish Pharmacopœia of 1868, and the Swedish of 1869, and the Norwegian of 1870, had agreed to give the same composition for all articles having the same name, which was a very great progress. In the years 1865–7–9 the question of this universal pharmacopœia was mooted at the International Pharmaceutical Congress; but he thought it would be very difficult for a reunion, as it were, of men who were not delegated by any other powers behind them, who might come together again or not, to do so serious a work as that of the general pharmacopœia. Now the Pharmacopée Française of the year 1866 also recognized in its preface that a universal pharmacopœia, or, at least, a European pharmacopœia, was a very desirable thing. The pharmacopœia itself was stated to be intended to help to prepare such a transition, such a union or harmony, and to have adapted itself in many details to the pharmacopœias of other countries. There was also another attempt at a universal pharmacopœia in Hager's 'Pharmacopoeæ Recentiores Anglica, Gallica, Germaniæ, Helvetica, Russiæ inter se collatæ.' He (Dr. Thudichum) had on the table a proof page of the proposed new pharmacopœia, in which several classes of type had been used; the important medicines being in large type, then the second class being smaller, and lastly, a small print for the common drugs. The value of the remedies was thus distinguished by the size of the print. That was the great principle introduced by Geiger and Mohr, and it was of the utmost consequence that it should be upheld. It would be easy for any pharmacopœia anywhere to exist in its integrity by upholding a certain kind of print for its own individual medicines, and yet embodying the whole of the remedies from the other pharmacopœias by giving them in different type. Therefore there was not the slightest difficulty for each country having its full and complete pharmacopœia, and, as it were, mixed up with it in a logical and alphabetical way, a universal pharmacopœia, so that the pharmacists and physicians would only have one book to refer to. Supposing that this work were not successful in being adopted by the public authorities of any country, he, nevertheless, claimed for it a very high scientific value, inasmuch as it would always, under all circumstances, be useful to any one as a book of reference. The society for carrying out the new pharmacopœia began with eight members, and they had latterly been happy enough to add several other international gentlemen to it, and these gentlemen now constituted what they called a "Pharmaconomic Society." The name had been adopted in order to indicate that the intention is not to produce a book for teaching, but strictly a book of law; that was to say, a book which could be followed by any one, and be to him a full and satisfactory exponent of prescription and justification of pharmaceutical action. The first condition was conciseness, and they hoped not to exceed fifty sheets of printing. He questioned whether any single man, no matter with what power endowed, would be capable of accomplishing such a work. It required the zealous and hearty co-operation of men distributed over all the countries concerned, men who could meet on common ground and mutually accord their experiences. He had no doubt that although the proposed work would not teach in words, it would teach by simple classification of the remedies. There were some medicines which were of cardinal importance to the healthful existence of man, and they were as old as history. In old historical works whenever they found mention of remedies, aloes was in the account, and there were digitalis and similar drugs. They would best see the difference there was between a country which was well treated by its physicians and well supplied by its pharmacists and one that was so far behind civilization that its pharmacy and medicine were both at a low standard by visiting such countries. Nevertheless, it was necessary for them, even in the best of circumstances, to constantly remind the mass of physicians and the mass of pharmacists what were the remedies of cardinal value, what were the remedies of subordinate value, but still useful remedies, and those which were mere trash, and which were therefore not only to be treated with indifference, but to be positively rejected. Although these latter remedies were to be discarded, they would still be found in the new Pharmacopœia, and the fact of their having to be rejected would be indicated. He hoped that it would be understood that in anything he had said, he did not in any way commit the Pharmaconomic Society. In some cases there were three or four alternatives presented to them, and it would depend greatly upon the opinions they could obtain from such bodies as the Pharmaceutical Society of Great Britain, which way their decisions in matters of detail were given. If, therefore, he had stated any principle which they should subsequently find changed, he hoped they would not think it inconsistent, as these matters of detail were now under consideration.

The meeting was adjourned to the 4th of December.

Provincial Transactions.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The first meeting of the association for the present session was held in Anderson's University, on Wednesday evening, October 30, at half-past eight o'clock; Mr. Davison, President, occupied the chair. He was supported on the platform by Messrs. Frazer, Currie, Kinninmont, Fairlie, and the lecturer of the evening, Mr. Betty, of London.

The minutes of the last meeting, together with a brief account of work done during the recess, in connection with certain motions carried at the last meeting, having been read, the Secretary stated that he had received a letter from the treasurer, Mr. Young, in which he intimated his resignation of the treasurership. It was also mentioned that Dr. Moffat had written to the Secretary expressing his regret that, owing to the pressure of professional engagements, he will be unable to render any assistance to the association this session. Several new members were then elected.

Mr. Young's resignation having been accepted, the President proposed that the Secretary should undertake the duties of treasurer *pro tem.*, which was agreed to. The Chairman then introduced Mr. Betty, who delivered the following address:—

Mr. President and Gentlemen,—Neither as a form nor a precedent, but strictly as a necessity, would I preface the substance of my address to you by a word of apology for my appearance amongst you this evening. To be frank, in my readiness to accept an invitation so cordially given by my brethren in Glasgow, and affording me the opportunity of becoming personally acquainted with the gentlemen who would welcome me as a guest and visitor in Scotland, I lost sight of my incompetence for the task attaching to my visit. Accord me, therefore, I pray you all the indulgence I require at your hands.

The question I purpose enlarging upon has been treated of on similar occasions to the present by many of our fellow-members, whose addresses doubtless you have read, and whilst it is not easy to avoid the repetition of what has been better said, it is easy to pass unnoticed much of practical value; yet though the subject remains a wide one, it has been shorn somewhat of its former amplitude. It has become unnecessary to dwell upon the advantages of application to the subjects of botany, chemistry, or materia medica. The syllabus of our examinations makes the study of these subjects imperative, and whoever would falter in his resolve to face that issue may take for himself the chiding of King Henry to Westmorland, "That he who hath no stomach to this fight, let him depart; we would not live in that man's company;" but I am much mistaken if you are not earnestly resolved to enter the lists (shall I add, to excel among your compeers and competitors?) and the aims of these sessional reunions are to give you words of encouragement, and to aid as far as we can your endeavours. It would be more than superfluous were I to detain you with remarks on your professional studies in connection with the nature of your daily employments, after Mr. Stoddart has exhausted the subject. He has urged students to use their powers of observation, so that many a work that otherwise would be irksome or mechanical may excite interest, lead to investigation, and reveal to the mind some hitherto hidden secret of nature. Upon the arrangement of your studies I quote the original. "There is one warning I am desirous to impress upon you with great earnestness, viz., the incalculable advantage of a systematic arrangement of your studies. I speak from experience when I say that a loose, indiscriminate manner of study is so much time lost. If you have ever so extensive a library, and dip at random into your Attfield, Bentley, Lindley, Fownes, and Royle, you will make a terrible mistake, and totally put a stop to profitable study. Should any of you attempt to pursue so erroneous a course, however industrious you may be, you will feel extremely uncomfortable when you have to face the Board of Examiners. A method I have always found to work extremely well is to draw up a tabular arrangement according to circumstances. Botany for one day, chemistry for another, materia medica for the third, and stick to it. If you are prevented from enjoying the half-hour allotted to Bentley, pass it over and work with Attfield on the appointed day, but never upset the arrangement. Use every spare five minutes. You will never know till you try what a large amount of work can be performed in a few odd moments. Do not think because you cannot have a couple of hours at a time that you are therefore debarred from study. Where there is a will there is also a way. Not one of your predecessors ever had the advantages you possess, the books you have, or the class-instruction now offered." And Mr. Stoddart adds, "Don't be without a microscope." You are thus warned of your prospects when before the Examining Board you are thrown on the results of random reading; nor can you supplement such unsystematic application by spasmodic efforts at learning just before "going up." Do not lend too ready an ear to captivating announcements; for recollect always the profitable result for you to attain is not to pass an examination, but to be educated up to its standard; avail yourselves of what assistance you can in your work, but expect no royal road to successful study. Consult rather the interesting statistics of our examinations for the sessions 1870–71, 1871–72.

	Total No. examined.	Passed.	Failed to pass.	Per cent. of failures.
Total number of examined candidates	694	436	258	37·70
Of these were connected with the Society's school	181	130	51	28·17
Not connected with the Society's school . . .	513	306	207	40·30

Conceded that the systematic teaching in a pharmaceutical school does aid education, and that our recognized school does educate, these figures prove conclusively that our examiners bring out the fact in the percentage of failures; and hence that our examinations do test a candidate's real knowledge.

And when you take into consideration the number of those who pass self-prepared; of those who, though prepared, hesitate to face the Board without some special help; of those who having failed by a few points only, seek private instruction, the aggregate will, I am convinced, show you that a fair preparation is the passport to a pass examination.

It would be dispiriting to our educational efforts were it otherwise; that, is if we had any reason to suppose that the efficacy of our examinations fell below that standard of excellence which prevails elsewhere. Many of us have a vivid remembrance how much examiners did possess of that fatal facility to discover, and that perverse propensity to follow up what we politely call "a partial knowledge of the subject." If I am not much deceived by what I hear, and my experience of its matriculative examination, the London University may be said practically to set cram at defiance; that monster cram which many more denounce than refuse to coquet with, and of which in our pious horror it becomes us not to magnify the proportions.

Reposing in our Board of Examiners a confidence shared in by the Government Assessor, I should judge it to be inconsistent not to resist any attempt to impose on your method of study conditions, such as compulsory attendance at lectures, which are not a necessity for a pharmaceutical examination. Raise the standard of examinations, if so you will, but allow free trade in learning. Whatever the advantages of class teaching, they are not a necessity. It may not surprise, yet must encourage many a beginner thrown on his own resources, to know that there were nine candidates for the first Bell Scholarship, and that the first was Mr. Talbot, who was located in a small provincial town, and had no help but class-books; that the present holder of the prize was self-instructed. How would it have fared with these students had they, in addition to proof of their talents, been required to demonstrate by their tailors' bills the extent of broadcloth or of tweed they had worn out on the forms of a class? The proposition how the Pharmaceutical Council can most effectually aid local efforts in affording means of professional education amongst us, has become the question of the hour, and presuming the subject comes within the scope of this address, I would not pass it by without comment.

We possess but one considerable school of pharmacy, that of London; that school is also singular as being subsidized largely out of the funds of the Pharmaceutical Society. This fact presents for our consideration the two main questions, Shall the Pharmaceutical Society cease to be an educating body, and withdraw its contribution to the cost of the London school? and, If the time has not yet arrived for the Society to declare itself an examining and registering body only, in what way shall it continue to exercise its double functions?

That a corporation empowered to examine should at the same time permanently supply that education which it is its legal duty to appraise, would be contrary to our usages. In your University of Glasgow, I am aware, examinations are conducted and education supplied, but the offices are held by distinct corporations.

The voice of a majority having pronounced for a continuance of the present system, and its extension throughout our country districts, the Council will be called upon shortly to decide upon the best means of carrying out this object. It will thus take a decided step towards the eventual dissociation of its examining and educational functions; for as this extension of provincial instruction is justified on the ground of its utility, it becomes part of our educational scheme to link metropolitan and provincial education into one system,—that is to say, so long as the Pharmaceutical Council decide to support by grants pharmaceutical education, so long must that assistance be apportioned between the metropolitan and provincial schools. At least, so it appears to me. I do not see any grounds on which you can reasonably subsidize a London school and refuse the demands of country associations for similar help. Our records from 1852 to 1868 prove most positively that the encouragement to provincial schools of pharmacy was an object dear to the hearts of the founders and the promoters of the Pharmaceutical Society, and this has ever been a tradition amongst us. Nor can I regard the pharmaceutical area as a desert containing one spring, but dammed up at its source, whither those who thirst for instruction must travel to drink; its waters should rather flow as far and wide as our present needs extend, at least, till impassable obstacles arrest their course. We should expect provincial schools to flourish rather than to witness our seats of learning confined to capitals. What obtains with us in common with other nations in Europe?

For centres of teaching must we seek their capitals? On the contrary, in Portugal we find Coimbra; in Spain, Valladolid, Salamanca, Seville; in Germany, Leipsic, Wittenberg, Heidelberg, Prague; in Sweden, Upsala; in England, Oxford and Cambridge. The University of Bologna, though proximate to Rome, flourished, and boasted of professors whose fame was European. One old medical school which will ever excite interest among students of medicine and pharmacy, and whose axioms so quaintly declared will never be forgotten, was that of Salerno. How many times have we run over in our minds the diagnosis of a cold,—

> "Si fluit ad pectus, dicitur rheuma catarrhus,
> Ad fauces bronchus, ad nares esse coryza;"

or in discussing with a keen appetite some culinary triumph redolent of the sage bush,—

> "Cur morietur homo, cui semper crescit in hortis
> Salvia salvatrix, naturæ conciliatrix?"

Though Abelard attracted, by his expositions of philosophical theology, that immense concourse of listeners in the university of Paris, we are told that France, on the other hand, *en revanche*, as they express it, possessed numerous provincial universities. St. Andrew's, Glasgow, and Aberdeen led the way for Dublin, Edinburgh, and London. The men who watched over our early institutions were not forgetful of these facts, as testified by their enduring desire to foster country schools of pharmacy. They raised in the metropolis an edifice destined to be the regal home of pharmacy, the source of all titles and honour, but with the example before them of the astute and patriotic Wolsey, who built his palace in Middlesex, but founded a college at Oxford.

One great result of academical teaching must not be overlooked, that *esprit de corps* which grows up and strengthens between young men associated for the same object, producing emulation, esteem, and frequently enduring friendships. What advantages are thus conferred on the young pharmacist over his predecessor, who too frequently regarded every other man in the same business as a stranger or a rival? In its coming attempts to set provincial education on a secure basis, I believe the Council will succeed by a scheme thorough, well considered, and liberal to the verge to venture. To have attempted is not enough; it must attempt and attempt again, so that it may at any future time confidently point to the share it bore in the trial. If I may draw any inference from facts, a good school, or good pharmaceutical teaching, will be a permanency in Glasgow, for here I find myself in a city, the commercial importance of which is of somewhat recent date, yet boasting of an university whose foundation dates almost within the range of mediæval history, of a school still more ancient, and which, at the present day, maintains both in increasing efficiency. Having so far treated of your professional curriculum, allow me, in speaking now of your general education, to remind you that just as working up so much subject matter as will pass you in a pharmaceutical examination, without such an interest in your work as begets the continuance of your exertions, is not true pharmaceutical education, so will the aims of your school-instruction be frustrated by a non-continuance of reading and application to the subjects of your scholastic terms. For in our earlier school days we learn somewhat by routine; we study grammar, yet remain on the threshold of literature; we acquire a knowledge of facts and dates; we commit to memory, yet do not apply or moralize; we see results side by side, yet do not compare them; we order our powers in proving mathematical problems according to stated rules. Now these are but the elements of education, and when you hear of the advantages or great necessity of a sound education, it is understood that all this school lore is but the foundation on which to raise the superstructure of such knowledge as shall render you the brilliant pharmacist of the future, who, with capacities and ambition, will be a man and not merely an unit of the population. For what constitutes a practical liberal education? Broadly, it may be replied:—that amount of learning, the result of so much application as suffices to discipline the memory, to train the mind so that by applying tests to thoughts and ideas it may mature them into conviction, and by detecting sophistry or fallacy in argument and supplying illustrations to conceptions it may aid by its logic the perception of truth; that reading which supplies the motives for deeds of men, some of which were once thought great, that places in bold relief a concatenation of causes, following facts which their authors assumed they had hidden in the secrecy of plots, that tells us of the virtues of peoples and of their rulers whilst working out a glorious chapter of their history, of their vices and crimes, while preparing the chronicle of their decline and fall; teaching us to read history, or, as Macaulay terms it, "the title-deeds of nations," and judge of humanity as it is, how noble and how base! To be national in patriotism, and cosmopolitan in sympathy, no longer meriting the description "toto divisos orbe Britannos;" but using for the expressions of our thoughts the languages of those beyond our insularity. To understand a language, the legacy of an empire once mistress of the world, sometimes called a dead language, if that really can be so called in which half Europe says its prayers, and which is still the pharmaceutical language *par excellence*. Continue therefore the study of the subjects already taught you, add to them such as further facilities may induce you, or their importance dictate to you the advantage of commencing, and believe me your work will not remain unrequited. Whilst you perhaps are labouring at first under fortuitous disadvantages, your powers of mind will be sustained at a vigorous tone, the goal of high proficiency will ever be in your sight, and in nearing it your stamina will respond to your will, as the thorough-bred horse answers to the call of his rider when he bounds forward and leaves the half-breds labouring in his rear. In what manner, and to what extent will you continue your school curriculum? Am I too exacting when I ask you to devote one quarter of an hour a day to literature, say English one day, one modern language the next, Latin the third? It is a modicum of time, and how to be better filled than for instance in reading Macaulay's Essays, Lays, or History of England, the poetry of Tennyson, Longfellow, or of your national poet, Sir W. Scott, the classical English of Washington Irving, or one of those admirable works that yearly issue from the press? Again, on your French day, what intellectual pleasure is afforded by the essays of Montaigne; the majestic lines of Corneille and Racine, or the incisive wit and satire of Boileau, the modern Horace! On your third day to be amidst the scences of nearly two thousand years ago, and in the Roman forum or senate, to hear the very words in which Cicero denounced Cataline, or pleaded for Milo! Verily your minds would travel amongst many men and many cities. You are reported north of the Tweed to be great wanderers. We read of your "travelled Thane, Athenian Aberdeen," and I trust this characteristic will lead you far in the direction I have indicated.

The intercourse between England and the continental States has become so constant and general as to render familiarity with at least one modern language, formerly the appendage of an accomplished, now a necessary part of a liberal commercial education. Your choice is not restricted. There is German, the language of science; French, that of literature; Italian, of poetry; Castilian, the tongue of Cervantes, of gallantry and romance, and, I might now say, of business. It would not be unprofitable to devote a very short time in mastering the first rudiments of Greek. Do not alarm yourselves; I have not come to impose any legal obligation upon you to *study* Greek, that you may be amused by the odes of Anacreon, read Euripides or Sophocles, nor even the Greek Testament; but to insinuate the value of your being familiar with the Greek alphabet. You know it is the genuine alphabet, as its two first letters, Alpha, Beta, are always telling us. Just glance only at the declensions of the nouns and adjectives, easily acquired after the Latin; just peep at a few verbs, say half-a-dozen, and pick up a preposition or two that may come in your way. The value of this information is the key it gives to so many current words relating to arts or science and to our immediate profession—words that to a beginner, without some clue, might appear formidable. May I instance a case or two? We read frequently of the Delta of the Nile and the Ganges, of the deltoid muscle, the sigmoid flexure, the ethmoid and sphenoid bones, etc. Now the termination *oid*, is the English adaptation of εἶδος, resemblance, and these words signify land having the configuration of the delta, or triangle, a muscle the shape of the delta, a flexure the form of a sigma, another Greek letter, and bones resembling a sieve and a wedge. If you know that κηλη, means a tumour, you quickly arrive at what hydrocele, bronchocele, hæmatocele may be, a watery tumour, a tumour on the windpipe, a blood tumour; ἀλγος is the Greek for pain; and we have neuralgia, cephalalgia, odontalgia, pains in the nerves, the head, the teeth. ὕδωρ is water, hence hydrogen, hydrothorax, hydrocephalus, the first ὕδωρ γιγνομαι, to produce water; hydrothorax, water in the thorax, the chest, please recollect not the throat, hydrocephalus, water in the head. Then γλυκυς, sweet, hence gylcerine, and γλυκεια ῥιζα, sweet root, glycyrrhiza; γραφειν, to write, hence biographer. Well, I have gone far enough into this point either to bore you or interest you into pursuing the subject further; I hope the latter.

And now a word as to the conditions upon which you may expect commercial success. To be the thriving man of business, you must be imbued with a strong impulse to work and the resolution to persevere. Moreover, you must have instinctively, or must gain by experience, a knowledge of human nature, your own included. It may have occurred, or probably will occur to your minds at some time during your apprenticeship or assistantship, that you are not at all times engaged to your own immediate profit in the duties of a public shop. My experience has told me that it is in the routine of a shop you acquire a capacity for business; and recollect that while your commercial success is prepared for by your intellectual training, it will be much influenced by the tact which you may exhibit in your relations with the public when you are brought in contact with it. Many a well-read, and in every respect a worthy pharmacist, lags behind another more shrewd, more cognizant of human dispositions, their sympathies, their thoughts, their preferences. Some one may reply, Is not a man to appear before the world as he is, must he wear a mask? I do not bid him to dissemble; but remind him that if he styles himself a person, which he is, according to Act of Parliament, his *persona* is the symbol of his career, and I would beg him to learn ere he takes his part on the world's stage where "all the men and women are but players." You will obtain an insight into the more or less distinctive manner in which different businesses are conducted, and you will find it a profitable rehearsal to seek out by comparisons your own short comings, and critically to estimate your aptitude in each daily shifting scene of life. "See, observe and listen," and there will be nothing servile or smirking in your manner. You will not be wanting in self-respect, and thus will respect others, whilst inviting all kindly feeling and securing support by your tact in business. Thus, with one you will exchange more frequently than you offer words of courtesy; to another your every word must be *à propos* of the business in hand; to a third the conversation is familiar and friendly; to the distressed, the sick and the poor a few words of timely sympathy, and the same deportment you would observe towards a peer.

If I might dwell a minute longer on this matter, I would say, read carefully, and adapt to your own circumstances the memoirs of men who have preceded us. I shall not to-day refer you to the early difficulties overcome by a Faraday, a Miller, or a Herschel, but ask you to acquaint yourselves with the memoir of a man who opened "that shop in Oxford Street, 338." Read every trait in his character; how economy led to wealth, how perseverance and a high order of moral worth brought fame, and placed him in the position of our philosopher and our guide. My visit to you will not have been unproductive, if I counsel you to peruse attentively the 'Life of John Bell.' I look upon that memoir as a precious gift to pharmaceutical literature; in it his biographer has depicted, with the hand of filial duty, that caution even to timidity, that benevolence, and that unswerving and heroic resolution in the path of right. This memoir has been recently reprinted, and the few copies I have here this evening I beg you to accept.

A pharmacist, whom I know well had read that life ere he commenced business; and during some years, when the battle of life was rude, he would have yielded up the contest or sunk into apathy, but he had the portrait of John Bell framed and so placed that each morning that fatherly, placid face met his eye, and bade him at the dawn of another day be of good hope. *Ex uno disce multos;* for many, I doubt not, have been thus influenced.

I have lightly touched upon your personal duties, and glanced at the duties of the Council, as regards the principle of its aid to you, to assist at their commencement, or during their first exigencies, your provincial schools; but I would remind you that this, though urgent and important, must in its nature be temporary; and that duties responsible and permanent attach to its position, so long as the Pharmaceutical Council has the public spirit to heartily fulfil its task. I well remember the time when pharmaceutical chemists did not throw up their caps and cheer for the approaching incorporation of our trade; in fact, it was not fashionable then to do so, and those who at that time withheld their influence from that movement were doubtless not unbiassed by the prospect of onerous obligations. Thus it behoves the Council not to cease or falter in its efforts to maintain the scope of pharmacentical examinations at a standard perfectly satisfactory to the Government; to render their details incontrovertibly just and practical in the interests of our own body; to keep a watchful eye on he Register, that it may be a perfect record of our corporation; to sustain the fabric which we are all so proud to call our own, the cradle of pharmacy in Bloomsbury Square, and its counterpart in your capital; to scrutinize every shilling of the expenditure; to aid in sustaining our Benevolent Fund, etc., and to watch, with a vigilant eye, every public question that may affect us either in its discussion or by its decision. You know that the Act of 1868 did not pass without the opposing action of some influential legislators being apparent, or the prompting of jealousy being perceived; and it will ever require the greatest consideration, soundest judgment, and strongest influence of the Council, to maintain, without aggressiveness or subserviency, the principles of that Act; for the moment you create in the political body a distinct corporation with a recognized public position and legal powers, you constitute it a distinct institution of the State, and thus it becomes involved, like other public organizations or independent national States, in the necessity of justifying its existence and preserving its integrity against any power without. As I wish to speak generally of our trade interests, I would beg of you permission to glance at the clouds that I believe lower in our political atmosphere, premising that no remark I may make is directed against any minister personally or against any party. I shall speak strictly of Administrations and not of Governments.

The yearly increasing extent of legislation required by our rapid material advancement does certainly outpace the progress some Administrations succeed in making; and certain questions that do not present themselves as of imperial or political importance escape the personal care of a minister, and devolve upon a subordinate department of State, which to prove its energy for its work, and full of belief that the eyes of all England are constantly upon it, expecting it to do something, would edge on a minister to place on the statute book all sorts of red-tape regulations, such as naturally emanate from an office. Another danger is a species of legislation not unknown towards the latter end of a session, and it comes to pass somewhat in this manner: A member is riding a hobby, and the Government puts him off for a time by expressing an intention of proposing a measure itself on the same subject. Meanwhile, no very explicit information comes from the whipper-in as to the state of feeling in the House on the details of this question, or time passes, and it abandons the attempt for the session. The member gets on his hobby again, determined to tilt against the Government, which then intimates that the measure if generally acceptable to the House will not be opposed by it; this means that if the aforesaid member can get one of the Opposition to be god-father to his measure, and thus disarm any action from the cross benches, and besides secure a good introduction of the Bill to the Upper House, he will have the tacit support of the Government, which can then point to this Act, often with a popular title, as part of the work of the session, and last, not least, it gets rid of a troublesome question. So there is wonderful accord in the House on this subject; instead of the keenness of a political debate, all is uninteresting and calm; for the nonce there is an unnatural quiescence in the House, such as we witness in certain cages exhibited in our streets, where cats, mice, sparrows, hawks, etc., live together in harmony. Yet this happy family legislation I have no love for; it passes too much as a matter of course, and is slovenly. We saw one example of it last session in "The Adulteration of Food Act," which, in its different stages, passed with the utmost indifference, and there was just time, in the House of Lords, to amend some mischievous clauses affecting the sale of drugs.

The first danger I do not look upon without concern. If the sagacity of the statesman is sometimes wanting, how will it fare when the initiative of measures is delegated to the placeman? I believe class interests would be sacrificed in detail to the public detriment. Was not the Megæra sent to founder on the high seas through a minister listening to departmental representation? Did the late appointment of a judge to the Privy Council emanate from a minister, or did it result from external influence, and does not that judge sit at the Privy Council clothed in ermine, and at the same time, so far as public censure can attach to a public appointment, with the shirt of Nessus sticking to his back? In short, has not this system of administering our affairs lately drawn from the second leader of the House of Commons, a gentleman whom you are about to honour by installing as Lord Rector of your University, the summary and declaration that "if to menace or attack every class and every calling, every institution and every interest were a policy, then he had *no* policy." As you recollect, our class has not escaped the meshes of the above molestation; the Pharmaceutical Society was, after the Act of 1868, quickly called upon to stand on the defensive, and your Council had to win its spurs almost in the first days of its new existence. Now it hopes to wear them with caution and prudence, for I take it that the attitude of opposition should at all times be preceded by the deepest thought and conviction, for a proposition that may present itself to woo our consent with accents soft as the breath of zephyr, if founded on a real necessity, and not supported by a technical argument, will become a popular demand, and swell to the force of a hurricane in the path of which every interest must bend. But in case of danger, you would expect, and justly, that we, and all, should be animated by one common impulse, and relying on the Council to lead and encourage our constitutional proceedings, should we not be troubled if its progress were checked in the narrow and tortuous channel of timidity, or wrecked on the shoals and quick-sands of a shallow, shifting, and time-serving expediency? May I ask, has the great body of our trade less pressing duties than these of your Council? Cannot our pharmaceutical organization claim that all of us whose interests are identical should be united in one clanship for our general good, and thus afford to the Pharmaceutical Society that grand support which should be coextensive with the duties it is called upon to perform in connection with the advancement of the interests of our calling; that, like Antæus who, giant though he was, sprung with renewed vigour from touching his mother earth, the Pharmaceutical Council shall find its strength augmented each time it comes into contact with that constituency to the favour of whose suffrages it owes its existence. I trust our numbers will so increase that ere long, at our Council election, the last elected will receive more votes than were lately given to Messrs. Hills and Schacht. In thus forming an organization equivalent to our numbers, and the representation of our political strength, we are doing citizen's duty, inasmuch as that aggregate body politic called the State is but a confederation of numerous yet well-defined interests similar to ours; and no one can suffer wrong without causing dissatisfaction and discontent, and thus weakening at least one part of our national edifice. And is not internal disintegration the forerunner of the dissolution of a State? You have many of you no doubt asked of yourselves half diffidently the question—"Will England's sun ever set? Will her astounding prosperity develope the germs of her decadence?" The future historian may write of her as of Troy, "Anglia fuit;" the sites of her cities may be traced in ruins as of Nineveh, or of Tadmor in the Desert. Your harbour may be again choked up by the silting sands, and your commerce dwindle down to the produce of your sea fisheries, under the hard laws of the future though unborn oppressor of your race. No man can penetrate the veil of the early future in the struggle for supremacy among peoples, still less can he pierce that wall of adamant that shuts out the far future from mortal ken. But of this there is no doubt, England will retain her fame if each man performs his personal, corporative and political duties. It behoves us thus to be educated, to give form and force to our public opinion, and thus add our share to a prevailing internal contentment.

Gather then round the Pharmaceutical Society in your numbers, support it in your strength, that what is now an institution of this country may descend to our successors as a sanctuary in which have been preserved inviolate the privileges of our guild.

It is self-evident that such an union must lead to beneficial and all-important results; to the removing of the commercial anomalies which still hang about our calling, to our becoming the only dispensers of medicine by legalizing the practice adopted by our most eminent physicians and surgeons and universally followed by the medical profession on the Continent and in America; to improved conditions of entering and following our trade, that a higher tone may prevail and a juster equivalent for education and responsibility be secured; whilst the scope for our energies directed by a more systematic training will be enlarged by the additional wants created in our manufactures, the requirements of the State or our municipalities in analysing, and by the increased demand for teachers, contributors to scientific literature, or examiners in our own society, etc.

These are not shadowy but substantial results, that can be worked for by our co-operative corporation. In difficulties that would tempt us into discouragement, in a tardiness that may mortify expectation and make the heart sick, play out your part with your northern tenacity of purpose, allow your individual interests to be interwoven into one organization, like the harmonious blending of colours in your native tartans. Words uttered in many previous addresses you have adopted, and they are now watch-words of our society. The President of the Pharmaceutical Conference, Mr. Brady, fires our ardour by giving us the secret of his own indomitable energy in speaking to us the word "thorough." Mr. Ince has pointed out the difficulty and the object in the phrase, "Strive to succeed." Our neighbour, Mr. Mackay, has described in eloquent words how excellence has been and is to be attained. And what can I contribute? Nothing of my own; but I ask you in working out the future of the Pharmaceutical Society, and your future, to read attentively the few lines in which the poet summarizes the dangers of a hero about to found institutions that have survived to our day, and whose labours were to give birth to a noble and conquering people:—

"Multum ille et terris jactatus et alto
Vi superum, sævæ memorem Junonis ob iram,
Multa quoque et bello passus, dum conderet urbem,
Inferretque deos Latio, genus unde Latinum
Albanique patres, atque altæ mœnia Romæ."

Gentlemen, I have said what you have but too patiently heard, and I hasten to conclude. We have communed on the duties of the present, the expectations and hopes of the future. On parting I utter not a barren wish, but my confidence that you will realize your utmost hopes and highest ambition. I would fain believe there exists a bond of sympathy between myself and you in whom rest the future hopes of pharmacy; that you will in cultivating the field of science, as in the commercial duties of your lives, hold firmly the handles of the plough of industry, and press its blade deep into the soil, that its treasures and rewards may be harvested. You will cast no look behind you, neither divert to the right or to the left. For a Being, sublime in wisdom, supreme in power, who has imbued you with the delight of existing and given you immortality as your birthright, has placed before you the polestar of a glorious future lot, and, if you rightly seek to reach it, will ever be ready to prosper you in your course.

At the conclusion of the address, on the motion of Mr. Currie, seconded by Mr. Kinninmont, the lecturer was awarded a hearty vote of thanks.

Mr. Fairlie then, in the name of the association, begged that Mr. Betty would allow his address to be published. This was seconded by Mr. Frazer, and agreed to.

Mr. Currie intimated to the meeting that he had some thoughts of forming a class for apprentices and others for the study of the old Edinburgh and the present British Pharmacopœias. After some discussion it was agreed that a meeting of council should be held on an early date, when Mr. Currie's proposal should receive full consideration.

A hearty vote of thanks having been accorded to the Chairman, the meeting dissolved.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The first monthly meeting of the session 1872–3 was held on Friday, November 1st, at the rooms in the Quadrant, Birmingham; Mr. T. W. Holdsworth in the chair.

Mr. J. Bower Williams, A.P.S., read a paper entitled "Notes on Dispensing," in which he pointed out several difficulties in dispensing pills, mixtures, etc., which had come under his observation. Mr. Williams alluded to the inutility of ordering non-officinal preparations, as exemplified by the following—

℞ Morph. Mur . . . . . gr. j.
Bals. Copaib. . . . . ʒ ij.
Syr. Tolutani . . . . ℥ ss.
Decoct. Glycyrrhiz. Fort ad ℥ viij.

On the question of the right of dispensers to alter prescriptions, he instanced the following as one presenting some little difficulty—

℞ Liq. Bismuthi et Ammon. Cit. ℥ ij.
Tinct. Lupuli . . . . . . ℥ j.
M. ft. Mist. Capt. coch. mag. ij ter in die e cyath. vin. aq.

After referring to the apparent insolubility of ferri citras, and a case where potassii iodid. and a dilute acid were ordered together, he thus concludes: "We frequently hear the sneer from medical men about 'ignorant chemists' (and often, I am sorry to admit, with truth); but when we see the blunders—nay, deliberate mistakes—that even first-class physicians make through their ignorance of the chemical decompositions which occur in dispensing their prescriptions, I think they ought to reflect a little before making such charges. Let them remember that 'those who live in glass houses should not throw stones.' As an instance, I may mention that of an eminent physician, and a professor at a school of medicine, who recently prescribed,—

℞ Vin Ipecac. . . . . . ʒ ij.
Potass. Bicarb. . . . . ʒ j.
Liq. Ammon. Acet. . . . ℥ ij.
Syr. Rhœados . . . . ℥ ss.
Aq. ad . . . . . . ℥ viij. M.

I found the effect of the alkalies on the syrup was to make the mixture a villanous dingy purple colour, not at all pleasing to the eye. Now, I take the liberty of asking why syrupus rhœados need be used? Syrupus simplex would have done just as well, and not have interfered with the colour. Doubtless the physician would have said the same, but he evidently did not know, and he *ought* to. I have seen prescriptions from this same physician with magnes. sulph. and potass. bicarb. ordered together. And I can well recollect a form for a cough mixture a certain country surgeon was in the habit of using, which contained, among other ingredients, oxymel scillæ and liq. ammon. acet. Probably, too, some of the gentlemen whom I see around me occasionally meet with prescriptions containing some preparation of hyoscyamus, stramonium, or belladonna, and liq. potassæ ordered together, when we well know, and every work on materia medica will tell you the same thing, that the caustic alkalies effectually destroy the active principles of these three solanaceous plants. I have been looking through some of our prescription books, and, luckily, have come across one or two to give you as illustrations. The writer of the first is a gentleman well known for the lowness of his fee and the extent of his practice. The date is only as far back as September, 1871. Here is the precious document.

℞ Liq. Potassæ . . . . . ʒ iij.
Tinct. Hyoscyam. . . . . ʒ v.
Inf. Uvæ Ursi . . . . . ℥ vij. M.

Here is another in the same month, but with no signature to it, so I cannot tell who the writer is.

℞ Liq. Potassæ . . . . . ℥ j.
Tinct. Hyoscyam. . . . . ʒ vj.
Inf. Gent. Co. ad . . . . ℥ viij. M

Another, still, I find written by the first gentleman, and dated August, 1871.

℞ Liq. Potassæ . . . . . ℥ ss.
Tinct. Hyoscyam. . . . . ℥ ss.
Inf. Buchu . . . . . . ℥ vij. M.

And I have not the least doubt but that I could find a dozen or two more; but these are abundantly sufficient to bear out my statement. I have not written this out of envy, spite, or malice, but simply to show that it would not be very difficult to pick holes in other people's coats if we were so disposed. It is to the intelligent and educated pharmacist of the future that we must look to effectually annihilate such remarks as 'ignorant chemists,' and perhaps I may venture to hope that in that time there will be no 'ignorant medical men.'"

A long and interesting discussion ensued on the pointr raised in Mr. Williams's paper; and eventually a cordial vote of thanks was unanimously passed to him fos his paper.

Mr. Williams, in thanking the meeting for their kindness, remarked that, as the subject was almost inexhaustible, hehoped that some gentleman who was more competent than himself would favour them with a paper next month.

MANCHESTER CHEMISTS AND DRUGGISTS ASSOCIATION AND SCHOOL OF PHARMACY.

The first ordinary monthly meeting of the session was held in the class-room, 37, Blackfriars Street, on Friday, afternoon, November 1st, Mr. W. Wilkinson, vice-president, in the chair.

An interesting paper "On the Alkalies and their Tests" was read by Mr. Pidd (an Associate).

The Secretary announced that thirty-four gentlemen had entered themselves for the chemistry lectures, thirty for materia medica, and twenty-nine for botany.

BRISTOL PHARMACEUTICAL ASSOCIATION.

In addition to the systematic courses of lectures to be delivered upon chemistry, botany and materia medica, of which announcement was made in the PHARMACEUTICAL JOURNAL of October 12th, 1872, the following monthly evening meetings have been arranged—

Friday, November 15th, 1872, "Papers and Discussions."

Friday, December 13th, 1872, Lecture by Thos. Coomber, Esq., F.C.S.

Friday, January 17th, 1873, Lecture by Thos. Wills, Esq. (Royal Institution).

Friday, February, 14th, 1873, Lecture by Dr. Tilden (Professor of Chemistry at Clifton College).

Friday, March 14th, 1873, Lecture by Dr. Armstrong (Professor of Chemistry, London Institution).

Friday, April 4th, 1873, Lecture by Michael Carteighe, Esq., F.C.S.

G. F. SCHACHT, } *Hon. Secs.*
JOHN PITMAN, }

Review.

CHEMISTRY: GENERAL, MEDICAL, AND PHARMACEUTICAL: Including the Chemistry of the British Pharmacopœia. A Manual of the General Principles of the Science, and their applications to Medicine and Pharmacy. By JOHN ATTFIELD, Ph.D., F.C.S., etc. Fourth Edition. London: Van Voorst. 1872.

The fact of this work having attained its fourth edition within as many years is a sufficient proof that it is appreciated by a large class of readers. The exhaustion of the three previous editions represents a sale (as the author tells us) of upwards of ten thousand copies; it is unnecessary therefore for us to offer any analysis of the book further than to point out the changes and additions which have been made in the present edition. The most important alterations occur in the sections treating of the general principles of chemical philosophy.

These chapters have been re-written, extended, and to a considerable extent re-modelled—we may add also that they have been much improved. Nevertheless, they still remain the weakest part of the work. Professor Attfield excels as a teacher of experimental chemistry. His book is an admirable manual for the laboratory. The experiments are well conceived, and are described in clear and concise language. In the explanation of individual phenomena he leaves little to be desired. But in [dealing with the philosophical treatment of chemical science as a whole, he is not so successful. The desire to place everything in a positive manner before the student, renders him too dogmatic in those subjects which have to do with thought rather than observation. Thus the line of demarcation between a law which embodies the generalization of facts, and the theory which rationally explains the law, is not sufficiently marked.

It occurs to us that in teaching such a subject as Chemical Philosophy, the truest conception of its present condition is conveyed in tracing the gradual developments which our views have undergone through the results of successive discoveries. Is not the doctrine of quantivalence better understood when it is preceded by a knowledge of the leading facts of substitution? The researches of Dumas, Laurent and Hofmann, were most instrumental in leading us to the idea of exchangeability, and, judiciously described, would be of material assistance in conveying to the student a right comprehension of modern chemical theory. In the present work the student is taught that atoms have an exchangeable value comparable to coins; though what has brought us to that view, or the evidence upon which it rests, is not touched upon.

Whether or not the almost unreserved use of the atomic hypothesis is the wisest course to pursue, it is evident that the author has adopted it with due deliberation, for he tells us in his preface that he believes, in the present state of knowledge and education, philosophical conceptions regarding chemistry can only be taught to medical, pharmaceutical, and the great majority of general students in some such objective manner. No doubt it is simpler to teach by the aid of the imagination, but is it so beneficial to the reasoning powers? It is easier to engrave an image on the mind than to erase it afterwards.

In the definition of terms, the author is generally precise, but on page 49 we find the following:—

"The term *salt* includes any definite solid chemical substance, but more especially those which assume a crystalline form."

Now sugar, morphia, and sulphuric anhydride are definite crystalline chemical substances, but they scarcely come within the commonly accepted notion of salts.

But such oversights are so few as to be microscopical blemishes in a work of real merit—one creditable alike to the author and to the school over which he presides.

Obituary.

Notice has been received of the following deaths:—

On the 25th of October, Mr. E. Bayley, Pharmaceutical Chemist, of the Walworth Road, London. Mr. Bayley had been a member of the Pharmaceutical Society from its commencement.

On the 15th of October, Mr. John Smith, of Lydney, Gloucestershire.

The following journals have been received:—The 'British Medical Journal,' November 2; the 'Medical Times and Gazette,' November 2; the 'Lancet,' November 2; the 'Medical Press and Circular,' November 2; 'Nature,' November 2; the 'Chemical News,' November 2; 'English Mechanic,' November 2; 'Gardeners' Chronicle,' November 2; the 'Grocer,' November 2; the 'Journal of the Society of Arts,' November 2; 'Grocery News,' November 2; 'Répertoire de Pharmacie' for October; 'L'Union Pharmaceutique' for October; 'Moniteur Scientifique-Quesneville' for November; 'Journal de Pharmacie et de Chimie' for November; the 'Scientific American'; 'American Journal of Pharmacy' for October; 'Pharmacist' for October; 'Druggists' Circular' for October; 'New York Medical Journal' for October; 'American Chemist' for October; 'Michigan University Journal' for October; 'Neues Repertorium für Pharmacie' for October; the 'British Journal of Dntal Surgery' for November.

Correspondence.

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

Sunday Closing.

Sir,—My friend Mr. Slugg wishes to know what is meant by "Sunday closing." I hardly supposed that a man of his intelligence and practical common sense would have required any enlightenment on a such a question, or that one who knows what is right as well as any man, would attempt to make the subject appear ridiculous. As far as the chemists "in the neighbourhood of Broughton and Cheetham Hill" are concerned, it certainly does not mean "that not even medicine is to be supplied on Sunday," nor "that a patient should wait until Monday," nor anything so absurd; but Mr. Slugg cannot have lived 40 years (more or less) in Manchester without knowing perfectly well that there are drug shops to be found in it with the door open all, or nearly all, the Sunday through, where anything and everything from a ha'porth of hair-oil to a gallon of tar may be bought as readily as on any other day in the week, and that others who are not open the rest of the day, do so in the evening. I think he will agree with his "friends" that this is a totally different affair from the dispensing of prescriptions or the supply of medicine, and that it was a very suitable subject for discussion by a few chemists meeting in a friendly way for the discussion of pharmaceutical matters relating to their own locality. No attempt was made to dictate either to any one present at the meeting or to those outside, but the opinion of most of those persons was strongly against the practice, and the course suggested was that the shop-door should not be kept open, nor any shutters taken down, nor any other means adopted to attract customers, and that medicine only should be supplied on Sunday.

This, I am happy to inform Mr. Slugg, is the meaning of "Sunday closing," as understood by his "friends" in this neighbourhood, and I trust he will agree with them that it is by no means impracticable.

W. Wilkinson.

Cheetham Hill, November 2nd, 1872.

Sir,—It is pretty evident from the letter of Mr. T. Slugg, of Manchester, which appears in this week's Journal, that he is not much in favour of this movement.

Perhaps if he had enjoyed twenty years' Sunday liberty, after ten years' Sunday slavery, as I have, he would look more hopefully on any efforts which have a tendency to mitigate this (to a large extent) unnecessary evil.

Mr. Slugg is of course the best judge of how he is to manage his own business, and any interference between him and his friends at Cheetham Hill and Broughton would be quite out of place, but the trade generally having been addressed through you, I feel at liberty to reply to his remarks.

Well, then, as to the meaning of Sunday Closing. It means (as most seem to understand) the keeping up your shutters on that day in a similar manner to your neighbour the greengrocer or the shoemaker. But when that is done, one is certainly at liberty to make any arrangements which the demands of our own individual business may specially require. Mr. Slugg knows all this as well as any of us; and the subject is one of too much importance to be properly treated in the style of banter he adopts.

As this letter is written with the desire of being useful, and not of indulging in argument, perhaps it will be as well to give my own experience as an answer to "What is to be done?"

So far back as the year 1846, being fully satisfied that the Sunday trading as then carried on was both unjust to the employed and unnecessary as regarded the public, I commenced a steady and successful opposition against it, and from that date to the present year have had ample opportunities of proving the practicability of materially diminishing Sunday duties, even in some of the largest dispensing establishments, metropolitan and provincial, whilst in ordinary establishments it may be rendered almost *nil*.

Eighteen years back, on taking the management of a dispensing department at the West-End of London, the Sunday arrangements were for two of us to be on duty great part of the day; but through the consideration of the medical men, and a little wise arrangement on our part, the Sunday work (although still requiring some one to be in attendance) became a mere bagatelle before I had been there two years, to the manifest comfort of us all, and without loss or inconvenience to any.

Nearly twelve years since I entered upon my present business (established by my predecessor more than fifty years before), and so satisfied was I with the result of past experience, and so firm in my convictions, that I determined from the very first that the shop should be closed on the Sunday, notwithstanding that most of the neighbouring chemists took down their shutters on that day.

I had a notice placed on one of the door shutters stating the hours when medicines could be obtained. Medical men and patients seemed to see the reasonableness of such arrangement, and I do not know that in all these years there has been three complaints as to any inconvenience; whilst the comfort to myself has been so great, that although we may, perhaps, have lost the sale for some few quantities of hair-oil, cigars, vinegar, and other such like pharmaceutical articles, which would doubtless have been asked for had the shutters been down, nothing would induce me to alter our present course.

Another very satisfactory feature ought to be mentioned, which is, that although my business increases, the amount of even legitimate Sunday work has gradually decreased, and is now a mere nothing. When I came here first, the majority of the trade took their shutters down. Now, out of about forty chemists in a city of considerable importance, with about six physicians, there is not altogether three chemists who keep their shutters down, and these not dispensing establishments.

The fact is, the Sunday trade, as too generally carried on, is not done out of necessity, but for the mere sake of a little paltry gain.

The following is a copy of a label which we place on our bottles, now modified in accordance with the improved state of things in this city.

"In common with most others in the city, this establishment is closed on Sundays.

Attendance will be given for the supply of Medicines:—

Morning . . . . 9 until 10.
Afternoon . . . . 1 until 2.
Evening . . . . 5, and 8 until 10.

We all know that patients must have their necessary medicines supplied, be the call when it may; but if, instead of arranging for this, we seek to put forth the exigencies of our business as an excuse for doing a seventh-day's trade, we shall neither gain the regard of those in our employ, nor even the respect of those for whom we cater.

One who has known the Drug Trade more than Thirty Years.

Creasote and Carbolic Acid.

Sir,—Mr. Enno Sander, of St. Louis, reported to a meeting of the American Pharmaceutical Association that he had tested several specimens of creasote, and had found only one to reply to the glycerine test. This confirms my statement made at the British Pharmaceutical Conference, and published in the Pharm. Journ. of the 21st September. Since these observations were made, we have examined numerous imported specimens, and have found only one, that produced by Mr. Trommsdorff, to be the genuine creasote of Reichenbach. All the others were phenic acid, or a mixture of that acid in large proportion.

I have no doubt that creasote may be obtained by the distillation of various resins. The interesting remarks on Guaiacol made by Mr. Williams at the Brighton meeting prove, at all events, that it may be prepared from Gum Guaiacum. T. N. R. Morson.

Patent Medicine Licence.

Sir,—As a London druggist, allow me strongly to repudiate the idea put forth both by 'An old Country Pharmacist' and Mr. George Brown, of Sandown, namely, that it is for the benefit of London members that the Patent Medicine Licence should be altered. Above all things, whatever is done for the country, let the London licence remain as at present. Chemists do not seem to sufficiently look at the actual circumstances of the case. A chemist is compelled to have the licence, for not only does everybody expect him to keep patent medicines, but without it he could make no single proprietary medicine of his own, and he would soon be fined for selling something he little expected. The Act not only forbids the sale of stamped medicines without a licence, but also those chargeable with the duty, whether they are stamped or not. So it is quite a mistake to suppose an unlicensed person can tear off the stamp and sell as many or as few as he likes. I remember a case where a chemist at Sandown was fined (having imprudently allowed his licence to lapse without renewal) for selling a bottle of essence of ginger which was recommended for wind and spasms. He was fined for both offences; first, for not stamping the bottle; and, secondly, for not having a licence.

With the outsider it is mere speculation. He sees that to deal in Patent Medicines is the easiest thing in creation, and it is only a question shall he make it pay. Five shillings is such an insignificant sum, that dozens give it a successful trial who would not risk one or two pounds, and thus do the chemist far more harm than the extra cost of the licence would. The idea of their selling more of Dinneford's, Condy's, or Goddard's, because they do not keep the stamped articles, seems to me purely imaginary. Fancy a customer who came for Holloway's Pills being persuaded to try Condy's Fluid, or one for Clark's Blood Mixture being recommended Goddard's Plate Powder. I certainly hold an opposite opinion. I believe the man who keeps the whole round of patent and proprietary medicines will do more in each particular one than a tradesman who keeps but a few special articles. The public do not readily understand the difference between stamped and unstamped, and I think a customer is more likely to go where he is certain of getting all he wants, than to a place where he has been told before to come only for unstamped preparations.

I would suggest £2 for London, and £1 for the country, as many of our country friends are so timorous.

Wm. G. Taplin.

75, Hampstead Road, London, N.W., Nov. 5th, 1872.

The Supply of Assistants.

Sir,—Mr. J. M. Fairlie is, perhaps, correct when he says "assistants of the right sort are not to be had," but I think the reasons he gives for their scarcity are entirely wrong. Does he think that assistants well-up in their business can be had for salaries of £50 per annum (out-door), salaries only too common in Glasgow?

There is no doubt but that the underpaid assistants in Scotland must feel the Examination Fees press upon them rather hardly; but of all I have met with (and I have met not a few) I have never heard one complain of the fees being excessive. It surely cannot be a fee of three guineas which is driving some to sacrifice both time and money to gain the higher profession of physician, as Mr. Fairlie points out. The cry for reduction of fees seems to me, Sir, to come entirely from the wrong quarter. The fact of assistants becoming scarce, which I am very glad to learn, seems to point to a better future for

An Underpaid Assistant.

Specimen of Commercial Morality.

Sir,—Will you permit us through your columns to make public a very pretty specimen of commercial morality?

We have just been weighing over two cases of sponge, with the following result:—

No. 1.

	Invoice Weights.	*Real Weights.*
Gross	98 lb.	97 lb.
Tare	16 lb.	$18\frac{3}{4}$ lb.
Allowance for sand	16 lb.	57 lb. (!!)
Net weight of sponge	65 lb.	20 lb. 13 oz. (!!)

No. 2.

	Invoice Weights.	*Real Weights.*
Gross	128 lb.	$85\frac{1}{2}$ lb.
Tare	20 lb.	20 lb.
Allowance for sand	27 lb.	$45\frac{1}{2}$ lb. (!!)
Net weight of sponge	80 lb.	20 lb. (!!)

In No. 1 there is the enormous deficiency of 45lb. in a weight of 65 lb.; in No. 2 a deficiency of 60 lb. in 80 lb., and yet the parties from whom we purchased them say, in reply to our letter stating the deficiency, that it "is not at all bad; some cases realize less"! Can you or any of your readers give us any information on this point? Is it a fact that 57 lb. of sand in a case the total net weight of which is only 78¼ lb. "is not at all bad"? And if yes, would some kindly disposed sponge merchant say what *would* be considered "at all bad."

Would, for instance, an additional 20 lb. to the 57 lb. be considered so?

We are aware that sponge naturally contains a considerable amount of sand, but for this we have made allowance; we should imagine that the real net weight of sponge in either case would not exceed 12 lb., as we have not by any means got all the sand out, we have simply given them a slight shaking. To illustrate this take the following fact:—As soon as the cases were opened, a piece of sponge from each was selected at random and carried carefully to the scales (but not without loss, as every pore of the sponge was full of sand). The piece from No. 1 case weighed 12 oz., and when well shaken 2½ oz. The piece from No. 2 weighed 33 oz., and when well shaken 5½ oz.!

It seems to us utterly impossible that all this sand should have got into the cases honestly; simply lifting a piece up (without shaking) immediately reduced its weight at least one-half, and at the bottom of No. 1 case there was a mass of it weighing, we should say, about 30 lb.; No. 2 case had apparently "sprung a leak" in transit and shed about 42 lb. of its principal contents—sand.

We have never done much in the sponge trade (and if the above cases are "not at all bad" don't intend), and we should like to know what is the custom of the trade in the matter.

B. Newham and Co.

Milk of Sulphur and Precipitated Sulphur, B.P.

Sir,—At an evening meeting of the Pharmaceutical Society, January 6th, 1869, a paper was read by Prof. Attfield "On the Adulteration of Precipitated Sulphur." (*Vide* Pharm. Journ., vol. X. page 472.) The Professor stated that of eight samples, one only represented a pure preparation. Granting this; the London Pharmacopœia, 1721, gives a form for precipitated sulphur, in which the result is sulphate of lime and sulphur. Now, I want to know if we are liable for selling a preparation made according to an old Pharmacopœia, provided we do not use it in dispensing prescriptions. I see clearly by the Pharmacy Act, 1868, that by using other than B.P. preparations, we are liable in dispensing recent prescriptions; but I do not see that it applies to a retail preparation as lac. sulph. made in accordance with the old London Pharmacopœia. Consequently, if we are asked for milk of sulphur I cannot see how we are expected to give precipitated sulphur, B.P.

Dr. Redwood clearly pointed out that, in his opinion, the two were distinct preparations; and if milk of sulphur were asked for, the public would not be satisfied with the precipitated sulphur, B.P.

I think as the Act to prevent the adulteration of articles of food, drink and drugs has now come into force, we should clearly understand how to proceed, as I was informed yesterday by two well-known wholesale druggists that they had decided not to send out the old lac sulphuris. I shall feel obliged by your inserting this, that we may have the opinion of the members of the profession.

W. N. G. Lance.

207, *Copenhagen Street,*
Islington.

A Dispensing Difficulty.

Sir,—If Mr. T. A. Jeffrey will refer to the Journal for October, 1869, he will find it stated that the best excipient for creasote pills is Cera Flav. in proportion of a gr. j. to ♏ j. The recipe which he gives a copy of, with ℈ j. Cera Flav. makes excellent pills which are not large. W. D. S.

The Examination.—A Suggestion.

Sir,—I was much struck with a remark made by one of my assistants on reading the list of successful "Minors" in your issue of October 26th. Noticing the array of those gentlemen who had passed in "honours," he said, "I should think that nearly all those men who passed in 'honours' have studied at the 'Square.'" Now, the thought occurred to me, sir, that an arrangement might be come to, whereby a student on entering his name as a candidate for examination, should at the same time furnish our worthy Secretary with the means he has had at his disposal for qualifying himself, the same information to be put into the Journal in an abreviated form at the end of the successful student's name. I think it would be a useful addition to the list, and would at the same time furnish the anxious hard-working provincial candidate with a small ray of light as to what chance he may have when placed before his examiners.

D. B. Sharp.

Toward Road, Boro' Road, Sunderland.

Pharmaceutical Education.

Sir,—In the Journal of October 19, I observed a letter on the above subject written by Mr. George Mee. I am glad he has made a step towards assisting those poor unfortunates who were apprentices in the trade at the passing of the Act, and were not allowed to have their names placed on the Register "as assistants in business," on account of not having attained the age of 21 years. A great number of those are young men who have little money to throw away for studying the subjects which they are required to know before presenting themselves at the examination table. I think they ought to be allowed some privilege, and only be subject to such a test of their practical abilities as the above-named gentleman has mentioned.

If a memorial were presented to the Council of the Society, praying for such an examination, I have not the slightest doubt but that Mr. Mee would assist in forming one of a deputation who would present such a petition.

I hope the assistants in each town who are so situated will work and get a petition signed by their employers, and themselves.

October 24th, 1872. An Assistant.

X.—You will find a notice of croton chloral in the second volume of the present series of this Journal, p. 424. There is also a brief description of its chemical characteristics in the Journal of the Chemical Society [2] ix. 557.

F. W. Wheeler.—Your specimen is part of the spadix of a palm, possibly a species of *Areca*, or at least near to that genus; but it would be necessary to be informed from whence it has been obtained before giving a more definite answer.

"*Brocklesby.*"—(1) "Associates in Business" enjoy the same advantages and privileges as "members of the Society," except the right of holding office. (2) No person can become a "member" unless he is a pharmaceutical chemist, or was in business as a chemist and druggist at the time of the passing of the Pharmacy Act, 1868.

David Peters.—At present no prohibition of such competition exists, but we believe the subject is under the consideration of the Council.

"*Pharmaceutial Chemist.*"—Sowerby's 'Useful Plants of Great Britain.'

A. P. S.—We are not aware of any limitation as to age, but recommend you to apply at the office of the Poor-Law Board.

"*An Inquirer.*"—(1) Wanklyn's 'Water Analysis,' (Trübner), and Sutton's 'Volumetric Analysis' (Churchill). (2) 'How Crops Grow' (Macmillan).

"*Compositæ.*"—(1) In forwarding plants to be named, it is necessary that good specimens be sent. (2) Babington's 'Manual of British Botany,' or Hooker's 'Student's Flora of Great Britain.'

M. P. Davies.—We have received the samples of your congealed glycerine and alkaline and chalybeate salts, but are unable to notice them as you wish in the Journal. Possibly any pharmaceutical novelty or improvement there may be in these preparations might form the subject of a paper at an evening meeting.

G. L.—See the New Regulations respecting Naval Dispensers on p. 364 of the present Number of the Journal.

Mr. Harvie is thanked for his communication, which shall receive attention.

"*Alpha*" is referred to the regulations respecting anonymous communications.

Communications, Letters, etc., have been received from Mr. Simmonds, Mr. Ekin, Mr. Rimmington, Mr. Whitfield, "Apprentice," "Country M. P. S.," "A Young Major," "Kino," "Disappointed," "An Assistant," W. B.

THE PRESENCE OF SILVER IN COMMERCIAL SUBNITRATE OF BISMUTH.

BY CHARLES EKIN, F.C.S.

In the June number, 1868, of the PHARMACEUTICAL JOURNAL will be found a short paper of mine on "Commercial Bismuth," in which I pointed out that, whilst the tests given in the Pharmacopœia for bismuthum purificatum excluded copper, and the process for purifying it eliminated arsenic and antimony, no notice was taken of the probable presence of silver, notwithstanding that it was known that commercial bismuth frequently contained silver.

My attention was again called to the matter by receiving the other day from a well-known and highly respectable firm of manufacturing chemists a sample of subnitrate of bismuth, containing so much silver that when exposed to the light it became of a deep bluish-black tint. I obtained a sample from another firm of at least equal standing as manufacturing chemists, and to my surprise I found that even this too contained a very appreciable amount of silver. Upon this I decided to investigate the matter further, and obtained samples from four of the first dispensing houses in London, and from respectable houses in the country, for examination.

Each sample was dissolved in nitric acid, diluted with an equal volume of water, the insoluble residue, if any, was collected on a filter, well washed first with diluted nitric acid, and afterwards with water, and then treated on the filter with ammonia. The presence of silver was considered sufficiently proved by the residue on the filter being blackened by exposure to light, by its being soluble in ammonia, and giving in its ammoniacal solution a light lemon-coloured precipitate, with iodide of potassium. The chloride was precipitated from the nitric acid solution and weighed as chloride of silver in the usual way. In no case did diluted sulphuric acid give any precipitate, thus showing the absence of lead.

Sample 1. The one first mentioned above. A very short exposure to light blackened it. Was not examined further, as the manufacturers acknowledged the contamination by silver.

2. The second sample mentioned above contained much less silver than sample 1, but sufficient to give a distinct bluish tint when exposed to light for two or three days.

3. Not a subnitrate at all, but a basic subchloride, containing chlorine equal to 90 per cent. of BiOCl; not completely soluble in nitric acid, and contained silver.

4. Contained silver and 3·9 per cent. of subchloride.

5. Contained traces of subchloride, but no silver.

6. Traces both of subchloride and silver.

7. Neither silver nor subchloride,

8. Contained silver and 4·9 per cent. subchloride.

9. Neither silver nor subchloride.

10. Silver and traces of subchloride.

11. Neither silver nor subchloride.

12. No silver, but 6·5 per cent. subchloride.

13. No silver; traces of subchloride.

14. No silver, about one per cent. subchloride.

15. Neither silver nor subchloride.

The samples showed great diversity in density and appearance. Sample No. 1 was a damp powder, having a strongly acid smell and reaction. I am assured by manufacturers that subnitrate prepared strictly according to the Pharmacopœia, after having been kept for about two months, developes so much acid as actually to effervesce with carbonates. After rewashing, however, it becomes more basic and more stable.

In sample No. 3, obtained from a London dispensing house, the substitution by the manufacturer of a subchloride for a subnitrate is of course unpardonable. I have understood that, owing to its being prepared at a less cost, there is a great deal of subchloride sold as subnitrate, but this is the first sample I have ever met with.

The subchloride in the other samples, although in one instance it amounts to as much as 6·5 per cent., I consider to be rather the result of careless manufacture than an adulteration. It would appear that after the bismuth is dissolved, the silver, which, as we have seen, must be frequently present, is precipitated as chloride by hydrochloric acid, and removed by decantation. If this is done carefully, there could be no objection to such a process, but that it is not generally done carefully is sufficiently proved by the presence of varying quantities of subchloride and, in seven samples out of fifteen, of chloride of silver. Samples 7, 9, and 11, which are very pure, I find, on inquiry, were manufactured by Howards and Sons, Stratford.

TINCTURE AND SYRUP OF ORANGE-PEEL AND TINCTURE OF QUININE.

BY CHARLES SYMES, PH.D.

The preparation of tincture of orange from fresh peel is a matter which has engaged my attention more or less during the last twelve years, and some few remarks on the observations I have made from time to time might not be out of place; especially as very vague conclusions appear to have been arrived at on this subject at the last Pharmaceutical meeting, after a description of some (to my mind) unsatisfactory experiments by the President.

On March 8th, 1868, I brought the subject before the members of the Liverpool Chemists' Association, exhibiting a sample of the preparation in question, and advocating its general adoption (*vide* PHARMACEUTICAL JOURNAL, 2nd series, vol. IX., p. 522), but it received comparatively little attention, and it was overruled by Mr. Shaw (in the chair) that the inconvenience of being unable to obtain fresh peel at all seasons of the year was sufficient to justify the continuance of the process according to the B.P.

Tincture of orange is essentially a flavouring agent, possessing slight stomachic properties; nevertheless, it is the most important of its class, largely prescribed, and therefore meriting attention. In drying the peel, however carefully this is performed, a large percentage of the aroma is lost, which, if retained, makes a tincture of *unquestionably superior flavour*; such being the case, any difficulty in procuring the fruit at some seasons is quite secondary. How easy would it not be to make many of the tedious pharmacopœia preparations if we could rest satisfied with inferior results? When this tincture has been kept twelve months the flavour is not quite so fine as when freshly prepared, but even then its superiority to tincture from the dry peel is evident.

Six ounces of peel, cut thinly from the fruit, weigh two ounces when dry; it will be evident then that this quantity will be required to make one pint of tincture, and that four ounces of water must be omitted in making the proof spirit. Although rectified spirit might be the best solvent of the volatile oil, etc., in the peel, there is an objection to its use, as it tends to *harden* the peel, rendering it more crisp and less permeable. In the winter I usually make sufficient to carry me safely through the summer, when the fruit is difficult to procure, but taking the quantity of the pharmacopœia for example I proceed thus:—Six ounces of thin fresh peel, cut small, are macerated 48 hours with four ounces of distilled water; 12 ounces of rectified spirit are then added, and the maceration continued with occasional agitation for one month; filtered, pressed, and the product made to measure one pint with proof spirit. Set aside in a moderately cool place for use.

Tincture of Quinine, prepared from the foregoing tincture in the summer, deposits in the winter —so it frequently does when prepared with the B.P. tincture,—presuming, of course, that pure quinine be used (not the unbleached, which frequently, if not always, contains cinchonine). Now, to prepare, say two pints, tincture suitable for comp. tincture of quinine, I proceed thus:—Take six ounces fresh peel, two ounces dry peel (in fine shreds, known as machine cuttings), add four ounces water, and after 48 hours, 32 ounces *rectified spirit*; allow to stand as before, but, after pressing, make up the deficiency with *rectified* instead of proof spirit. Thus a tincture is obtained of fine flavour, and capable of retaining the quinine in solution. Here it might be objected that I am introducing a third strength of spirit, and with it complication. This is to some extent true, and I should be the last to do so if no practical results were to be gained, but it must have occurred to many persons as being somewhat inconsistent that in the B.P. we should have but two strengths of spirit (and these more or less arbitrary) as being best capable of dissolving and preserving the active principles of the whole materia medica.

Syrup of Orange Peel.—Most of what I have written with regard to the tincture from fresh peel will apply to the syrup made from that tincture, but with this exception, it does not lose anything of its fine aroma by age. Sugar appears to possess a preservative influence, and this suggests an experiment worth trying when Seville oranges are again in season, viz.:—Take the six ounces of fresh peel and beat well with an ounce or two of sugar, before adding the water and spirit, for producing the tincture; will it retain its fresh flavour quite unchanged?

THE MICROSCOPE IN PHARMACY.

BY HENRY POCKLINGTON.

(*Continued from p.* 341.)

Jamaica Sarsaparilla.—The following structures enter into the composition of this root, and will be treated separately:—The rind, or bark, the cortical substance, single circle of dark-coloured cells enveloping the meditullium, the vascular system, and the central cellular substance which sometimes contains isolated vessels in the case of the root of *Smilax officinalis,* and in some species frequently does so.

1. The outer bark, or rind, consists of three or four layers of oblong cells, frequently much thickened, and reddish brown in colour. The outer layer is sometimes furnished with cylindrical multi-cellular hairs. The cells of this layer are much compressed.

2. The cortical substance is composed of short cylindrical cells, which contain a variable quantity of starch. The proportion of starch is an important element to be taken into consideration when deciding upon the nature of a specimen under examination, as the officinal root contains a much less proportion of starch in the cortical layers than most other kinds. The cells of the cortical layer are thin-walled, porous, and, excepting near the rind, of very regular size.

3. The vessels surrounding the central wood cylinder are long tubular cells with thickened walls, and are not easily distinguished in longitudinal sections, but are readily recognized in cross sections.

4. The vascular system is usually said to be arranged in wedges. Some describe the vessels as being arranged in alternating circles. Neither are very evidently true. From five to seven large pitted (oval pits) vessels are arranged, the largest vessel towards the centre, and the smallest near the single circle last mentioned, in what may be considered wedges; and between the thin ends of each two of these wedges a third wedge of smaller vessels, or more frequently an oval structure composed of oblong porous cells. A cylindrical vessel, enveloped by several layers of liber cells, sometimes is placed at the base of these wedges, and occasionally in the officinal root, very frequently in some others, similar vessels are found in the central portion. Three classes of structure appear to enter into the structure of these vessels as in those of the stem. The vessels proper are interesting objects, the pitting on some is scalariform, on others punctate. The accompanying structures are also pitted or porous.

5. The cells of the central portion resemble those of the cortical substance, excepting where modified by the proximity of the vessels.

The cell contents, in addition to the colouring matter, are acicular raphides and starch granules. The latter are compound granules, and composed of from two to six without central cavity, but with a punctate, or radiate hilum, which is generally indistinct. Schleiden claims to have found amorphous starch in the bark of this root, but his observations have not been, so far as I know, confirmed. Very minute granules are found here as elsewhere, and appear amorphous under a low power; more than this I have not seen.

It will not be necessary to go into the structural details of the other roots, as they all present the same general features, and several of them are evidently either specifically identical or very closely allied to the officinal root. Amongst these are "Lima,*" "Valparaiso," and "Vera Cruz," which do not differ, excepting in the quantity of starch in the cortical substance.

Honduras Sarsaparilla.—The first distinguishing feature is the much greater proportion of starch in the cortical substance. The number of vessels in the wedges of the meditullium usually ranges from two to four, only the liber is more developed, and two

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* *Smilax* (*species incerta*), named only after the supposed habitat or place of export. My thanks are due to Mr. J. Collins for these and other species not commonly met with.

contiguous wedges frequently unite at the base, and form a "loop" of vessels. These characters vary in different samples of Honduras—very probably diverse species are imported under this name—in none of them, however, are the vessels so distinctly "radiate," or the "double wedge" arrangement so well seen.

Mexican Sarsaparilla.—The cortical substance does not contain so much starch as either of the foregoing; its cells are not so large, it is more spongy, and not so regular in size. The vessels of the vascular system are much smaller, are arranged in series of two to six, and are not in wedges, or rarely so, and very frequently the central portion is nearly completely occupied by separate cylindrical vessels. The vessels are smaller, not so broadly pitted, and the cells generally are less porous.

Guatemala Sarsaparilla (doubtfully *S. papyracea.*) The rind of this sarsaparilla consists of four to six layers of ligneous cells, of which the outer contains a great quantity of colouring matter, more distinctly red than in other sarsaparilla. These cells are much thickened. The cortical substance is well developed and very full of starch. Its cells are large and regular as in the officinal root. The vascular system somewhat resembles that of Honduras sarsaparilla, the vessels are large, and in series of two to four. Separate vessels are found near the "wedges" here more like notes of admiration (!), but are not generally found in the central portion.

Caraccas.—Chiefly characteristic by the concentric arrangement of the vessels, which are here less separated by liber tissue than in other varieties, and are so close together as to form almost a circle, as in some exogens. Separate vessels in the central portion.

Want of space prevents reference to certain other roots, most of which, however, are to be referred to one or other of those already described. The points to be specially noted are the size and shape of the cells of the rind, and the number of layers. This is not a constant by any means, but is of value in connection with the others following. The size and texture of the cortical substance, and the proportion of starch it contains are of importance, and with the size, form, and general character of the wedges, or rays, of the vascular system, are the principal features to be considered. But it must be confessed that, as regards sarsaparilla, the microscope is only an adjunct to the ordinary naked-eye method of distinguishing the officinal root, equally valuable, but equally dependent upon an educated and practised eye.

The only other root of the Pharmacopœia which remains is that of Sumbul, which I am obliged to reserve for the present from want of opportunity to examine a sufficient number of specimens. In my next article I shall begin the barks and pass on to the woods.

ODOURS.*

BY M. FERNAND PAPILLON.

(*Concluded from p.* 346.)

Each of the three kingdoms of nature contains odorous substances. Amongst minerals are found a few solids and several liquids and gases which are endowed with more or less strong, generally rather disagreeable, but characteristic odours. These are elementary bodies, such as chlorine, bromine, iodine, etc.; acids, such as hydrochloric acid and hydrocyanic acid; carbides of hydrogen, such as petroleum; and alkaline substances, as ammonia, etc. The odours that are manifest in animals may nearly all be attributed either to gaseous compounds of hydrogen and carbon, or hydrogen and sulphur, to various solid and liquid acids arising from the decomposition of fats, or to special principles secreted by the glands, such as musk, ambergris, civet, etc. Plants present a great variety of odours; absolutely inodorous plants are very rare, and many that when fresh appear to be so, manifest when dried a perceptible perfume.

The odours of plants are due to principles very unequally distributed in the various organs; some are solid, as balsams and resins; others are liquid, and are called essences or essential oils. In the majority of cases the essence concentres in the flower, as is seen in the rose and violet; in other plants, such as the vetiver (*Anatherum muricatum*) and orris (*Iris Florentina*), the root alone is perfumed. In the cedar and santal it is the wood, in mint and patchouli it is the leaf, in the Tonquin bean it is the seed, and in canella it is the bark which are the seats of the odorous principles. In the orange the leaves yield the essence known under the name of "petit-grain," the flowers furnish the "neroli," and from the rind of the fruit is obtained the "essence de Portugal." A great number of vegetable odours are obtained from tropical plants, but the European flora furnishes a large proportion, and nearly all the essences employed in perfumery are of European origin. In England are cultivated lavender and peppermint; at Nismes the cultivators pay particular attention to rosemary, thyme and lavender; Nice has the specialty of the violet; Cannes extracts the essences of rose, tuberose, cassia (*Acacia Farnesiana*), jasmin and neroli;* Sicily gives the citron and orange; Italy the iris and bergamot.

Modern chemistry has allotted nearly all vegetable odours to three categories, namely, hydrocarbons, aldehydes, and ethers. Apart from a small number among them which contain sulphur,—as the essences of the family Cruciferæ,—they all present the same qualitative composition, carbon and hydrogen, with or without oxygen. The proportions of these three constituents change, but always in regular gradations, as hydrocarbides, aldehydes and ethers. Here, as in all organic chemistry, everything depends upon the proportions of the constituent principles; the qualitative constitution imports so little, that a variation in the proportional weights of these constituents gives rise to an infinite variety of distinct compounds which have not the slightest resemblance to one another.

But the wonderful properties of the elements, and the mysterious energies with which matter is endowed, are apparent in the still more remarkable phenomenon, known under the name of isomerism. Two bodies, completely dissimilar in their properties, may present absolutely the same ultimate composition, both qualitatively and quantitatively. But, it may be asked, in what do they differ? They differ in the arrangement of their molecules. Charcoal and the diamond are identical as to their matter; ordinary phosphorus and amorphous phosphorus are one and the same substance. Now, the odoriferous principles of plants supply some extremely curious examples of isomerism. Thus, the essences of turpentine, citron, bergamot, neroli, juniper, savin, lavender, cubebs, peppermint and cloves are isomeric bodies; that is to say, all have the same chemical composition. Submitted to analysis, all these

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* Abstracted from a memoir, entitled 'Les Odeurs d'après les Découvertes Récentes de la Chimie et de la Physiologie' (Moniteur Scientifique-Quesneville, xiv. 296 et seq.).

* Grasse and Cannes, which are the principal centres for the manufacture of essences in France, produce 150,000 kilograms of perfumed pomades and oils per annum, and nearly 7000 kilograms of pure essence of neroli, petit-grain, lavender, rosemary and thyme, a quantity that represents a prodigous number of flowers. The orange-flower water is reckonied by millions of litres.

products yield identical bodies in identical proportions; namely, for each molecule of essence, ten atoms of carbon and sixteen atoms of hydrogen. This is indicated by their common formula $C_{10} H_{16}$. These facts concerning isomerism prove that the qualities of the bodies depend much more upon the internal arrangement and deportment of their smallest parts, inaccessible to our investigations, than even upon the nature of their matter, and show how far we yet are from having penetrated into the first conditions of the activity and energy of matter.

Among the odoriferous essences which are ranged by chemists in the class of aldehydes, may be mentioned mint, rue, bitter almonds, cummin, anise, fennel, canella, and meadow-sweet. Finally, others are placed in the series of ethers, which are very varied and complex, notwithstanding the constant simplicity of their primary elements.

Such is the chemical nature of the greater part of the odorous principles of vegetable origin. But chemistry has not been limited to establishing the internal constitution of these substances; it has been able to reproduce artificially a certain number of them, and the compounds so fabricated in the laboratory, are in every respect absolutely identical with the products extracted from the plant. The theoretical speculations on the arrangement of atoms, which are sometimes alleged to be useless, contribute not only to make natural laws better known, but they also frequently, as is shown in the present example, give the key to unlock brilliant and valuable inventions. An Italian chemist, Piria, while working in Paris, in 1838, was the first to reproduce a natural aromatic principle. He prepared, by means of reagents indicated by theory, a salicylic aldehyde, which he found to be essence of meadow-sweet (*Spiræa ulmaria*). Some years afterwards, in 1843, M. Cahours discovered methylsalicylic ether, and showed that it was identical with the essence of wintergreen (*Gaultheria procumbens*). The following year Wertheim obtained the essence of mustard in preparing allylsulphocyanic ether. These discoveries made a great sensation. At the present day chemists possess the means of preparing many other natural essences. Ordinary camphor, and the essences of bitter almonds, cummin, and canella, which we have seen to be aldehydes, are prepared without the camphor-tree, almonds, cummin, or canella.

Besides these ethers and aldehydes, of which the identity with the essences of vegetable origin has been demonstrated, there exists among the new compounds of organic chemistry, a certain number of products formed by the union of ordinary alcohol or amylic alcohol with various acids,—that is to say, ethers which possess aromatic odours more or less analogous to those of some fruits; but at present we are unable to say that these odours are due to the same principles. However this may be, the perfumers and the confectioners, more energetic and better advised than the chemists, immediately availed themselves of them. Artificial aromatic oils appeared for the first time at the exhibition in London, in 1851. There was to be seen a "pear oil," exhaling an agreeable odour of Jargonelle pear, and useful in the aromatization of bonbons, which was only a solution of amyl-acetic ether in alcohol. By its side was "apple oil," having the perfume of the best pippins, obtained by dissolving amyl-valeric ether in alcohol. The most abundant essence was that of "pine apple," which was nothing but ordinary butyric ether. There was also "essence of cognac," or "grape oil," employed for giving to brandy of inferior quality the choice aroma of cognac. But the product which was then, as now, the most important article of manufacture, was the "essence of mirbane," the odour of which corresponds entirely with that of essence of bitter almonds, and which in commerce is frequently substituted for the latter. The essence of mirbane is identical with nitrobenzol, produced by the reaction of nitric acid upon benzol. Benzol, in its turn, has a common origin with the aniline colours as one of the products of the distillation of tar.

Besides the essences above noticed, of which the manufacture is still growing in importance, there are also prepared artificially essences of quince, strawberry, rum, etc. All these preparations, it may be mentioned, are used in the aromatization of various confectionery, liqueurs, and preserves, the products of industry replacing those of Nature. In every case the synthesis of the odoriferous principles ranks among the most beautiful triumphs of organic chemistry.

Linnæus, whose mind was eminently analytical and methodical, not only ranged animals and vegetables in orders, but also classified diseases, and even odours. He divided the latter into seven classes: aromatic odours, as those of laurel leaves; fragrant odours, as those of the lily and jasmin; ambrosial odours, as those of ambergris and musk; alliaceous odours, as that of garlic; fetid odours, as those of the goat or the stinking goose-foot; repulsive odours, as those of many Solanaceæ; and, finally, nauseous odours. The denominations of Linnæus have generally prevailed in language, but they have only a conventional value. There is no standard for the comparison of odours; they can only be arranged according to the degrees of analogy that exist between the impressions they make upon the olfactory nerve. They have no characters that can be rigorously defined, and therefore it is impossible to give them a natural classification.

The sensations produced by odours are appreciated in very variable degrees, although with less diversity than those of tastes. Montaigne says that he has seen those who feared the scent of apples more than arquebusades. History records that Louis XIV. could not endure perfumes. Grétry was distressed by the scent of roses, and the smell of a hare caused Mdlle. Contat to faint. Odours which to us are repugnant, as those of asafœtida and valerian root, are, on the contrary, the delight of Orientals, who employ those substances as condiments. M. Cloquet mentions a young girl who found great pleasure in the smell of old books, and a lawyer upon whom the exhalations of a dunghill produced the most agreeable sensations. Therefore, it is not possible to establish general rules concerning the influence of odours upon our organs, and the quality of sensations which they cause in us. Nevertheless, it is certain that in a physiological point of view there are some which exercise a constant action. Chardin, and other travellers, say that when the pouch containing the musk is removed from the animal, the operator is compelled to cover the mouth and nose with linen bandages, many folds thick, to avoid violent hæmorrhage.

Certain substances which, in a state of considerable diffusion, have an agreeable perfume, exhale, when in a concentrated state, a repugnant and, sometimes, dangerous odour. This is true, especially of patchouli, civet, and the essences of neroli and thyme. The odours of the lily, daffodil, violet, rose, elder, etc., when they attain a certain degree of concentration, exercise, ordinarily, an injurious effect upon the system, by causing more or less violent headache, syncope, or even worse. The annals of science mention several cases of death due to the toxic action of certain odorous emanations. Labiate plants, as sage and rosemary, on the contrary, appear to be endowed rather with salutary properties. It is important, however, to distinguish between the, in some sort, purely dynamic action of the odour, intoxication by the essence, and the effect of carbonic acid given off by the plants. These three causes have been confounded by authors who have recorded cases of death occurring after more or less prolonged inhalation of fragrant air.

This variable action, sometimes salutary, sometimes hurtful, of odours upon the nervous system explains the part they have always played in the history of nations.

For there is certainly something instinctive in the universal and continual liking of mankind for perfumes. Without doubt this is rather a sensual refinement than a natural desire. But the same thing has happened with perfumes as with drinks and music,—habit has become second nature; the senses have acquired a taste for this particular intoxication, which charms them, and hides painful realities.

It is in religion that we recognize the earliest employment of perfumes. Nothing noble or sacred could be imagined without the intervention of their influence. Perfumes were held to dispose the gods to listen to the vows addressed to them in the temples where incense burned and spread its balmy vapours. From the highest antiquity the priests of various religions had recourse to the employment of odoriferous substances. Five times daily the disciples of Zoroaster placed odours before the altar where burned the sacred fire. Moses, in the Book of Exodus, gives the composition of two liturgical perfumes. The Greeks gave to perfumes a high place in their ingenious mythological fictions; they believed that the gods always announced their presence by an ambrosial odour. Thus Virgil, in speaking of Venus,—

> "Avertens rosea cervice refulsit,
> Ambrosiæque comæ divinum vertice odorem
> Spiravere."

The employment of perfumes in religious ceremonies doubtless, had for its object to provoke a kind of intoxication in the priests and priestesses, and to mask the smell of the blood and putrid matters resulting from the sacrifices. The Christian religion borrowed from Paganism the use of perfumes in religious ceremonies. There was even a time when the Church of Rome possessed territory in the East devoted exclusively to plantations of trees yielding balsamic resins.

Besides these public uses in ancient times, perfumes were frequently employed in private life. In reading ancient history few things are more astonishing than what appertains to this subject. Amongst the Jews the use of perfumes was confined within proper limits by the prescriptions of the Mosaic law, being reserved for religious worship. But with the Greeks it attained an excessive extension and refinement. They deposited their clothes in scented coffers; they burnt aromatics during their meals; perfumed their wines, and covered the head with perfumes at a banquet. At Athens the perfumers had shops which were used as places of assembly. Appolonius, a disciple of Herophilus, has left a treatise on perfumes, which proves that even in regard to the extraction of essences, the Greeks had arrived at a surprising perfection. Neither the prohibitions of Solon nor the anathemas of Socrates could arrest the spread of this passion. The Romans inherited it from the Greeks, and added to the perfumes of the East those of Italy and Gaul. They used them with profusion to scent their baths and chambers, beds and beverages, and scattered them upon the heads of their guests. The awning that covered the amphitheatre was steeped in perfumed water, which fell, as a gentle rain, upon the heads of the public. Even the Roman eagles were, before a battle, covered with the finest essences. At the funeral of his wife, Poppæa, Nero burnt upon the pyre more incense than Arabia produced in a whole year. It is said, also, that one at least, who had been proscribed by the Triumvirs, was betrayed by the odours that he carried and was so discovered to the soldiers sent to seek him. Besides the perfumes extracted from mint, marjoram and violet, which were the most common, the ancients frequently used the rose and various aromatics, such as spikenard, cinnamon, balm of Gilead, etc.

It is curious to notice that the use of perfumes, brought to Rome with the customs of the Greeks, was in its turn introduced with the Latin customs into France and the north of Europe, and chiefly by the Roman religion. In fact it passed from religious ceremonies into political ceremonies, and thence into private life. Among the presents that Haroun-al-Raschid sent to Charlemagne were large quantities of perfumes. In the middle ages, monarchs and the great barons washed their hands before and after a repast in rose water; some even indulged in gushing fountains of aromatic waters. At that time too it was customary to carry the dead to the place of sepulture with the face uncovered, and place in the coffins burning perfumes. The French monarchy constantly showed an unbridled liking for these luxuries. Marshal Richelieu used perfumes in such excess that he was no longer sensible to them, and habitually lived in an atmosphere so loaded with them as to cause indisposition to people who visited him. Madame Tallien, upon coming out from a bath of strawberries and raspberries, used to cause herself to be gently rubbed with sponges dipped in perfumed milk. Finally, Napoleon every morning poured eau de cologne upon his head and shoulders.

CONNECTION BETWEEN CHEMICAL PROPERTIES AND PHYSIOLOGICAL ACTION.*

BY THOMAS R. FRASER, M.D., F.R.S.E., F.R.C.P.E.

Among the numerous elementary substances or chemical compounds the action of which has been investigated it is difficult, if not impossible, to find two that possess exactly the same physiological action. Now, as one elementary substance is distinguished from every other elementary substance, and one compound substance is likewise distinguished from all other compound substances, by the possession of certain special chemical properties, it is obviously suggested that a relationship exists between the chemical properties and the physiological action of active substances. No doubt analogies, of a close and striking description, occur between the physiological actions of different substances; but these analogies tend to bring more distinctly into view the relationship referred to, by showing that similar physiological effects are often produced by substances which resemble each other in many of their chemical properties. For instance, the various salts of potash in a remarkable manner paralyse the heart's action, those of ammonia accelerate the circulation and produce spasms and general convulsions; and, indeed, the general truth of the proposition, enunciated by Dr. Blake in 1839—to which, however there are several exceptions—that the salts of the same base have analogous actions, is now universally recognized. To the industry of this observer we are indebted also for another general proposition of great interest which bears upon this relationship. Several chemical substances possess the property of crystallizing in the same form, and of replacing each other in crystalline compounds without alteration of the characteristic geometrical figure; in other words, they possess the property of isomorphism. The physiological action of a large number of inorganic substances belonging to different isomorphic groups has been examined by Dr. Blake. The symptoms that were observed have led him to believe that, with a few exceptions, a striking analogy exists between the isomorphic relations and the physiological action of the substances examined, an analogy to which he has given expression by the statement that "isomorphic substances produce similar effects."

Not only is there evidence to show that substances which resemble each other in their chemical properties may possess physiological actions of a similar kind, but a correspondence may likewise be traced between certain of the chemical properties and the physiological activity, or poisonousness, of substances. The combining or atomic weight of elementary bodies forms an important character by which they may be distinguished from each other. Dr. Rabuteau has published an extensive and

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* Abstracted from a Course of Lectures delivered before the Royal College of Physicians, Edinburgh, and printed in the 'British Medical Journal.'

valuable series of experiments which he had undertaken for the purpose of determining whether any relationship exists between the atomic weight and physiological activity of elementary bodies. As a result of this investigation, he has found that *the metals are more active physiologically according as their atomic weights are more elevated.* For example, in reference to sodium, potassium and thallium: sodium, with an atomic weight of 23, is almost inert; potassium, with an atomic weight of 39, is active in moderate doses; and thallium, with an atomic weight of 204, is a dangerous poison, nearly as poisonous, indeed as lead, with an atomic weight of 207. On comparing magnesium, zinc and cadmium, it is seen that magnesium, with an atomic weight of 24, is scarcely more active than sodium (23), for the salts of the former are prescribed in about the same doses as those of the latter; while zinc, with an atomic weight of 65, is a dangerous substance, although much less so than cadmium, whose atomic weight is 112. In reference to the metalloids, Dr. Rabuteau has found that those which are *diatomic*, as oxygen, sulphur, selenium and tellurium, conform to the same law as the metals. The monatomic metalloids, however, are governed by a law which is the reverse of this; a fact which had previously been pointed out by Bouchardat and Stuart Cooper, who observed that chlorine (35·5) is more active than bromine (80), and the latter more so than iodine (127).

The support that is thus given to the theory of a relationship between chemical property and physiological effect, is greatly strengthened when we find that the physiological action of substances may be modified by changing their chemical properties. One of the most remarkable examples is that afforded by amygdalin. This neutral principle is derived from bitter almonds, and is a substance devoid of physiological activity. There occurs along with it in the bitter almond another principle, emulsin, also a substance possessing no physiological activity. A large dose either of amygdalin or of emulsin alone may be injected into the circulation of an animal without any effect whatever being produced. When, however, the two substances are together injected, even at points far removed from each other, physiological effects are produced with great activity, and death occurs. The originally inert amygdalin becomes a powerful poison, the result of a modification in its chemical properties—a modification which may be easily recognized by comparing the odour of the moistened amygdalin with that of the mixture of amygdalin, emulsin and water, and which may be represented by the equation:—

$$\underset{\text{Amygdalin.}}{C_{20}H_{27}NO_{11}} + 2H_2O = \underset{\text{Hydride of Benzol.}}{C_7H_6O} + \underset{\text{Prussic acid.}}{CNH} + \underset{\text{Glucose.}}{2C_6H_{12}O_6}.$$

Another example is found when morphia is acted upon by hydrochloric acid at a high temperature by which its chemical properties are modified and its composition changed so that one equivalent of water is separated from it. Morphia thus modified possesses physiological action very different from that of morphia itself. In place of producing hypnosis, this changed morphia—to which the name of apomorphia has been given—acts as a powerful emetic, so powerful, indeed, that in man emesis occurs within a very few minutes after the one-thirteenth part of a grain, or even a smaller dose, has been subcutaneously injected.

On the general law, that the physiological action of a substance may be modified by changing its chemical properties, has been founded the application of chemical antidotes for poisons. The chemical properties of arsenious acid are changed by hydrated sesquioxide of iron or of magnesia, those of tartar emetic by tannin or albumen, those of lead by sulphate of magnesia, those of prussic acid or soluble cyanides by proto and persalts of iron, those of oxalic acid by carbonate of lime, and those of morphia, strychnia, and various other alkaloids by tannin or iodine and as a result of this change the physiological properties of these substances are modified.

To the recognition of this law, likewise, therapeutics has become indebted for the introduction of a remedy which every one must admit has proved of the greatest value in the treatment of disease. Although chloral was discovered more than thirty years ago, it was not until 1869 that Liebreich ascertained and investigated its important physiological action. The chemical change anticipated was the decomposition of the chloral, after its introduction into the circulation, by the alkaline salts present in the blood. This decomposition may readily be seen by adding some caustic alkali to a tolerably strong solution of chloral hydrate; the result being the precipitation of minute globules of chloroform and the simultaneous formation of formiate of the base that is added:—

$$\underset{\text{Chloral.}}{C_2Cl_3HO} + KHO = \underset{\text{Chloroform.}}{CCl_3H} + \underset{\text{Formiate of Potassium.}}{CO_2KH}.$$

The principle that a connection exists between the chemical properties and the physiological action of active substances, receives a further support from several well-known facts, which show that the physiological action of active substances may be accompanied with distinct chemical reactions between them and certain of the vital structures. Thus, in producing its violent corrosive action sulphuric acid withdraws the element of water from the tissues, liberates the carbon of the ternary hydrocarbons and separates from them their basic constituents. The analogous corrosive effects of nitric acid are accompanied with the oxidation of tissue-elements, and combinations with electro-positive substances, and with the formation of xanthoproteic acid—by the last of which reactions the characteristic orange staining of the skin and fibrous tissues is caused. The local effects of the caustic alkalies are also accompanied with well-defined chemical changes in the vital structures on which they act.

One of the most striking examples of a definite change of chemical property accompanying the physiological action of a substance is that afforded by carbonic oxide. Claude Bernard, the distinguished physiologist, discovered that carbonic oxide renders the blood of a marvellously florid colour, that it thrusts out oxygen from that fluid, and that its action is in some way related to the latter effect. More recent investigations, especially those of Lothar Meyer and Hoppe Seyler, have confirmed Claude Bernard's results, and also shown that carbonic oxide forms a definite chemical union with the hæmoglobin of the blood. The resulting compound is one of great stability; so much so that carbonic oxide-hæmoglobin resists the action of powerful reducing agents. The physiological action is the direct result of the change in the chemical properties of hæmoglobin—a change which has, among other effects, that of preventing those chemical interchanges between it and the oxygen of the air on which life depends. The relation of the great stability of the combination between carbonic oxide and hæmoglobin to certain of its physiological effects is also apparent, for the serious symptoms which are produced by the most minute quantity can be recovered from but slowly. They can, however, be recovered from; and again we find that a chemical explanation may be adduced for this physiological change, as it has been recently discovered that, under the prolonged influence of oxygen, the carbonic oxide is at last liberated from its combination with the hæmoglobin.

There is some reason for supposing that somewhat similar chemical effects are produced during the action of prussic acid; and it has been shown by the careful and elaborate observations of Dr. Gamgee that nitrites conduct themselves towards hæmoglobin in an analogous manner to carbonic oxide—a fact which may explain certain of the phenomena produced by nitrite of amyl.

These various illustrative examples are sufficient to show that there are good reasons for supposing that resemblances between the chemical properties of substances may be accompanied with certain similarities in their physiological action and activity; that the physiological action of many substances may be modified by changing their chemical properties; and that the physiological action of a substance may be accompanied with distinct chemical reactions between it and certain of the vital structures. Various attempts have been made to determine on what special chemical properties the physiological action of substances depend; of which those of Blake and Rabuteau are undoubtedly the most important. Dr. Broadbent, of London, has advanced the opinion that the physiological action of a substance is related to a property which he terms *chemical tension*, and defines as the amount of energy developed by any possible rearrangement of the constituents of the substance; while Dr. Benjamin Richardson also has shown that, in a series of bodies belonging to the same chemical type, the character of the symptoms somewhat depends on the volatility and solubility of the various members of the series. It is not necessary to occupy time by discussing these theories. Whatever germ of truth they may contain, their value in indicating a connection between the chemical properties and the physiological action of active substances is a comparatively limited one. It will be preferable to pass without further delay to the consideration of some other investigations which bear upon this subject.

There are numerous indications of a relation between the chemical composition of a substance and its physiological action. Thus, as already mentioned, the salts of the same base have generally a common action—a law that is departed from when the base is united to an acid which itself has a distinct action. Similarly, compounds of the same acids with physiologically indifferent bases produce the same effects. When, however, the relationship between composition and physiological action is considered more fully, we fail to discover the cause of the peculiar action of substances in the presence and proportion of particular elements. Many substances have identically the same composition—termed by chemists isomeric—possess very different physiological actions. This, for instance, is the case with the isomeric series represented by oil of turpentine, oil of lemons, oil of juniper, etc., all of which have the composition $C_{10}H_{16}$; and with that represented by nitrite of ethyl and glycocol, both of which have the composition $C_2H_5NO_2$. Kakodylic acid likewise very well illustrates the insufficiency of composition alone as an explanation of physiological action; for although it is a soluble substance, and contains more than 54 per cent. of metallic arsenic, it may be administered in large quantities without producing any effect whatever. And, finally, the action of the organic alkaloids is obviously opposed to this explanation—an opposition which becomes apparent when we consider that aconitia paralyses the spinal cord, and also the inhibitory cardiac ganglia; while strychnia increases the activity of the reflex apparatus in the cord, and stimulates rather than paralyses the cardiac vagi nerves, although both substances are alike composed of carbon, hydrogen, nitrogen and oxygen.

The chemical properties of substances, however, depend not only on their *composition*, but also on their *constitution*, or the mode in which their constituents are arranged or united together. The difference between composition and constitution may be explained by a reference to such substances as the compound ethers. They are formed by the action of an acid on an alcohol, and may be so decomposed as to yield again the alcohol and acid from which they were produced. Now, common alcohol ($C_2 H_6 O$) and valerianic acid ($C_5 H_{10} O_2$) have together the same composition as amylic alcohol ($C_5 H_{12} O$) and acetic acid ($C_2 H_4 O_2$) together. The combination of each of these two pairs of substances gives rise to a compound ether of identically the same composition, but differing in properties; and each of these compound ethers can be decomposed so as to yield the pair of substances from which it was produced. Thus,

$$\underset{\text{Common alcohol.}}{C_2 H_6 O} + \underset{\text{Valerianic acid.}}{C_5 H_{10} O_2} = H_2O + C_7 H_{14} O_2$$

$$\underset{\text{Amylic alcohol.}}{C_5 H_{12} O} + \underset{\text{Acetic acid.}}{C_2 H_4 O_2} = H_2 O + C_7 H_{14} O_2$$

The one ether obviously differs from the other in the manner in which the constituents are united together; that is to say, in its constitution.

It appears, therefore, that substances may possess physical, chemical and physiological properties that do not depend on their special composition. This independence of composition and property is also met with among inorganic substances. Some elements form only one series of compounds—as zinc with its single oxide, chloride and sulphate. Other elements form more than one series—as iron with its proto- and per-salts, arsenic with its arsenites and arsenates, and sulphur with its sulphides, sulphites, and sulphates; and distinct physical and chemical properties are possessed by each individual series. In the examples last mentioned, the investigation of the physiological action of the compounds belonging to any special series is a matter of considerable difficulty. Where varieties of constitution exist, the compounds of the less stable varieties readily undergo decomposition, and assume that constitution which possesses the greatest stability. Thus the proto-salts of iron easily change their constitution, and become converted into per-salts; and arsenates become reduced to arsenites. That changes of constitution also occur in the body, has been rendered certain by numerous observations, and more especially by those of Rabuteau, who has shown that, when introduced into the system, bromates become changed to bromides, iodates to iodides, and sulphites and hyposulphites to sulphates; in fact, that towards these substances the organism acts as a reducing agent. Hence, there is an absence of definite knowledge regarding the action of more than one series of the compounds of the elementary bodies.

(*To be continued.*)

THE MANUFACTURE OF OLIVE OIL IN CALIFORNIA.

For a number of years past, the olive-tree has been cultivated with varying success throughout the Southern States of America, and especially on the islands on the coast of Georgia and Florida, and along the sea-board of North Carolina. The quality of the product, however, not being the best, its manufacture has never assumed proportions of any magnitude, nor has it been able to compete with the oil imported from Europe.

A writer in the 'Overland Monthly' publishes the information that the culture of the olive-tree and the manufacture of oil from its fruit is gradually becoming a leading industry in California. The character of the climate, and the soil of the valley of Santa Barbara and of the foot hills of Santa Inez, for sixty miles along the coast, are adapted to the production of the finest varieties of oil. It is predicted that this portion of the State will eventually be numbered among the most celebrated oil districts of the world.

The olive is propagated almost entirely by cuttings taken from the sprouts and branches of mature trees at the time of pruning. The cuttings are generally from ten to fifteen inches long, and from half an inch to three or four inches thick; the thickest are the best. These are placed in a perpendicular position in a bed of good soil, six, eight, or ten inches apart, their tops level with the surface. The earth is pressed closely around them, and their ends are slightly covered to protect them from the drying influence of the sun. Here they remain, throwing out leaves and branches, until April or May, when, with as little disturbance as possible of the roots, they are taken up, and, after being trimmed to a single sprout, are set out in the orchard, in rows about twenty-five feet apart each way. The ground between the trees may be cultivated for several years, with little or no detriment to the young trees. When the olives are to be gathered, cloths are spread under the trees, and the berries are pulled from their branches by hand and thrown upon the ground, or are beaten off with a long rod. If they are intended for making oil, they are carried to a dry room or loft and scattered upon the floor, or, where this is not convenient, a drying frame is made—consisting of broad shelves one above another, and sliding in and out as the drawers of a bureau—and the berries are spread upon the shelves. By this exposure to a dry in-door atmosphere, the berries ripen further, their watery juices are evaporated, the oil is released, and, when the skins have been broken, flows more readily under pressure. A slight mould may gather upon the berries during the few days that they remain here, but not sufficient to have an injurious effect upon the oil, or it may be prevented entirely by stirring the berries daily.

The process of extracting the oil, as practised in Santa Barbara, is simple, even to mediæval rudeness. A large, broad stone wheel is held by an arm from a centre post, and, by a horse attached to this arm, is made to traverse a circular bed of solid stone. The berries are thrown upon this stone bed, and are shovelled constantly in the line of the moving wheel until they are considerably mashed, but not thoroughly or until the stones are broken. This process finished, the pulp is wrapped in coarse cloths or gunny sacks, and placed under a rude, home-made screw or lever press. The oil and juices, as they ooze through the cloth or sacks, flow into a small tank, and, as they increase, are distributed into other vessels, from the surface of which the oil is afterwards skimmed. The oil flowing from this first pressure is what is known as "virgin oil," and commands the highest price from connoisseurs of the table. Without further preparation the oil is now ready for use, except that, in order that any intrusive matter may be separated from the body of the oil and collected at the bottom of the oil cask or jar previous to bottling, it is set away for a time to rest. At the Mission of Santa Barbara, the oil is stored in huge antique pottery jars, that, ranged round the room, remind one of the celebrated scene of the jars in the story of 'The Forty Thieves.' The "second-class oil" is the result of a second and more thorough crushing of the berries, in which even the stones are broken, and of a subsequent subjection of the pulp to the press. The berries are sometimes submitted even to a third process of crushing, and previous to pressure, are brought to a boiling-heat in huge copper kettles. The oil thus obtained is of an inferior quality, and is sold for use as a lubricator, and also as an ingredient in the manufacture of castile and fancy toilet soaps, and for other purposes for which it is superior to animal oil. The residue of the berries is then returned to the orchard and scattered under the trees, and possessing the qualities of a rich and rapid fertilizer, may be said to be yielded to us again revivified and luscious in the richer fruitage of succeeding years.

The tree, at five years of age, returns a slight recompense for care; and at seven an orchard should afford an average yield of about twenty gallons of berries to a tree. If there are seventy trees to an acre, there should be obtained from it one thousand four hundred gallons of berries. From twenty gallons of berries may be extracted three gallons of oil; and, if properly manufactured, olive oil will command four to five dollars a gallon at wholesale. Thus, an average yield of olives, derived from an orchard covering one acre of land, will produce about 800 dollars worth of oil. After deducting the entire cost of production and manufacture, a net profit may be anticipated of at least two dollars per gallon; and thus, one acre, containing seventy trees, yielding an average of twenty gallons of berries, or the equivalent of three gallons of oil each, will afford a surplus above all expenses of about 400 dollars a year.

Olive culture is so simple that any one of ordinary intelligence may engage in it. The process of manufacturing the oil is an entirely different business, and belongs separately and apart from the cultivation of the olive. In time it will not be expected, as now, that each grower shall be manufacturer also. As soon as the supply of olives in a neighbourhood is sufficient to warrant the erection of suitable machinery for expressing the oil, every requisite for the purpose will be at hand. The olive grower's labours for the season will end with the deposit of his berries at the oil manufactory; and according to the custom of the olive districts of Europe, one half the oil from his berries will subsequently be returned to him, ready for use and for market.

A large part of the oil sold in this country, and purporting to be olive oil of European manufacture, is the product of adulteration and imitation. It is generally manufactured in this country, and is composed principally of animal oil, though mustard-seed oil and other inferior vegetable oils also form materials for its adulteration. Every housewife knows that olive oil purchased from the grocer, when exposed to a cold atmosphere, sometimes thickens and turns white or opaque in the lower part of the bottle; and every one familiar with the nature of olive oil knows that it retains its perfect transparency and uniform oily consistence under any temperature. Animal oil condenses under the influence of cold; but vegetable oil does not.* This difference has been well noted on the shelves of stores where the genuine and the adulterated oil have been ranged for sale, side by side. The genuine oil glows clear beneath the glass in all weathers; the adulterated oil turns flaky with the cold, and the lard goes down with the fall of the winter's thermometer. It is an advantage, also, of the genuine "virgin oil," obtained by home manufacture, that it retains its perfect sweetness longer than any other oil. "Virgin oil," made at the Santa Barbara Mission four years ago, is to-day in possession of the nice delicacy of its first flavour when fresh from the berries.—*Scientific American.*

RESEARCHES ON THE PHYSIOLOGICAL ACTION OF KINIC ACID; REDUCTION OF FERRIC CHLORIDE IN THE ORGANISM.†

BY M. RABUTEAU.

Kinic acid agrees in its action with citric and tartaric acids, and has no active properties peculiar to itself. Its alkaline salts have no taste, and, like those of other organic acids, are converted into carbonates in the body. They cause constipation when injected into the blood, and would probably be purgative if introduced in sufficient quantity into the alimentary canal. Ferric chloride is readily reduced by organic substances. To this reduction is due the blue stain which is produced on the hands after using ferric salts or potassium ferrocyanide. The author considers that ferric salts are reduced to ferrous in the stomach, and are absorbed as such, and that when ferric chloride has been injected into a varicose vein to a coagulate the blood, the coagulum which it at first produces afterwards disappears, because the ferric salt is converted into a ferrous salt which hinders the coagulation of the blood instead of inducing it.

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* Pure olive oil separates granular crystals below 10° C. (50° F.), consisting of palmitin.—Ed. Amer. J. Pharm.

† Compt. Rend., lxxv. 219–221, and Journal of Chemical Society.

The Pharmaceutical Journal.

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THE RECTIFICATION OF THE REGISTER.

If the practice of pharmacy is ever to reach the high position which the Pharmaceutical Society has during the last thirty years sought, by an unstinted outlay of energy and money, to secure for it, something more than passive acquiescence will be required from those members of the trade who do not belong to that body. The task of compiling and keeping a Register of the Chemists and Druggists in Great Britain,—made necessary by the passing of the Pharmacy Act,—was committed to, and willingly accepted by the Pharmaceutical Society. It might have been expected, and fairly so, that such an unselfish undertaking, from which every chemist and druggist in the country was to reap equal benefit, would have received from each person interested the cheap assistance of keeping the Registrar informed of his place of residence. For so long as the Register can be referred to with confidence, as the sole evidence required in a court of justice that a person is registered under the provisions of the Pharmacy Act, 1868, so long will every chemist and druggist have at his command a ready means of preventing any but the properly qualified man from competing with him in business. It cannot be denied that at present the names of many persons are on the Register who have no other right to be there than that of a vested interest, inasmuch as they were actually in business at the time the Act was passed. But this evil will decrease with the lapse of time and eventually cease to be. Each year some of these names will be eliminated from the list; the fresh names added will be limited to those whose owners have passed the statutory examinations; and it is no flight of the imagination to say that in a comparatively short time pharmacy as a calling, being confined to qualified men, will not only be honourable from the scientific acquirements of those who follow it, but more profitable from the remuneration their skill will command through diminished competition.

We have been induced to make these remarks, the truth of which must be obvious, by the result of the recent notice given by the Registrar with respect to a large number of names of persons from whom *four* inquiries, including *two registered letters*, had failed to elicit any reply. Notwithstanding the length of the list published on the 12th of October, it was thought that the circumstances attending the original compilation of the Register would account to some extent for it, and we believe it was not expected that the list would be considerably diminished through its publication. But our readers will, perhaps, be equally surprised with ourselves, to learn that of the persons then warned, no less than 236, or 25 per cent., have communicated with the Registrar during the past four weeks. Why they should have deferred doing so until they had put the Pharmaceutical Society to the expense, in each case, of two registered letters, besides stationery, printing, and other office expenses, in a matter of interest to themselves alone, they would scarcely be able to explain satisfactorily. It again raises the regret expressed in these columns on a former occasion, that the Act does not require registered persons, as is the case in some of the American States, to send to the Registrar a yearly notice, accompanied by a fee, and stating their wish to be retained upon the Register.

Possibly a few of these deficiencies arise from the fact that to some persons the filling in of a return is always a source of trouble. Some time since it was stated by a public department that no matter how simple a form issued might be, there was always a large percentage returned blank or improperly filled up. And an illustration of this was afforded at the last election of annuitants on the Benevolent Fund of the Pharmaceutical Society, when the problem being generally the distribution of two votes between three persons, 118 votes or $2\frac{1}{4}$ per cent of the whole number given, were rendered informal through want of success in solving it.

Another illustration of the disturbing elements is to be found in the following singular effusion. In charity to the writer we suppress his name, although he scarcely deserves such consideration, and probably is not capable of appreciating it.

"I most respectfully enclose my ticket-of-leave, in order that you may know that I am alive and kicking, and feel that every chemist must be proud of his dignified position in being placed on a par with the convicted felon. The one has to report himself at the police-station; the chemist, to your honourable Society."

Chacun à son goût, and this person is probably the only one preferring to have *all* his associations tinged with the ticket-of-leave system. But lest there be still some holding aloof from a similar feeling or merely from neglect, it is perhaps as well to remind them that the time given in the notice of October 12th will shortly expire, and that in the words of the Act, "*absence* of the name of any person from "such printed register, shall be evidence until the "contrary shall be made to appear, that such person "is not registered according to the provisions of the "Pharmacy Act."

LADY PHARMACISTS.

The action of the Council of the Pharmaceutical Society in removing the barrier that prevented ladies attending the Professors' lectures has been freely commented on by the public press and generally approved. The following paragraphs, from an article in *The Queen*, is a fair specimen of the tone of the whole:—

"The dispensing of medicines is an occupation in which many women are engaged. In country places frequently, and not seldom in towns, the wives or daughters of medical men, or of professional druggists, have been taught to prepare the medicines in general use, and have acted as very efficient assistants to their relations. In fact, in some cases, the business of dispensing medicine has been chiefly carried on by the women of the family.

"Recently the dispensing of drugs at St. Mary's Dispensary (now the New Hospital for Women) has been entirely in the hands of properly trained women; and, indeed, the dispensary has been used as a kind of school, in which other women have been taught the art of dispensing.

"The compounding of drugs requires no very laborious exertion. It necessitates careful attention, accuracy, neatness, and method, and the knowledge required is not beyond the reach of women who will apply themselves duly to the necessary studies. In fact, the examinations, such as that of the London University, which women now pass, involve attainments of a much more varied kind than those required to become a qualified dispensing druggist."

BETT'S SUITS' DEFENCE FUND.

At a recent meeting of the Chester Chemists' Association, it was unanimously resolved—

"That a subscription be raised amongst the members of this association, in behalf of the Bett's Suits' Defence Fund, and that the amount thus obtained be forwarded in the name of the society to the Hon. Treasurer of the Fund."

In accordance with this resolution the sum of £2. 15s. has been transmitted to Mr. L. Newbery, who, it is to be regretted, still reports a considerable deficit.

The commencement of the various courses at the Paris School of Pharmacy took place on Monday, November 4. The programme is as follows:—General Chemistry, M. Bussy, Professor, assisted by M. Riche, on Tuesday, Wednesday and Saturday, at 3.30 p.m.; Pharmacy, M. Chevallier, Professor, Monday, Wednesday and Friday, at 1 p.m.; Zoology, M. Milne Edwards, Professor, Tuesday, Thursday and Saturday, at 10 a.m.; Natural History of Drugs, M. Planchon, Professor, Monday, Tuesday and Friday, at 3.30 p.m.; Physics, M. Buignet, Professor, Monday, Wednesday and Friday, at 1.30 p.m.; Practical Class, M. Personne, Director of Practical Chemistry and Pharmacy, daily, from noon till 4 p.m.

JOHN BOHLER.

In the Obituary column, at p. 394, will be found a short memoir of one who, twenty years ago, was well known to many chemists and druggists as a collector of herbs and pharmaceutical plants. It will no doubt be read with interest, and those especially who knew him will regret that his career should have been closed under such apparently unfortunate circumstances.

Provincial Transactions.

OLDHAM CHEMISTS' ASSOCIATION.

On Wednesday, October 6th, a lecture upon the Natural History of Chalk was delivered under the auspices of the Oldham Chemists' Association, by Mr. J. Neild, at the Church Institute. The lecture was illustrated by several diagrams showing the structure of the various animals that had contributed to the formation of the chalk. A vote of thanks to Mr. Nield brought the proceedings to a close.

HULL CHEMISTS' ASSOCIATION.

The annual meeting of the above society was held at the Cross Keys Hotel on Thursday evening, October 29th. Mr. Atkinson Pickering, the president, occupied the chair. The report was read by the secretary, Mr. C. B. Bell, and on the motion of the President, seconded by the vice-president, Mr. A. Smith, was adopted. Provincial pharmaceutical education was a leading topic of discussion, and the success with which the lectures on chemistry and materia medica, etc., promised to be attended, was a source of great gratification to the members present. A universal feeling of satisfaction was expressed at the unprecedented attendance at the summer course of lectures on botany, held at the Hull Botanic Garden.

A ballot for the election of officers for the ensuing year was taken, with the following result:—President, Mr. Anthony Smith; vice-president, Mr. Francis Earle; secretary and treasurer, Mr. Charles B. Bell; committee, Messrs. Pickering, Myers, Preston and Hammond. Votes of thanks to the officers for their services during the past year were most heartily accorded.

NORWICH CHEMISTS' ASSISTANTS' ASSOCIATION.

On Friday, November 1st, a lecture on Toxicology was given by Mr. Philip H. Mason, at the Association Rooms. After reviewing the general history of poisons, in the popular acceptation of the term, as well as in the medico-legal sense, the lecturer divided them into two principal classes, irritant and neurotic, and, reserving the latter class with its sub-divisions for a future lecture, proceeded to discuss the following inorganic poisons, and the methods for detecting them in organic mixtures and in different parts of the animal economy:—Arsenic, antimony, mercury, the mineral acids, alkalies, the salts of lead, zinc, barium, copper, potassium, bichromate, etc. etc. Oxalic and prussic acids were also glanced at. The lecture was illustrated by numerous experiments.

MANCHESTER CHEMISTS' ASSISTANTS' ASSOCIATION.

The last ordinary meeting of the above was held at the Lecture-room, 37, Blackfriars Street, on Monday evening, November 4th, the president, Mr. Lane, in the chair.

An instructive paper was read by Mr. Saunders, on Arsenic and Antimony with their Sources and Modes of Separation. The various tests were also shown, including Marsh's and Reinsch's; also Fleitmann's test for arsenic in the presence of antimony, with other conclusive tests shown by actual experiment. Afterwards a vote of thanks was awarded to the reader for his very useful and interesting essay. A paper on Volumetric Analysis has been kindly promised by Mr. Siebold for Monday evening, November 18th.

BRIGHTON ASSOCIATION OF PHARMACY.

The opening meeting of this association was held in Hanover Lecture-room, Church Street, on Friday evening, November 8th. There was a fair attendance, and, without any preliminaries, the president, Mr. W. D. Savage, read the following paper:—

Gentlemen,—At the commencement of a new undertaking, or the resuscitation of an old one, it would seem to be, by practice, the proper thing to say something as to the *objects* likely to be obtained by the organization, and what efforts will be necessary to secure their accomplishment.

The second rule of the association defines the *object* to be the mutual improvement and general advancement of the interests of all its members; and the *tenth* rule indicates the way by which this is to be attained, viz., by lectures and reading of pharmaceutical papers. In practice we may find it necessary to transpose the position of these, and so begin with the reading of suitable papers, feeling our way by degrees to higher things as opportunity and means become available. I contemplate, however, a much wider sphere of usefulness in the whole being brought together (apart from social gatherings arising out of these associations), the interchange of thought and the force of example will go a long way either to sustain or mar the efforts of the leaders of the undertaking. It too frequently happens that by a spasmodic effort an association is formed which soon withers and dies. This mainly arises from relaxed energy on the part of the promoters; or more frequently, perhaps, from the removal of some one who had the necessary time and perseverance to uphold it. The principals and assistants engaged in this renewed effort, must feel mutually bound to aid each other, and to support by their presence at the meetings, and to take such part in the proceedings as to justify the belief that they are anxious for the success of the undertaking. The mere formal acquiescence in the establishment of such an association is not enough,—to become a member is essential. But unless some little sacrifice on the part of the principals is made, it must sooner or later end in failure. The parties more immediately interested in the success of this association are the apprentices and assistants; the former, by the means at their disposal, will be enabled to advance their pharmaceutical education, and the latter to strengthen and enlarge that which they have already obtained. But I cannot help thinking that *all* who are connected with the trade must rejoice at the opportunity that this association affords of removing a stigma from our town, and of being able to help those who are desirous of helping themselves; and thus it is that the originators of this undertaking have wisely (I think) combined the interest of employers and employed in having associated on the committee of management principals and assistants. It may be thought by some that such a combination is injudicious and will prove impracticable in working. As the majority of our establishments have but one assistant, how can principal and assistant leave at the same time? This of course cannot be; but the difficulty may to a certain extent be removed by an arrangement that the principal should attend monthly, or other meetings where his presence and experience would be most required, whilst the weekly meetings for *practical* instruction would be most advantageously promoted by the attendance of assistants and apprentices. By a little concession and mutual desire on the part of both that such arrangements should be carried out, beneficial results must follow, until the good time comes when our shops can be closed and business engagements cease at eight o'clock, so that all may then be free to attend such gatherings. In the meantime we must make the most of our opportunities; and when we contemplate the limited means at the disposal of such men as Faraday, with the noble results that he achieved, we have no cause of despair, but on the contrary, grea encouragement to persevere and avail ourselves of the many facilities placed within the reach of all who will but use them, in every department of science or commerce. Education is the cry, and in none just now is the appeal made more urgent than in that of Pharmaceutical Education. We have the various schemes propounded by Messrs. Reynolds, Schacht, Attfield, Wootton, and Redwood, and locally we have our friend, Mr. Schweitzer's suggestions, read at the Conference. Amidst such a variety of plans and opinions you cannot wonder at the perplexity of the Pharmaceutical Council, and their hesitation to adopt any scheme until the difficulties that at present surround the question are cleared away, and more experience acquired to enable them to decide equitably. On reviewing the different proposals we may perhaps be permitted to consider some of the distinctive characters of each plan, beginning with that of my esteemed friend, Mr. Richard Reynolds, of Leeds; for although his views, as enunciated at the Leeds Association (see the Journal of March of this year), are later than those of the Provincial Education Committee of the Council, which appeared in the proceedings of Council, March 2nd, 1870,—yet, as a member of that Committee, we may fairly infer, that if not the author, he was the promoter of those suggestions of having in large towns the *means* of acquiring technical education. And whilst the parent Society could not initiate such schools of pharmacy as the report indicates as necessary, and as Mr. Reynolds advocates, still they could materially aid the same after their formation and having furnished evidence of their vitality and usefulness. It is said that the plan is analogous to that of the medical profession, whose wants are supplied by the eight schools of medicine established in the principal towns of England. Such a provision connected with the Pharmaceutical Society (although entirely independent of it so far as management is concerned) would place those favoured towns in somewhat the same position as London, so far as to enable students to attend lectures and receive practical instruction. It has been argued that places like London would then be resorted to by apprentices and improvers. This, to a certain extent, would prove to be so, but the parent Society remaining as now an examining body would be all the better off by such institutions preparing the students to pass creditable examinations; and the students themselves would not require to be so far from home, nor, consequently, to incur such a large expenditure. Mr. Schacht again deserves much credit for the elaborate scheme which he proposes for provincial education, and its general principles were approved by the Council. Without, however, entering into every particular, especially as the details have not been furnished, certain propositions based on the science and art programme of Kensington, of payment for results, seem to me impracticable. As at present propounded it is imperative that 25 lectures on chemistry and botany shall be given by *competent teachers*; that they shall be on different days, and be of one hour's length; and that the student do attend at least 20 of these lectures. How is it possible that such an arrangement can be carried out? Mr. Reynolds, in a letter to the Journal of July 27, very ably suggests difficulties that would arise in attempting to carry out Mr. Schacht's scheme. Amongst others, he points out the awkwardness of having two examining bodies, for the Pharmaceutical Society are to send examiners. Suppose, for illustration, that we had a class arrangement on Mr. Schacht's principle, and one of our students did so well that he obtained a prize for himself and £2 for the Association. The same young man, under a different system of examination, goes up for his Minor, and is plucked! How disagreeable and unsatisfactory such a state of things would be, and still there is nothing improbable in such a result. But I must pass on to consider the next proposition suggested by Professor Attfield, which he read at the Conference meeting, and it is so well known that it scarcely needs reference, beyond that of pointing out some of the more important parts. There is much in the professor's scheme that commends itself to my approval; indeed, I am not certain that on the whole it is not the best scheme for provincial education as yet suggested, embracing, as it does, some of Mr. Reynolds's proposals. It stands thus:—1. To increase the fees of teachers of chemistry, materia medica, pharmacy, and botany; 2. To pay one half the salary of curator and lecture assistant; 3. To distribute such duplicate specimens from the Society's museum as might be available; 4. To make grants to libraries; 5. To grant loans of materials for class teaching, with power for making them absolute grants. These are parts of the scheme of the Provincial Education Committee, adopted by the Council on November 2nd, 1870, but from the stringent regulations imposed on the local associations they were virtually impracticable. When the local committees applied for loans the individual responsibility imposed by the regulations was so great that, as was the case with Nottingham, they declined to avail themselves of the offer. The part of Professor Attfield's scheme differing materially from the others is the imperative attendance at lectures at some recognized school; this very desirable course would be found inoperative in practice, at least for many years to come. How can the village or small town apprentice find time or means to accomplish it? I cannot help thinking that Professor Redwood's proposition would be an excellent one for immediate use, viz., that candidates should be required to state *where*, *when* and *how* their education had been conducted. This suggestion if carried out, would at once enable the examiners to see where *cram* would be likely to occur, and so regulate by varying their course of examination to test the efficiency of the professed teachers of *cram*. I cannot leave this subject without adverting to the observations at the Conference of our friend Mr. Schweitzer; he thinks the aid given in money or books to provincial societies is so much money thrown away, whilst the establishment or maintenance of a number of regular schools would be equally ineffective, and tend to cripple the parent Society; that apprentices should have passed their Preliminary previous to entering on the trade; that masters should not take apprentices unless they are able to instruct them, so that at the end of their term, with very little study, they may pass the Minor examination. Our friend thinks that the Preliminary or classical examination is evidence of a youth's fitness for entering the business; that the Minor should only represent an assistant's qualification, whilst the Major should be a necessary qualification for becoming a principal, and that no more suitable place for the attainment of these objects is to be found than Bloomsbury Square. If the Society, after paying their officers, should have any funds to spare, let them open the whole establishment gratuitously for a limited period to apprentices and assistants. Whilst I am ready to concur in many of the views enunciated by Mr. Schweitzer, I also think they may probably apply more forcibly to the future than the present, but our thoughts are for the present, and for some time to come. I have great faith in self-reliance; but a little help in time of need is like lightening the burden of a fallen horse, which he will carry well enough after he has risen. The proposals of Mr. Schacht seem to me as likely to be of very limited application, as none but the largest towns could get the necessary organizations. Mr. Reynolds's plan seems necessary if Professor Attfield's requirements were carried out, inasmuch as attendance at recognized schools could not be confined to London. I have dwelt so much on this subject that I am afraid you will consider me very prosy, but provincial education is of such vital importance just now that more than ordinary reference seemed to be required. My own ideas are simple; and I think with Mr. Schweitzer that the days of the uneducated amongst us are numbered. An apprentice henceforth must be able to pass his Preliminary, or furnish evidence that he has passed one or other of the local university examinations. The master must not object to concede at least one hour each day for study; and to my mind the morning is by far the best part of the day for such a purpose. In the evening (where more than one apprentice or assistant is kept) an arrangement, when practicable, should be made so that each one might have alternate hours, say from seven, until closing time, being within call if required. Such an arrangement on Mr. Stoddart's plan of systematic study would, I am sure, enable any young man with ordinary application to pass his Minor examination within two or three years, and do away with the necessity of attendance at any recognized school, whilst half, or at most, a session at Bloomsbury Square *afterwards* would complete the "Major," and do away with much complexity that now surrounds the question. I would not discourage such an association as this, because I believe them to be important auxiliaries; but in small towns where no such co-operative aid can be obtained, I believe the means which I have indicated capable of accomplishing the object; but the masters must not only allow the necessary time, but assist in procuring chemicals for experiments. I do not think the indiscriminate run of your chemicals and chemical apparatus without any charge or restraint the best course to adopt, but to purchase *at cost price* all the apparatus required by an apprentice or assistant, and an equitable return for all unbroken utensils at the end of the term. No principal could object to supply every facility for the improvement of those under his care. On the other hand, the engagement must be one of mutual interest, and the *employé* must show by attention and care that he merits the privileges conceded. I must here observe that in too many cases there is a spirit of estrangement betwixt the principal and assistant, which, in a rightly established concern, should not exist, if we properly realize the fact that our apprentices and assistants are to be the future masters; and as we impress them by our conduct, so will they probably act. It is important that our example should be worthy of imitation. Some of the large establishments in London are governed on equitable principles, whilst, on the other hand, others seem so exacting and selfish, with the coarsest living, the maximum of work and the minimum of domestic comfort, that it is no wonder that frequent changes occur, and those who submit to such treatment do so grudgingly, and only to obtain experience, without any of those pleasing reminiscences that ought to subsist after leaving the service. We should all try, I think, to bear in mind the wise maxim "to do unto others as you would they should do unto you"; and whilst I am anxious to impress upon my brother principals the *suaviter in modo* treatment to those in their employ, I would none the less most urgently appeal to every apprentice and assistant to consider their responsibility, and endeavour by a proper regard for their principals' interest to merit the confidence and kindness reposed. I recollect that Mr. Stoddart, at one of the Conference meetings, when he was presiding, saying that he on one occasion required a large parcel to be conveyed a short distance to the carrier, in the absence of the porter; when the assistant seemed to hesitate, he placed it on his own back and took it without a word, and the lesson was so salutary that he never had occasion for future complaint. It is true assistants should not be treated as menials, but occasions will arise when a little deviation shows a right feeling, that cannot be otherwise than thoroughly appreciated. Those of us who can look back to the last generation of chemists and druggists, know what a change has taken place, and how different things are now as compared with what they were. Our apprenticeship was one of drudgery, and with few exceptions the provincial town and city druggist combined tea, tobacco, oils, paints, colours, and in some cases were seed merchants. Some of these combinations exist now in the northern counties, and a young man coming south finds that he has a new trade to learn, less physical and more mental energy is required; but when an assistant has graduated in the two kinds of trade, and become master of each, he is usually a valuable assistant. I would here remark the importance of a knowledge of the kind of trade mentioned to rightly estimate the recent agitation of the poison question. It is a serious matter to those chemists who live in agricultural or manufacturing districts, to have additional duties imposed upon them, and anything like registration of poisons at certain seasons of the year would necessitate an additional assistant on market day, when usually as much business is done as on all the other days put together. We who live in the south know nothing of the bustle and confusion arising from multiplicity of orders given and required to be executed on market day; we must therefore look charitably on some of the shortcomings of our country friends; and whilst public security against unnecessary risk should be guarded against, we ought carefully to avoid imposing burdens that would be honoured in the breach rather than in the observance. Legislative enactments can never supersede individual responsibility, and no greater incentive to proper precaution will be found equal to self-interest. By a single accident (to which the most careful of us are liable) might follow the loss of business and reputation. One of the greatest safeguards will be found in our educational status, and I would here call attention to some important alterations contemplated to come into force in October of next year, and to remind my young friends that they must, if they desire to avail themselves of the present mode of preparing for the Minor examination, make the best use they can of the ten months before them, for after then a new order of things will prevail. On the evening of Tuesday last I attended a meeting of the General Purposes Committee in Bloomsbury Square, when a deputation of five members of the Examining Board met us, and Mr. Carteighe, as their exponent, went most fully into the proposed change, whereby the Minor after this year will become the principal practical examination. It will stand thus:—"Candidates for this (the Minor) examination must have passed the first or Preliminary examination, and must produce certificates of having attained the *full age of* 21 years, and of having been employed for three years by a pharmaceutical chemist or a chemist and druggist, in dispensing and compounding prescriptions." I tried to alter the proposal about age, thinking it more satisfactory that a youth should be able to pass his principal examination whilst apprentice, but this was overruled by my colleagues, and made to dovetail with the Bell scholarships, which for the future will exclude those who have passed their Minor, and are *under* 21 years of age. This is much more equitable than the previous arrangements, which placed the ordinary candidate at a disadvantage, having to compete with an examined man. The Committee having arranged with Mr. Parkhurst to give you a course of ten lectures, I do hope that the efforts of the committee to promote the interests of the association will be appreciated, and that the classes will be numerously attended. Nothing tends so much to depress the energies of a lecturer or teacher as an empty room; let the seats be well occupied and the audience attentive, and a good result is sure to follow. I have already adverted to the views entertained by Professor Attfield on provincial pharmaceutical education, and the anxiety manifested by him at the alarming extent to which "cram" prevails; but few of us could anticipate the fact, as stated by Mr. Andrews in a letter which appears in the Journal of Nov. 2nd, that for the last four years no less than 130 each year have passed the Examiners' Board by "cram." Some persons will be disposed to say that there must be some defect in the mode of the examination, or so large a number could not elude detection, but only let such persons consider the limited time—say twenty minutes or half an hour at most—which each examiner can detain a candidate, and, of necessity, to ascertain the relative merits of each by asking the *same* questions, termed, by Mr. Carteighe, "stock questions," you will at once perceive the difficulties which beset the question, and, to judge the examiners fairly, all these things should be considered. Men who pass by such means as a *month's* preparation can never feel perfectly satisfied; and I do hope that none of our Brighton young men will sully the prestige of our town by a back-door entrance whilst the front portals of Bloomsbury Square are wide open, and ready to welcome legitimate effort and honest work with the enduring title of M.P.S. I cannot conclude this address without mentioning the kindness of our friend Mr. Hills in presenting through the secretaries of the Conference the portraits of Jacob Bell, Wm. Allen and Dr. Pereira, men whom we have reason to be proud of, and whose virtues may we emulate! We must not omit to express our gratitude to the executive of the Conference for their handsome and valuable gift of suitable books (to be selected by ourselves) to the value of £10. Last Sunday I had the privilege of hearing an excellent sermon preached from the words "Beginning at Jerusalem," a most suggestive text—the apostles starting from the place where they were best known on their universal mission of mercy. So let us say to the young men beginning at Brighton, avail yourselves of the advantages of this association, and wherever your future lot may be cast, let your character and conduct reflect credit on the Brighton Association of Pharmacy.

The paper was listened to with the greatest attention and its conclusion was greeted with applause. Mr. Savage said he should be glad to hear the remarks any member might have to make.

A short discussion then ensued, and a vote of thanks to Mr. Savage for his able and interesting paper brought the proceedings to a close.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

The first meeting of the season was held on Thursday, 7th November, 1872. In the absence of Dr. Frankland the chair was taken by Professor Williamson, F.R.S., vice-president. The meeting was well attended, and after the termination of the usual business several interesting papers were read. Two by Mr. E. C. C. Stanford, F.C.S.; the one, "The Action of Charcoal on Organic Nitrogen," being an account of his experiments to ascertain the value of a method of deodorizing and utilizing fish offal and other offensive matters, by mixing them with charcoal; the other "On Iona Pebbles." A communication entitled "Mineralogical Notices," by Professor Storey-Maskelyne and Dr. Flight, was then read by the former, giving a short description of several minerals mostly new or from fresh localities. Mr. J. R. A. Newlands gave a brief explanation of "A Means of Preventing Explosions in Coal Mines," which the author proposes to effect by erecting air-tight chambers over the upcast and downcast shafts, and forcing air through the workings by powerful air pumps or ventilating fans. There were also papers "On the Specific Heat of Occluded Hydrogen," by W. C. Roberts, F.C.S., and C. R. A. Wright, D.Sc., and "On some Probable Reactions that yielded Negative Results," by Dr. C. R. A. Wright. The meeting finally adjourned until Thursday, 21st, when a paper "On Anthraflavic Acid" will be read by Mr. W. H. Perkin, F.R.S., etc. During the evening a beautiful specimen of bromocamphor was exhibited by Mr. Williams, of the firm of Hopkin and Williams, who stated that it was used medicinally as a nerve sedative in such diseases as delirium tremens.

Parliamentary and Law Proceedings.

Child Murder and Suicide in Manchester.

An inquest was held on Monday before Mr. E. Herford, the city coroner, concerning the deaths of Annie Gurlin, aged 29, widow, who lived in Cross Street, Thompson Street, Oldham Road, and her daughter Ada Millicent Gurlin, aged about 2½. The first witness called was Ann Lawrence, residing in Rochdale Road, who deposed that the deceased Annie Gurlin was her daughter. The latter had been in a very melancholy way for some months, fretting about her husband, who died eight months ago. She seemed very cross with everybody, and was quite different to what she had previously been. Upon various occasions she had told witness that she should like to poison herself and her children. One day last week she took some laudanum, and it made her very poorly. She said that she intended to kill herself. Witness left her at her house about ten o'clock on Saturday night in her usual health. Witness took the other children home with her, leaving only the younger deceased there with her mother. On Sunday morning witness went back to the house, unlocked the door and passed into the bedroom, where she found them both lying in bed together, dead. She started off for a doctor and the police, and when she returned she found the police in the house. She had not the least doubt that her daughter was out of her mind.

Police-constable William Hawkins received some information, in consequence of which he entered the house. Upon the floor near the bed, where the two deceased lay, he found a bottle and spoon.

Mr. J. Jordan, assistant to Mr. William Bentley, druggist, Shudehill, stated that about a fortnight ago the deceased, Annie Gurlin, came to his employer's shop and asked if she could have an ounce of prussic acid for her husband, who was a photographer. He asked some questions, upon which the deceased fetched a woman, who supported her statement, and said that her husband was not dead. The prussic acid was then supplied in a bottle similar to the one produced.

Mr. William Walls, surgeon, Oak Street, said the bottle found by the policeman contained prussic acid. Upon making a *post-mortem* examination of the two bodies he discovered indications of the presence of prussic acid which had caused death. On the Wednesday previously the elder deceased had called upon him and complained of pain in her left arm, and she wanted it bled, saying it had bled through a scratch she received a few days before, and it relieved her. He told her to bring her mother with her. She went away, but did not come again. He thought that she wanted him to open a vein, and that she was not sane.

The jury returned a verdict to the effect that Annie Gurlin poisoned herself and her child, Ada Millicent Gurlin, whilst in an unsound state of mind. It transpired that the woman who supported the statement made by the elder deceased to the druggist was named Mary Walker, and she was present at the inquest. The jury, in censuring her conduct, expressed their opinion that proceedings ought to be taken against her.—*Manchester Courier.*

Death by Misadventure.

On Wednesday, October 6, Dr. Hardwicke held an inquest at 13, Devonshire Terrace, Paddington, touching the death of Harriet Scott, aged 74. It appeared that a chemist who prepared an injection ordered by her physician, inadvertently put in a double quantity of morphia.

After deliberating for a considerable time the jury returned a verdict of "Death by misadventure."

Obituary.

JOHN BOHLER.

A recent obituary in the Sheffield *Daily Telegraph* contained a notice of the death of Mr. John Bohler, at the age of 75, and from a later issue we take the following interesting particulars:—

Although neither a native nor a settled inhabitant of Sheffield, the late John Bohler was so well known to many of our townspeople, especially the older members of the medical profession, and to the students of botany in general in various parts of the kingdom, that a few words of record seem due to his memory. We believe he was born at South Wingfield, in Derbyshire, of a very humble stock, and of parents to whom he owed nothing beyond "the accident of his birth." He learnt to read and write, after a fashion, at the village school, and as early as possible was put to stocking-weaving, the common employment of the neighbourhood. From his earliest boyhood he had a taste for collecting and identifying plants, heaps of which were piled up in his lodging-room.

In due time he found that certain plants had not only medical virtues, but a selling price, so he became a collector for the apothecaries and druggists, and probably no man in England was better acquainted with the habitat of every officinal herb, infusions of which are recognized in the Pharmacopœia or adopted in empirical practice. Hyoscyamus, colchicum, daphne, etc., continued in use, but decoctions were giving way to alkaloids. He tried his hand at these, but he was no chemist. Curiously enough the disciple of Culpepper, Thornton and Hill never sank into that most arrant of quacks, the modern "herb doctor."

His vocation of collector led to a loose, rambling, but sober and studious life. His means of purchasing books were exceedingly limited, but he borrowed and read most of the popular works on botanical science, of which he acquired a competent knowledge; these, added to his experience as a collector over a very wide field, made him a welcome visitor to the closest naturalist.

About thirty years ago his name appeared on a work entitled 'Lichenes Britannici,' several *facsimiles* of which were published by the late Mr. Ridge; the specimens being collected and mounted by Bohler; and the description written by Dr. Deakin, author of 'The Botany of the Coliseum of Rome.' These "time stains," as they were somewhat poetically called by our forefathers, are mostly found growing on the barks of old trees, or on walls or rocks; they are sometimes rich in colour, and curious in their structure, especially as seen under the microscope. One arboreal species is known as *Lecidea Bohleri.*

We believe he one year delivered the sessional lectures on botany at the Sheffield Medical School, besides giving private lessons. Perhaps the most complimentary and only compensating employment he ever met with, was being engaged some years ago by a Committee of the British Association to assist in a botanical exploration of Snowdon, North Wales. He wrote the account of local plants in Dr. Aveling's 'History of Roche Abbey.'

Of late years he has devoted his attention to the cryptogamic races, especially fungi, for mounted collections of which he usually found purchasers. But toadstool collecting was a lean pursuit, most persons caring little about any except the esculent ones. Nor was pondering in damp places and in the winter time, at his age, and often, it is to be feared, with an empty stomach and an insufficient supply of clothing, favourable to health, to say nothing of comfort. And so, from little to less, and, we are afraid, from that to nothing, the substance of the poor old man fell off.

He was until about twelve months since one of the most untiring walkers in the kingdom, England and

Ireland having added their botanical varieties to his research. But his familiar beat was Sherwood Forest, and there within a few weeks he took a last farewell of scenes so long and delightfully familiar. He had personal peculiarities, failings, perhaps faults. A vagrant life, however picturesque, is rarely favourable to the *res angusta domi*. In aspect, manners and conversation he was the very personification of an unaffected simplicity; and his old friends in Sheffield concur in the regret that a man so modest and interesting, who may be considered, perhaps, the last example of a character once better known as the old English simpler, should have closed his life in indigence and obscurity, if not actual destitution.

Notice has been received of the following death:—On the 31st October, Mr. Thomas Percival Mucklow, chemist and druggist, of George Street, Aston, Birmingham.

Reviews.

QUALITATIVE CHEMICAL ANALYSIS. By Dr. C. REMIGIUS FRESENIUS. 8th ed. Translated by A. VACHER. London: J. and A. Churchill. 1872.

Fresenius' works on qualitative and quantitative analysis hold so high a place in the estimation of English students of practical chemistry that the reviewer approaches his task of meting out praise, or of finding fault with a standard work like the new eighth edition of the qualitative analysis, with considerable hesitation. Most of our readers will learn with satisfaction that the liberties which Mr. Vacher took with the last English edition have not been repeated, and that the author's wish and *injunction* to adhere strictly to the original text have been faithfully complied with. On the score of justice to the German author, and in view of the advantages accruing to the English student, we congratulate the editor that he abandoned "the broad view of his duty" and contented himself with becoming a mere translator.

Fresenius divides his book into two parts, each consisting of several sections. Every one familiar with laboratory teaching will know that the first two sections, comprising eighty pages of the work, descriptive of divers chemical operations and of reagents, are, as a rule, passed over, and that the student is set at once to practise the reactions for bases and acids. The information they convey—admirable of its kind—is usually glanced at only when a reference to any of the manipulatory operations described has to be made, or when some information about reagents is wanted. The plan of the book evidently assumes that a general knowledge of chemistry, such as is obtainable by attending a course of lectures, has been acquired previously to the study of qualitative analysis. If so, the value of the elaborate and detailed instructions consists in being useful matter of reference. The section treating of the reactions of the bases and acids has by general consent always been looked upon as the most useful part of Fresenius' qualitative course. The accuracy and fulness of the information collected during many years by the author is beyond praise; and if it were for nothing else, the book should be in the hands of every chemical student. The additions comprise, among other things, careful instructions regarding the spectra (illustrated by a new spectrum table) of the elements which can be studied by means of a Bunsen flame, and the results of Bunsen's experiments on the deportment of bodies at a high temperature. Spectrum analysis has made such rapid strides during late years that it may be questioned whether the meagre information conveyed to the student, by tacking on to the qualitative laboratory course a description of some of the more easily obtainable spectra of the metals of the alkalies and alkaline earths, satisfies the cravings of an earnest student; and whether it may not be advisable to reserve spectrum analysis, with the application of an induction coil, for a separate course of study. It is to be hoped that some of our masters of spectral analysis will soon supply a want felt by laboratory students of a short and concise treatise on the new branch of chemical analysis.

Fresenius is sometimes carried away in his desire to supply as much information as possible, as is evidenced, for instance, on p. 103, where we are told that in respect to the detection of traces of alumina by an alcoholic solution of morin, the analyst should compare Goppelsroeder, Zeitschr. f. Anal. Chem. 7, 208. We are afraid this injunction will be as frequently disregarded as not. In fact, throughout this section of the book it becomes noticeable that much of the new information conveyed by the author will remain mere matter for reference; and this tendency of expanding and taking account of matter which cannot be looked upon as absolutely necessary to an elementary course of qualitative analysis had, no doubt, induced Mr. Vacher—and we own with much justice—to apply the pruning-knife. It would have been well if the author had distinguished the more important from the less valuable reactions by means of small type, as is done now in many text-books. In fact, the student gets, on first acquaintance, utterly bewildered with the host of reactions and injunctions regarding solubility in water, alkalies, acids, salts; and lasting discouragement results from not being able to grope his way through this labyrinth of disjointed facts. Throughout the whole book there is not one hint how best to overcome the difficulty of fixing the numerous chemical changes upon the memory; the analyst is simply told to perform certain operations and to note certain changes. No such help as may be derived from proper methods of generalization of results of a similar kind is even so much as hinted at. There is no attempt made at explaining or giving a reason for the chemical changes propounded, or at showing the analogy and natural connection between the various reactions. These omissions have always been looked upon as serious defects in the work; defects which the new edition does nothing to efface.

The second part, comprising directions for the analysis of simple salts and complex bodies, exhibits even in a more marked degree the painstaking nature of Fresenius' teaching, but if bewilderment seized the pupil on studying the reactions given in the first part, he becomes utterly demoralized by the intricacies of the directions how and what to do in the second. It is evident that the attempt to guide the analyst through the numerous phases of *possible* complications has misled Fresenius into unnecessary repetition and into constant references backwards and forwards. Instead of being guided how to work out for himself methods of separation based upon the knowledge of the properties of bodies which he has acquired, the analyst has to be constantly led by leading-strings, and to be told how to move, step by step, on the chess board of qualitative analysis, and hence when left to his own resources he becomes as a rule utterly helpless. The distinction between the few leading experiments and mere confirmatory experiments involved in the preliminary examination of substances does not become sufficiently apparent. We hold, with all due deference to the eminent author, that it is highly objectionable to adopt separate analytical courses whether the substance under examination be a simple or compound body,—a solid or liquid,—a metal or an alloy,—neither a metal nor an alloy,—whether it be soluble in water or acids, or insoluble in either,—whether organic acids be present or not. There is scarcely a commercial salt which does not contain sufficient discernible impurities to advance it from the division of simple salts into that of compound bodies. Telling the analyst what to *expect* is not a method conducive to lead him to use his own judgment correctly, and is liable to work much mischief. Moreover, an earnest student does not want to be told constantly what to do. Part of the interest attached to chemical analysis is destroyed. A carefully compiled analytical course should provide for every contingency that may arise without involving tedious and fatiguing repetitions. A student may surely be supposed to have learned *ex gr.* by the time he arrives in compound analysis that a yellow sulphuretted hydrogen precipitate may consist of sulphides of cadmium, and arsenic, as well as stannic sulphide; and to tell him (p. 237) that in that case he should look for these substances *only*, may well be treated as an act of supererogation. Instructions of a similar nature will not teach the analyst to think for himself and to learn to draw correct conclusions from the facts he observes.

Testing specially for silicic acid among the substances precipitated by chloride of ammonium and ammonia, also for oxalates, etc., as Fresenius still does, instead of removing silicic acid by evaporation and filtration, and decomposing oxalates, etc., previous to proceeding to groups III. and IV. uselessly complicates the analysis of these groups, already rendered sufficiently difficult by the presence of phosphates which cannot be eliminated with equal facility.

As might be expected from the experienced author, part II. abounds with numerous interesting explanatory notes which will be especially valued by private students. An appendix treats in a comprehensive manner of the deportment of the most important medicinal alkaloids with reagents.

It is to be regretted that the author still adheres to the old notation (O = 8). He should have been made aware that, in this country at least, the unitary system of notation is all but generally adopted by chemists.

In conclusion we may say that every one interested in analytical chemistry will hail this book with pleasure, and it is to be hoped it will not be long before a much wanted new edition of Fresenius' quantitative analysis will make its appearance.

BOTANY FOR BEGINNERS, AN INTRODUCTION TO THE STUDY OF PLANTS. By Dr. M. MASTERS, F.R.S. Bradbury, Evans and Co.

Introductory works on botany have not been infrequent of late, and this is one that will be perused with interest by many, especially by those who, having a fondness for flowers, are desirous of knowing something of the scientific story of the lives of plants which is here told in an agreeable and attractive manner.

With regard to the value of the work to pharmaceutical students, we must say a few words. Originally appearing in the pages of a newspaper it is somewhat desultory in form, and the author has adopted what is to our thinking the objectionable plan of commencing with expositions of imperfect flowers. The willows, poplars and ashes, were probably in flower when the first chapters of the work appeared, but it is only during a very few weeks in the spring that these are to be met with. When a student takes up a work and his attention is directed to plants or trees none of which are at the time in flower, although there may be plates which to a certain extent supply their absence, he loses the practical value of an examination, and very probably misses the thread of the discourse. The real value of a work like this consists in its leading the student onwards by practical acquaintanceship from one step to another; and the material required to work upon should be ready to his hand during as many months of the year as possible. Further than this, we doubt the propriety of commencing with the study of imperfect flowers. Is the first lesson best learned from an imperfect type? Does not the examination of a common buttercup give a better groundwork to the study of the relation of the floral organs than can be acquired from a willow catkin?

Let the student work first upon such a plant as that, becoming thoroughly acquainted with the organs common to most flowering plants which are there clearly represented, and he will afterwards take more interest in and better understand those forms of vegetation in which certain organs are suppressed or merely indicated.

We have also a controversy with the author's use of the word *inseparate*, to express the union of parts, instead of the accepted terms cohesion and adhesion. He apologises for the use of a word "as yet not in common use," but the word is as old as Shakespeare's time, and was used by him in a sense quite different, namely that of indivisible,

> "this is, and is not, Cressid!
> Within my soul there doth conduce a fight
> Of this strange nature, that a thing *inseparate*
> Divides more wider than the sky and earth;
> And yet the spacious breath of this division
> Admits no orifice for a point as subtle
> As Ariachne's broken woof to enter."

Surely this cannot be the right word to express, as our author says, "an apparent union,"—a case of mild attachment. Botanical terms are sufficiently multiplied without further additions, and unless new definitions are clearly shown to hit the mark we are better without them. In this case we think the shaft flies wide, and the reasons for its being launched are not clearly given. We are told at page 28 "that the terms cohesion and adhesion imply that parts originally separate became subsequently united; but this is not in the generality of cases a true expression of the state of affairs. Such a union does take place sometimes, but very rarely."

So far so good; but the antidote to this statement had been given a few lines before, where it is stated,—"But more than this, the stamens are free above, but *inseparate* from the tube of the perianth below. They too began life as independent stamens, but the isolation ceases after a time, and in adult life they appear as if joined to the tube of the perianth." The "beginner" will not easily reconcile these statements, and a want of precision is confusing to any one who reads carefully for the purpose of study. Whilst thus differing from Dr. Masters, it gives us much pleasure to draw attention to the merits of his little work. His descriptions of plant life are simple and efficient, written in so lively and pleasant a style that we should judge the book could by no possibility be dull to any one who has a taste for the study. Without making much pretension it covers a good deal of ground, and each subject is so touched upon as to give a picturesque view of some aspect of plant story. The book is enlivened and made more useful by the presence of a number of woodcuts, some of which are new and very good, whilst others are old friends, and although the work cannot be taken as a Primer, it is one that will do both "beginners" and others good to read.

CHEMISTS AND DRUGGISTS' DIARY AND PHARMACEUTICAL TEXT BOOK. 1873.

Amongst the numerous diaries which are issued at this period of the year, the above presents features of peculiar interest to the chemist and druggist, and the Chemists and Druggists' Diary for 1873 is calculated to keep up the reputation won by its predecessors. The portion devoted to the diary proper seems to be printed on finer quality paper than heretofore, and several new features have been introduced into the skeleton pages. There is some useful letter-press at the end, although not so much in quantity, we think, as last year. The collection of recipes will no doubt prove useful for reference. For one or two of these a source nearer home than a general reference to three American journals might have been given; and here and there some of them present a slovenly appearance, as for instance in the reproduction of a statement that half a pound of Ung. Hydrarg. Oxidi Rubri made eighteen months ago presents at this time just as fine an orange-chrome colour as when first made, which, though correct when it appeared in a dated periodical nine or ten months since, may have been scarcely suited for indefinite repetition. These, however, are minor defects; and besides these recipes there is a very useful dictionary of incompatibilities, together with the usual, as well as some unusual, almanac matter.

Notes and Queries.

[323.] GLASS LABELLING.—I should be glad if any reader would inform me how to affix glass labels to drawers, as the whole of mine are falling off, notwithstanding I have only recently had my shop entirely refitted.—A Chemist.

[324.]—EMULSION OF WINE AND OIL.—Can any of your readers give me the process for "Uniting Oil and Wine" without any intermediate substance? I understand this is done by the medical profession and chemists at Hastings, and is a favourite remedy in consumption.—A.S.

[325.]—LYCOPERDON GIGANTEUM.—Will any of your readers inform me, (1) whether the unripe *Lycoperdon giganteum* plant is wholesome as food, and (2) at what period of its life it becomes useful (on combustion) for taking bees.—L.

CHLORAL HYDRATE AND BROMIDE OF POTASSIUM.—Dr. James Thompson, of Leamington, states in the *Lancet* that he has found a combination of chloral hydrate and bromide of potassium very useful in *delirium tremens*, and that in many cases where sleep was not produced by chloral hydrate alone, it was obtained by the addition of an equal proportion of bromide of potassium to each dose.

DELICATE TEST FOR AMMONIA.—M. Lex proposes to take advantage of the fact that liquids containing only traces of ammonia are coloured green if treated first with carbolic acid and afterwards by chloride of lime in testing for ammonia.—*L'Union Pharmaceutique.*

PRESERVATION OF PENCIL AND INDIA INK DRAWINGS.—To accomplish this object Erckmann recommends that the drawings should be placed upon a glass plate or smooth board and covered with collodion, containing two per cent. of stearine. When dry they may be washed with water without being injured.

BOOK RECEIVED.

The Beginnings of Life: being some account of the Nature, Modes of Origin and Transformations of Lower Organisms. By H. Charlton Bastian, M.A., M.D., F.R.S. With numerous illustrations. London: Macmillan and Co. 1872.

The following journals have been received:—The 'British Medical Journal,' November 9; the 'Medical Times and Gazette,' November 9; the 'Lancet,' November 9; the 'Medical Press and Circular,' November 9; 'Nature,' November 9; the 'Chemical News,' November 9; 'English Mechanic,' November 9; 'Gardeners' Chronicle,' November 9; the 'Grocer,' November 9; the 'Journal of the Society of Arts,' November 9; 'Grocery News,' November 9; 'New York Druggists' Circular' for November; the 'Dublin Journal of Medical Science' for November; 'Scientific American'; the 'Indicator,' November 9.

Correspondence.

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

Payment of Local Secretaries.

Sir,—As an old student I have the greatest affection and respect for everything associated with Bloomsbury Square, and for several years past I have contrived a pilgrimage to the Annual Meetings. A variety of circumstances this year deprived me of my usual treat, but an announcement in the Journal that, in connection with the meeting for distributing the sessional prizes, etc., on October 2nd, articles of novelty and interest would be exhibited, induced me to be present. I enjoyed the meeting; saw several old friends, and grasped the hand of our beloved Professor Bentley, but I must express my disappointment at finding not a single exhibit. Clearly no great pains had been taken to secure any, or is it really to be understood that at present pharmacy is so developed that no scope remains for further extensions and improvements in appliances and apparatus, or have the questions associated with poison regulations, and the Preliminary examination swamped all other energies?

I am a local secretary, and in speaking for myself I doubt not I express the sentiments of others. Whatever time or trouble is devoted to the interests of the Society and the trade is a labour of love, and no money payment in any shape is expected or wished, but I do ask that the Society will make it worth our while to make an occasional journey to London as pharmacists. I shall shock some when I state my preference for the old style of conversazione to the more modern entertainment at South Kensington. Continue this as a social gathering and to please the ladies, but do not let it and the politics of the Annual Meeting absorb the occasion.

I ask that something may be done for the further education (pharmacists never cease to be students) of those who have perhaps long ago done with examinations, and who, as a rule, will not care to pore further over the contents of our present museums, valuable as these may be. What we want is opportunity of inspecting in a focus the latest and most improved forms of the tools we use, whether in practical pharmacy, experimental chemistry, analysis, or microscopy

I hope ere long to see space secured for a permanent collection of laboratory apparatus and trade appliances, but until this is realized, cannot we have a temporary display at the time of the Annual Meeting?

The provincial local secretary will most likely wish to spend a morning in the library of the Society, conning over the books to see what volumes he can with profit add to his own shelves at home, and examining the latest edition of standard works. Until recently a table was spread with a rich selection of scientific periodicals, English, Continental and American. Why does this arrangement no longer exist?

John Whitfield.

Scarborough,
November 5th, 1872.

Examination Fees.

Sir,—Several of your correspondents in debating the educational question, demur alike to an increased stringency in the examinations to the Society, demanding from candidates proof of their having passed through a curriculum of previous study, and to the continuance of the present very moderate amount of examination fees, on the ground that fewer persons are entering the business than formerly, in consequence of the barriers which already exist; and they who demur deprecate any increase in the difficulties which bar an entrance on the legal practice of pharmacy, apparently dreading in the immediate future a famine of legally qualified pharmaceutists and chemists and druggists.

There is, however, one point which seems to have been much overlooked in the discussion of this subject, and that is the fact that there is at present—and for some years to come there is likely to be—a great many more legally qualified chemists than can possibly obtain a living by the practice of pharmacy; hence a large proportion are compelled to eke out a subsistence by adding other trades to their own legitimate one, by counter prescribing, and sometimes by even less excusable incursions on the domain of medicine and surgery. This is the direct result of there being many more persons embarked in the calling than there is any need for. Many of these persons—in the country especially—have as boys picked up a rudimentary knowledge of drugs in apothecaries' surgeries, or as porters in the service of druggists, and from their social position and antecedents, are tolerably satisfied if they can clear from their business as much as a skilled mechanic receives as wages. Others have been indeed apprenticed to a druggist of some sort or other, but either through their own apathy, or through lack of opportunity, their knowledge of pharmacy and its allied sciences is little or nothing in advance of the first named. Now it is to be expected and desired that both these classes of persons should gradually disappear; and I do not hesitate to say, that if pharmacy is to be made worth the attention of educated young men as a business career, that the number of "chemists shops" in proportion to the population must greatly decrease, their place being taken by a much small number of pharmacies, and a considerably increased number of oilmen, Italian warehousemen, booksellers, photographers, etc. This gradual separation of incongruous businesses will of course be a work of time, but the sooner it takes place the better for the public and ourselves. There will be in the future a difference both in quantity and quality; and there is urgent need that the first decrease and the second improve. Meanwhile there need be no "searchings of heart" for some time to come with regard to a falling off in the number of registered practitioners of pharmacy.

Wm. H. Hayward.

Trowbridge.

Sir,—Anonymous correspondence, as a rule, does not deserve the same attention as if authenticated by name and address of the writer; but I cannot allow the remarks of 'An Underpaid Assistant' to pass without calling in question their correctness. There are few, if any, assistants "well up" in their business here who would accept a salary of £50 or even £60 per annum. I know many, anything but well up, receiving higher salaries; but this is, to some extent, beside the question at issue, as there are other reasons, as well as those given, why assistants are leaving the business, such as long hours and confining employment, as compared with other businesses. My statement, however, I adhere to, viz., that the present scale of examination fees has not only pressed heavily on some who have gone forward to the examinations, but has deterred others from going forward at all. And I gave this as a reason, among others, why the fees should be reduced instead of raising them as proposed by Mr. Vizer and Mr. Carteighe; but 'An Underpaid Assistant' seems to doubt this. I have to remind him, however, that it is not a question of "three guineas" at all, but five guineas, and in some cases eight and nine guineas, and with Mr. Carteighe's addition would perhaps be twelve guineas, some of our young men having had to pay one and two guineas additional for the Preliminary and the same for the Minor. Of course, they were "plucked" once or twice; but this is a contingency always to be looked forward to, and I do not think the Society should make capital out of it. Then the fee for the Preliminary is two guineas of itself, while the medical Preliminary here is only 10*s.* 6*d.* It is little wonder therefore that a young man preparing to study should choose the cheapest, especially when the future prospect is better. Your correspondent thinks the cry for a reduction of fees comes from the wrong quarter; I should like to know from whence it should come, and when. I do not think there is much prospect of it coming from the assistants who are leaving the trade in disgust; and it will certainly not be time for employers to do so when the business has been drained of its best hands.

17, *St. George's Cross, Glasgow, Nov.* 12*th*, 1872. J. M. Fairlie.

The Sale of Poisons.

Sir,—I shall be glad if you will be kind enough to inform me through the columns of your Journal whether or not grocers are allowed to sell chlorodyne and Winslow syrup.

It has recently been decided (Pharmaceutical Journal, page 94), that the sale of Battle's Vermin Killer must be registered; and as it is equally as well known that the two preparations I have named owe their sudorific effects to morphia as it is that the active ingredient in Battle's Vermin Killer is strychnine, it seems to me that the Sale of Poisons Act must be applied to all patent medicines containing poison, if applied to one; and in that case chlorodyne and Winslow's syrup must be classed under part 2, schedule A, Pharmacy Act, 1868.

If my supposition is correct, I shall be obliged if you will further inform me if it is the duty of the Pharmaceutical Society to take steps against parties contravening the Act.

Thos. Brewis.

Amble, September 30*th*, 1872.

Pharmaceutical Education.

Sir,—As one of the "poor unfortunates" mentioned in the letter of an assistant in last week's Journal, I would suggest that instead of spending time and energy in trying to obtain "some privilege," they should take for their motto, "Nil desperandum," and qualify themselves for the existing examinations.

I must confess that at one time I might have added my voice to his, in pleading for privilege, but that now I write from the other side the hedge, and if the following brief sketch will prove a stimulus or encouragement to any assistant, my letter will not be in vain. The only schooling I was fortunate enough to receive was obtained at a small village school, where Latin was indeed a dead language. At the age of fourteen years, I was apprenticed for five years to a chemist in a country town, and during the whole term, only studied very little by fits and starts, never dreaming of a compulsory examination. My term having expired, I took a situation in one of the large manufacturing towns in the north, and when within three months of my 21st birthday I was informed by a commercial friend that I had two examinations to pass, I could hardly believe him; but having ascertained that it was a fact, I set to, and without losing a day at business (with the exception of half a day for the Preliminary and two days for the Minor), with scarcely any aid, and at a cost of under £12, including fees, travelling expenses, etc., within a year I was so fortunate as to receive a star in the Minor, and can now look back on the compulsory examinations as among the good things of life, seeing that knowledge is power and I may add pleasure too.

An Associate in Business.

The Annual Subscription.

Sir,—Attention has been drawn to the fact, that a great number of those who have qualified themselves as Pharmaceutical Chemists do not become members of the Society; one cause is, doubtless, that many cannot afford the extra half-guinea; for the young Major, from want of practical knowledge, or it may be years, often finds himself compelled to accept a junior's berth and salary. I venture to suggest, as a remedy, that Major associates not in business be admitted to membership without extra subscription; this would be an addition to the few inducements offered to students to take this qualification.

A Young Major.

London, November 6*th*, 1872.

The Library.

Sir,—In the interest of provincial pharmaceutical education, may I suggest the desirability of bringing under the notice of the Council the rules which at present regulate the use of the library of the Society by country members.

The rules for the issue and retention of books apply equally to all, and, as a consequence, while to the town member they merely regulate the use of the library, to the country members they almost close it. The postage to and fro of any book of moderate size, and this doubled if the book be retained beyond the fortnight, forms a tax which is almost prohibitory.

What I would suggest is, that to remove in some degree the disadvantage under which country members labour with regard to the library, the Society pay the outward postage of books to the provincial members, and that they be allowed to retain them three weeks instead of a fortnight. By this means the extra expense now incurred by them would be reduced to 50 per cent. and the benefit would be correspondingly increased. The result would be that they would be placed, with regard to their use of the library, more on a par with their London brethren.

The country members may fairly claim the consideration of the Council for this matter, the use of the library being the principal direct advantage they derive from their connection with the Society.

A. H. Claypole.

Early Closing.

Sir,—I am always happy to say a few words on early closing, as I have found from experience that chemists are open much longer than there is any necessity for. The reason people go to a chemist's late is generally because they expect to get in, whereas if the public knew chemists finally closed at a certain time there would be very few late customers. I am quite willing to admit in large towns medicine from a prescription may occasionally be required late; but even this more often is because the patient or prescriber knows it can be dispensed at any hour. I think if chemists were asked if things served after 8 oclock were really necessaries, the majority would answer in the negative. Pennyworths of pills, twopennyworths of castor oil, and seidlitz powders could as well be had before eight as after it, and therefore calls for such trifling remedies—which every one ought to have in their house—cannot be looked upon as a sufficient reason for keeping open so late. I recollect a few years ago writing on the same subject to the 'Chemist and Druggist,' and while I was penning the letter a woman called me up for something for her husband, who, on inquiry, had been poorly a fortnight, and had just then, at 20 minutes to ten P.M., thought he had better take something. This is only one case out of many.

Neither medical men nor the public are unreasonable; and if we are disposed, our working hours *may* and *ought* to be much shortened; for how can we expect our young men to study if they have to work until ten?

Again, Sunday trading many also be reduced to a minimum by a little discretion and pains. Eleven years ago, when I came here, people used to come for all sorts of things on Sunday, but by degrees they have all dropped off, and so have most of my would-be-late customers; and yet my business has increased yearly. I now lock up and turn off the gas at nine every evening, excepting Saturday, and myself and young men either go out or sit at home and read, and on Sunday I do not open at all, and find this arrangement not in any way unpalatable. At the same time, if anything urgent is required, the public have the willing services of

Alfred W. Smith.

93 & 94, *High Street, Rye, Sussex.*

Sunday Closing.

Sir,—Kindly allow me the opportunity of replying to Mr. Wilkinson and 'One who has Known the Drug Trade Thirty Years.' To the latter I say that he is quite mistaken in supposing that I am not in favour of what he calls Sunday closing. In proof of which I assure him that I am fifty-eight years of age, and never in my life opened my shop on a Sunday in his sense of the words; that never since I was my own master have I sold anything on a Sunday that was not required strictly for medical purposes; and that for more than twenty years I have only required the attendance of my assistants in turn, from 12.30 to 1.30; from 4 to 5, and from 8 to 9.

To Mr. Wilkinson I reply, that as no glossary was provided with the announcement of the new agitation, I really did expect something more, or rather something less, was intended than what is described by my friend, which is not Sunday closing. By "closing," a place of business is always understood ceasing to transact business there. If a notice were placed on the door of a broker's office, stating "this office will be closed every day at four o'clock," and one or two clerks always remained behind to receive telegrams, or money, and transact other business, any one being admitted on knocking at the door, say till six o'clock, it would not be true that the office closed at four. Or if a number of clerks were employed at a telegraph office from Monday to Saturday, and on Sundays one or two were in attendance to despatch messages, etc., it could not be said that the office was "closed on Sundays."

I am delighted to find that my brethren are agitating for the establishment of the practice I have adopted for more than a quarter of a century, and heartily wish them success; but I don't "close on a Sunday." I wish I could.

J. T. Slugg.

November 11*th*, 1872.

Patent Medicine Licences.

Sir,—Instead of debating the question of the various prices of a patent-medicine licence, I think we ought boldly to "rise as one man," and ask that licences to sell stamped medicines be only granted to registered chemists and druggists. Now that laudanum is being sold by grocers (Pharm. Journ., Oct. 26th, 1872, p. 339) under the guise of a patent (?) medicine, I should think the Legislature would, if the matter were properly put before them, readily grant this privilege.

When I came into this part of the kingdom I was much surprised to find the regular price of a 1*s*. 1½*d*. patent to be 1*s*. At first I would not believe that the more respectable of the profession would be guilty of lowering the prices; but alas, for the noble science of pharmacy, I found it only too true! Yes; gentlemen who had acquired the higher qualification required by the Major examination, and gentlemen with letters after their names indicating fellowship with learned societies, were doing that which many a greengrocer would scorn to do, namely, selling 1*s*. 1½*d*. puffs at the starvation price of 1*s*. After making inquires, I was informed that the 1*s*. price was started by a local newspaper proprietor, who had to take out the charge for advertising the precious stuff partly or wholly in the patent stuff itself, instead of coin. Whether this be the true solution or not I cannot say, but this much I do know, that patent medicines are regularly sold by my neighbours all at 1*s*., much to my loss and theirs too.

Now, if the trade in patent medicines were confined to chemists and druggists, this terrible state of competition might be done away with, while the public would in no way suffer. I know it would make very little difference to the *élite* of the trade—those who have their dispensing establishments—yet I think the Pharmaceutical Society should look a little to the interest of the more numerous and humble of her children, those poor country druggists whose scanty subsistence is eked out by the sale of sundries, including a very large proportion of patent medicines, and who seldom see a prescription.

Why should one man before he can sell a pennyworth of paregoric, be compelled to spend time, money and talent in passing the ordeal of the Pharmaceutical Society, while another is allowed, for 5*s*. per annum, to dispense such blessings as soothing syrups, laudanum, etc., *ad lib.*? I pause for a reply.

A Village M.P.S.

Sir,—The question of patent medicine dealers and licences has more than once been thoroughly ventilated; and as it can be proved, no doubt, to the satisfaction of anyone, that restricted articles are being supplied to the public by persons who are not registered chemists, and in nowise qualified to deal in the same except under cover of the medicine licence, it is time some action should be taken in the matter. The suggestion of Mr. Alexander Ellis to raise the duty to £2 would probably shut up his opponents, but it would not deter very many unqualified persons from pursuing their present course. Whatever arrangements be made relative to the amount of duty, I hold that this large department of the chemists' business ought to be secured to the properly qualified man. He has little enough compensation for the legal requirements upon his attention; besides which, it is a farce to prohibit a non-registered person selling laudanum, etc. under heavy penalties, when, by paying 1½*d*. in the 1*s*. to Inland Revenue, he can do so with impunity; further than this, it is well known that large numbers of country shopkeepers continue to deal in prohibited articles without in the least disguising the fact.

A Country M.P.S.

Sale of Patent Medicines.

Sir,—I have always been given to understand it to be illegal to open Patent Medicines and retail the contents in small quantities; I find, however, this is largely done in Bristol. Chemists open packets of "Steedman's" and sell the powders singly, or in any quantity; and hairdressers and hucksters sell Whelpton's Pills in pennyworths. One hairdresser purchases £5 or £10 of Whelpton's at a time for this purpose. This sale seems to me to defraud the Revenue, since every 2*s.* 9*d.* box so opened would, if sold in 7½*d.* boxes, produce 9*d.* instead of 3*d.* duty; and were the sale I describe stopped, a far greater number than six 7½*d.* boxes would be sold in place of each 2*s.* 9*d.* It also seriously affects the sale by chemists in the neighbourhood, and they naturally ask, "What can be done to alter this state of things?"

W. H. T.

Totterdom, Bristol, Nov. 3rd, 1872.

SPECIMENS OF COMMERCIAL MORALITY.

Sir,—In your issue for November 9th appears a letter headed "Specimen of Commercial Morality," and signed 'B. NEWHAM AND Co.' With the difference in weight between the invoice and real weights I am not now concerned, but I think your correspondents are not aware of the "doctoring" sponge undergoes before reaching the English market. Perhaps, like myself, your correspondents assumed the sand contained in the sponge was derived from the bottom of the ocean. Some years since, however, I met with a naval officer who had been for some years on the Mediterranean Station. He had watched the sponge fishery closely, and I gathered from him that the value of sponge on the spot where collected had immensely increased. A sponge that ten or fifteen years ago might have been purchased on the spot for a shilling, could not now be purchased for less than five shillings. But as regards the sand, he informed me that the pieces of sponge when procured by the sponge divers were placed separately around their little gardens and were watered daily (once or twice), according to the humidity of the atmosphere, with water in which fine sand was suspended, the sponge, acting as a filter, retained the sand, while the water soaked away. This process was repeated till the sponge would retain no more sand. It was then carefully packed in cases for the English market. It is reasonable, therefore, that as your correspondents observe, the bottom of the case should contain a large quantity of sand. The shaking in transit would naturally produce this result.

Your correspondents probably purchased sponge in original cases, and we all know how large is the quantity of sand in them. Many respectable houses now send out sponge free from sand (at greatly increased prices), and I think it is a fair question for the consideration of the retailer whether such a system is not to his advantage. If I have been misled in my information as to the source of the sand, perhaps some of your correspondents will kindly put me right.

W. JUDD, F.C.S.

Leamington, Nov. 12th. 1872.

W. Cathcart.—Everlasting Chlorine.—The sulphuric acid is added upon the assumption that it causes a concentration of the other acids, as will be seen by the following, which has been kindly furnished to us by the exhibitor, Mr. Septimus Piesse, of New Bond Street:—"One of the actions of concentrated mixed nitric and hydrochloric acids is to evolve chlorine. The addition of sulphuric, by absorbing the water originally with the acids, and also that produced by their decomposition, keeps the acids in a perpetual state of concentration, under which condition they alone act when cold. Theoretically the action is thus—

$$2HCl + 2HNO_3 = 2H_2O + 2NO_2 + Cl_2$$

but this does not represent entirely the reaction which occurs; for at times, unless the temperature be kept down, oxides of chlorine, etc., come over; the addition, therefore, of the sulphuric acid to the nitro-muriatic acid must be very gradual. The everlasting chlorine, as exhibited, was made by mixing the acids of commerce,

Hydrochloric Acid	2 parts.
Nitric Acid.	2 „
Sulphuric Acid	1 „

The first addition of the sulphuric acid to the other acids merely causes evolution of hydrochloric acid. This arises from the sulphuric taking away water at point of contact. Further addition of the acid soon, however, changes the colour of the liquid, and Cl is evolved quite regularly, sparkling like champagne after the first effervescence is over." Your other question we are unable to answer.

"*Methyl.*"—We have no doubt the word applies to the spirit as well as to any preparation containing the spirit; but if you have a licence for keeping methylated spirit, and do not use such spirit for any of the purposes prohibited by the Act, we do not suppose that using it for burning would be interfered with. Ask the supervisor of your district to write to the Inland Revenue authorities.

"*Verbum.*"—1. The word is accented pā′tent or pat′ent by various authorities; some give both. We are not prepared to say which is the more correct. 2. Iodi′dum.

A. G. M.—Numberless recipes for the articles mentioned have been given in former numbers of this Journal, where you will find a mine of information upon these and similar points.

W. B.—No certificates are given to Associates.

"*Elementarius.*"—There is no limitation as to age at present.

A. J. Rayson.—A person who has once passed the Minor examination may at any subsequent time carry on the business of chemist and druggist.

A. B. Daniell.—We should recommend you to ascertain with certainty if there be any silver at all in the lead in question, for if the chloride precipitate is entirely soluble in water, it is pretty clear that silver is not present.

"*Juno.*"—Phosphorus may be administered dissolved in ether; or, still better, in oil. See Pereira's 'Materia Medica.'

"*Verus.*"—(1) According to 'Storer,' 1 part of phosphorus is soluble in 320 parts of cold alcohol, sp. gr. ·799. (2) The same authority gives the solubility of acetate of morphia in cold water as 1 part in 17.

R. Modlen.—We know of no such work as that described by you.

M. P. S.—Mix the spirit of chloroform gradually with the bulk of the water and shake after each addition; the mixture will then be formed free from any separation of chloroform.

"*Kino.*"—We are unable to give an opinion. You should apply to the Inland Revenue authorities.

"*An Apprentice.*"—Huxley's 'Lessons on Elementary Physiology' (Macmillan), or Carpenter's 'Principles of Physiology' (Churchills).

F. Adams.—According to the strict letter of the law, any medicine advertised as a remedy for the relief or cure of any disorder is liable to stamp duty. But the Commissioners interpret this provision with some leniency. With respect to the labels forwarded, you had better apply to the Secretary of Inland Revenue at Somerset House. See an article in the PHARM. JOURN. [1] xiv. 145, and the Calendar of the Pharmaceutical Society.

Co-operative Stores.—"*Disappointed*" sends an account of his experience resulting from taking an engagement at a co-operative stores, which he offers as a "warning." Having left the stores after a short stay, he applied with good credentials for a situation at a West-End house, where, upon his replying to a question as to the name of his last employer, he was simply shown the door. The same result has followed forty-three other applications, with the slight variation that in one case "the person raised his foot and literally kicked me out of his premises." "*Disappointed*" appears to think that having repented of his false step, and been somewhat severely punished, it is time that he were forgiven. Perhaps some of our readers will think so too.

Sunday Closing.—We have received a communication from "An Assistant" who appears to have misunderstood the purport of our remarks on p. 348, since he writes, "According to your view, where a dispensing trade is done, the assistant must be in waiting to dispense any prescription that may turn up. Now, it is this confinement which is the obnoxious thing. It matters very little whether the door be opened or closed as long as I am confined to the place." We do not think that what we wrote is open to this construction. Our statement that it was intended to have "some one in attendance capable of dispensing or selling medicines" refers to an undoubted necessity, but does not imply that the person must always be the assistant. Arrangements would have to be modified according to the circumstances of each establishment; and in some localities it would perhaps be practicable to limit the Sunday dispensing to one or two establishments, each taking its turn.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. P. L. Simmonds, Mr. MacDowell, Mr. W. L. Jones, Mr. A. W. Smith, Mr. D. Hanbury, Mr. G. Dudgeon, Mr. Marshall, Mr. Morris, Mr. Lindley, Mr. O. A. Reade, Mr. Clifford, T. C. H., "Verbum," "Nil Desperandum," "Spongia Usta."

SPECIFIC GRAVITIES OF THE LIQUIDS OF THE BRITISH PHARMACOPŒIA, 1867.

BY CHARLES UMNEY.

The insertion of the specific gravities of most of the liquids in the British Pharmacopœia of 1867 was one of those prominent features which made it surpass its predecessor of 1864, and also the previous editions of the London, Edinburgh and Dublin Pharmacopœias.

The compilers undoubtedly regarded a determination of the density of the officinal fluids, when compared with their behaviour with various reagents, as one of the most rapid methods by which the value of such liquids could be estimated.

Had the "characters and tests" of the Pharmacopœia been enumerated without the addition of the specific gravities of the liquids, then they must have been considered as incomplete; on the other hand, if the specific gravities only had been given without the tests which have been wisely appended by the authors, then such data might have induced some to view a density determination as an infallible method of determining real value.

To the pharmacist, the record of these specific gravities is of vast importance, as he is thereby enabled to make a comparison of the density of those liquids he receives in a manufactured form with those published in the Pharmacopœia, and thus judge approximately of their strength and purity.

Again, to the pharmacist, whose chief aim is to vouch for the value of every preparation he dispenses, no better means can be found for checking the accuracy of his work than a determination of specific gravity, and comparison of the results with the data of the Pharmacopœia.

In order to test the accuracy of the specific gravities given in the Pharmacopœia, I have from time to time since its publication made notes of numerous determinations, and more especially in those cases in which I have found deviations from the officinal density; the discrepancies noticed are but few, taking into consideration the numerous figures there given.

Thinking the publication of those specific gravities, which in my hands have seemed to differ from those of the Pharmacopœia, would not only be interesting to the readers of the Journal, but also give other workers an opportunity of testing their accuracy, I have arranged side by side in the following table the specific gravities as noted by me and those of the British Pharmacopœia.

	B. P. Sp. Gr.	Sp. Gr. Found.
Acid. Sulphurosum (9·2 pr. cnt.)	1·040	1·048
Ext. Cinchonæ Liquidum . .	1·100	1·122
Liq. Bismuthi	1·122	1·134
Liq. Calcis Chloratæ	1·035	1·050
Liq. Ferri Perchlorid. Fort. .	1·338	1·445
Liq. Hyd. Nitratis Acidus . .	2·246	2·130
Liq. Plumbi Subacet. . . .	1·260	1·270
Liq. Sodæ Chloratæ.	1·103	1·090
Syr. Ferri Iodidi	1·385	1·400
Syr. Mori	1·330	1·298
Syr. Papaveris	1·320	1·330
Syr. Sennæ	1·310	1·320
Tinct. Ferri Perchloridi . . .	·992	1·007

It cannot be too much impressed upon every pharmacist that, in order to ensure the uniformity so much to be desired in medicine, it is absolutely necessary that he should make frequent specific gravity determinations of those liquids which pass through his hands.

To the manufacturer a knowledge of specific gravities is invaluable; having once verified the divisions on the scale of his hydrometer, he uses it without reserve; for by its indications he is enabled to judge of the care and diligence bestowed upon the fabrication of a solution, the component parts of which have previously come under his eye, even although he had no opportunity of watching the process.

Acid. Sulphurosum.—It has been shown (PHARMACEUTICAL JOURNAL, vol. X. p. 516, and Proceedings of the Pharmaceutical Conference, 1869, p. 77) that a solution containing 9·2 per cent. of sulphurous anhydride will have a specific gravity of 1·048 and not 1·040, and that a solution of 5 per cent., the strength now generally adopted, is of specific gravity 1·027.

Extract. Cinchonæ Liquid.—It is directed to evaporate the aqueous extractive from one pound of Calisaya bark to three fluid ounces, or until the specific gravity be 1·200, and to this add one ounce of alcohol (·838). The resulting liquor is said to be 1·100 (about).

I have found that a mixture of fluid extract of cinchona and spirit of wine of the density described will be of specific gravity 1·122. I would modify, therefore, these directions, not only because of this discrepancy, but because they are wholly based upon an error, for it is assumed that *three fluid ounces* of liquor can be obtained from one pound of bark, a yield much beyond the average, and which would be defined with more accuracy as *two fluid ounces.* If the present proportions of volume of cinchona extractive and spirit of wine are to be adhered to, then the Pharmacopœia should direct that one-third of its volume of spirit of wine should be added to the fluid extract of cinchona, when the specific gravity would be 1·122. If, however, a 1·100 density be as concentrated as it is thought necessary to prepare the fluid extract of cinchona, then the directions should be amended thus: Evaporate the liquors to *two fluid ounces,* or until the specific gravity be 1·175; to this add one-third of its volume of rectified spirit, when the resulting liquor will have a specific gravity of about 1·100 (1·102).

Liq. Bismuthi.—Although perhaps the officinal method is seldom resorted to for the production of the liquor, still it would be well to amend the specific gravity as it now stands in the Pharmacopœia, to 1·134.

Liq. Calcis Chloratæ.—In this preparation we have an example of specific gravity being no indication of strength, as the chlorinated lime from which this solution is prepared, is a mixture of variable proportions of hypochlorite, chloride and hydrate of calcium, the specific gravity being chiefly influenced by the chloride of calcium present. I look upon the specific gravity 1·035, identical as it is with that of the Dublin Pharmacopœia, as an error; for in my hands using 30 per cent. chlorinated lime the specific gravity has not been less than 1·050, and in taking good commercial chloride of lime I have found the specific gravity to be 1·057. Good commercial chlorinated lime never contains less than 33 per cent. and sometimes as much as 37 per cent. of available chlorine. My experience has taught me that chlorinated lime is sent into the market for the use of the druggists, of such a low chlorine value as would not be accepted as bleaching powder in any manufactory where purchase is preceded by analysis, unless offered at a reduction in proportion to its real value. I should suggest that in future chlorinated lime should be described as containing *one-third* of its weight (33·3 per cent.) of available chlorine. I append the results of a recent examination of specimens of Liq. calc. chloratæ, B. P., of pharmacy.

	Spec. grav.	Available Chlorine per cent.
Brit. Pharm.	1·035	2·958
No. 1	1·045	1·830
No. 2	1·049	2·780
No. 3	1·042	·590
No. 4	2·600	1·053

These show that anything but uniformity exists, and that the maximum chlorine value is seldom or ever attained. In all probability, were the standard of the chlorinated lime raised to 33·3 per cent., then we might have a liq. calcis chloratæ containing 3 per cent. of available chlorine.

Liq. Ferri Perchloridi Fortior.—It has been shown by Abraham (PHARM. JOURNAL, vol. IX. 2nd series, p. 272) that the specific gravity of this liquor should be 1·445 and not 1·338, and this I can corroborate. While writing upon this solution, I would suggest that in future a somewhat smaller quantity of nitric acid be used than is at present ordered, as the great excess over and above the theoretical quantity acts powerfully upon the spirit of wine with which the liquor is diluted for tincture, and renders the tincture most unacceptable to those who were accustomed to the tincture made by the London Pharmacopœia process.

Liq. Hydrarg. Nitr. Acidus.—In my hands the directions of the Pharmacopœia have been insufficient to ensure a uniform result.

We are told "to boil (the solution of the mercury in the acid) gently for fifteen minutes, cool, and preserve the solution in a stoppered bottle. Specific gravity, 2·246." No mention is made of making up the product to a given weight or measure.

On the several occasions on which I have made the solution, I have never obtained it of the officinal density, 2·246. The greatest gravity I have noted after fifteen minutes' gentle boiling has been 2·130, sometimes it has been much less. I would suggest that the following clause be added to the directions:—"Let the product be made to measure 5 oz. 1½ fluid drachms, or to weigh eleven ounces. The specific gravity should be 2·130."

Liq. Plumb. Subacet.—The directions for preparing this liquor are almost identical with those of the London Pharmacopœia, although the proportions are somewhat varied—

	Pharm. Lond.	*Brit. Pharm.*
Acetate of Lead	2167 grains.	2187·5 grains.
Litharge	1280 grains.	1531·2 grains.
Water	20 oz.	20 oz.

The increase in the acetate of lead is unimportant, but the proportion of litharge is nearly 20 per cent. (19·6) greater in the British than in the London Pharmacopœia. In Phillips's translation of the London Pharmacopœia, 1851, the specific gravity is described as 1·260; and although the proportion of litharge has been thus augmented, in the British Pharmacopœia the solution is still said to be of specific gravity 1·260.

Now I have found that it is possible to obtain a solution when making a large quantity with the greatest ease at 1·285, and even in making a quantity of one pint, which I imagine is seldom done, the resulting liquor will have a density of 1·270. This, I should suggest, should be the recognized minimum gravity of the officinal solution.

Liq. Sodæ Chloratæ.—Although I have scheduled this solution, and have given a specific gravity which, I think, would represent a solution of carbonate of soda, 12 oz. in 36 oz. water (1·100), into which chlorine (not dried) has been passed to saturation and increased thereby in weight 3·3 per cent,—still I have never been able to obtain a solution containing 2·535 per cent. of available chlorine by this officinal process, neither have I been fortunate enough to meet with any manufacturer who has ever been more successful.

The strongest solution I have produced has contained 2·02 per cent of available chlorine when examined immediately after production, with specific gravity 1·090, but this has rapidly decreased in value, on account of free chlorine being present, which, decomposing the bicarbonate of soda, is converted into chloride, and consequently unavailable chlorine. As far as I can estimate, this very nearly corresponds with the theoretical quantity that would be contained in the hypochlorite of soda formed, presuming the liquid to be in addition saturated with free chlorine. If the statement be true, that when the chlorine comes in contact with the solution of carbonate of soda, there are formed hypochlorite, chloride and bicarbonate of sodium; then the 12 oz. (5250 grains) of carbonate of soda ordered in the Pharmacopœia would require 651·6 grains of chlorine, 325·8 grains of which would be transformed into hypochlorite, and would be always available in the proportion of 1·469 per cent. of chlorine in the perfected solution.

Let us presume the addition to this of the quantity of chlorine in an aqueous solution, which is about ·606 per cent.,

Then 1·469 Chlorine (as Hypochlorite)
+ ·606 Chlorine (as free Chlorine)

= 2·075 per cent. of available chlorine,

closely corresponding with the result I obtained in practice (2·02). It may be argued that this is rather speculative, but if we turn to Pereira's 'Materia Medica' (page 556), we find at any rate one part of this corroborated as far as the hypochlorite is concerned, by the composition of the chlorinated soda of the London Pharmacopœia being expressed as,

Hypochlorite of Soda	3·11
Chloride of Sodium	2·44
Bicarbonate of Soda	6·26
Water	88·19
	100.00

Now as hypochlorite of soda has 47·7 per cent. value of available chlorine, the quantity of hypochlorite in the solution of the London Pharmacopœia will be equal 1·48 per cent. of available chlorine, free chlorine being altogether ignored. It is difficult to understand why there should be such a different statement as to strength in the two Pharmacopœias, when the same proportions of ingredients are given in both formulæ.

To confirm my opinion upon the impossibility, or at any rate the impracticability, of preparing this solution by the officinal process, I examined specimens of "Liq. Sodæ Chlor. B.P." of pharmacy, with the following corroborative results:—

	Spec. Grav.	Available Cl. per cent.
Brit. Pharm.	1·103	2·53
No. 1	1·041	2·40
No. 2	1·070	1·72
No. 3	1·093	4·05
No. 4	1·047	2·08
No. 5	1·080	·71

A qualitative examination convinced me that most, if not all, had been made by a process of double decomposition between chlorinated lime and carbonate of soda; indeed, with some the decomposition had been so imperfect, that considerable quantities of lime salts were left in solution. To remedy this very unsatisfactory state of things, I should suggest that in future the chlorinated soda be made by a double decomposition process, as in the Dublin Pharmacopœia and French Codex, altering the proportions, however, thus—

"Take good commercial Chlorinated Lime, (33 to 35 per cent. Cl.)	16 oz.
Carbonate of Soda	24 oz.
Water	1 gallon.

"Dissolve the carbonate in two pints of the water, and triturate the chlorinated lime with the remainder, allow the solution to stand three hours, then filter; add the carbonate of soda solution, separate the precipitate by a second filtration," or the whole might be accomplished by one precipitation and filtration as in the French Codex. The specific gravity of such a solution will be 1·054, and will contain at the least 2·53 per cent. (the present Pharmacopœia quantity) of available chlorine.

This process has also the advantage that the solution can be made in three or four hours by any pharmacist, whereas the British Pharmacopœia process is only suited for a chemical factory, and the result very unsatisfactory.

Syrupus Ferri Iodidi.—If the directions of the Pharmacopœia are strictly followed, and the weight of syrup there ordered to be made from two ounces of iodine be made up to *two pounds eleven ounces*, then the specific gravity of the syrup will be 1·400 and not 1·385.

If the syrup of 1·400 specific gravity be put aside for a few days, it will soon be found that the sides of the bottle will be studded with crystals. I have placed several bottles, taken at various times, aside for the purpose of noting the change. In all, crystals of sugar well defined, as large as crystals of sulphate of soda, can be seen. It is also worthy of remark that in all these specimens of 1·400 specific gravity, in which the crystallization of sugar has been going on, the upper part of the liquid is tinged with free iodine, whereas in a syrup of the 1·385 density placed side by side with the other specimens, no such colour has made its appearance, neither is there the least sign of crystallization.

It would be well, therefore, to amend the Pharmacopœia directions, thus, "The product should weigh when cold *two pounds eleven ounces and three quarters*, and should have the specific gravity 1·385.

Syrupus Mori.—If the directions for preparing syrup of mulberries be strictly followed, the spirit added, and the product made to weigh *three pounds six ounces*, then the specific gravity will be 1·298, and not 1·330. It can be seen by a comparison of the proportion of sugar ordered for this syrup, with the quantity directed to be used for syrup of lemons, or even some of the other officinal syrups, that if 1·330 be the correct specific gravity of the mulberry syrup, then the other syrups are incorrectly described in density. It would be well to amend the formula thus:—

Mulberry Juice	(sp. gr. 1·060)	1 pint.
Refined Sugar	,,	2 pounds 3 ounces.
Rectified Spirit	,,	2½ fluid ounces.

The product should weigh *three pounds six ounces*, and have the specific gravity 1·330.

Syrups of Poppy and Senna.—The slight variation is of little importance. In all probability it is due to the better exhaustion of the senna and poppies.

Tinct. Ferri Perchloridi.—As this tincture is a mixture of one fluid part of solution of perchloride of iron with three fluid parts of spirit of wine, it is obvious that if the specific gravity of the Liquor Ferri Perchlorid. Fort. is incorrect, then the tincture prepared from it will also be incorrect. From *a liquor* of 1·445 *the tincture* will be of specific gravity 1·007.

Having then given these criticisms upon the specific gravities of the Pharmacopœia, it would, perhaps, be interesting to append a list of some other specific gravities I have noted, which are not figured in the Pharmacopœia at the present time, and although they are but of little importance. These, with the exhaustive schedule of specific gravities of tinctures, lately published by Stoddart and Tucker, will leave but few liquid officinal preparations the densities of which have not been published.

Acet. Scillæ	1·038
Ext. Filicis Liquid.	1·000
Liq. Ammoniæ Acetatis	1.022
,, Ammoniæ Citratis	1·062
,, Zinci Chloridi	1·460
Mist. Sennæ Comp.	1·115
Mori Succus	1·060
Rhamni Succus	1·070
Spiritus Ammoniæ Fœtidus	·847
,, Armoraciæ Comp.	·920
,, Camphoræ	·850
Syrupus Aurantii	1·282
,, Ferri Phosphatis	1·305
,, Rhei	1·310
,, Rhamni	1·320
,, Scillæ	1·345
,, Zingiberis	1·312

Upon these but few remarks are necessary.

Ext. Filicis Liquid., if carefully prepared, will have a specific gravity of at least 1·000. It is to be regretted that much of the oil of male fern of pharmacy, and more especially that imported, is of much less specific gravity, on account of about 20 per cent. of ether being either mixed with the fluid extract, or from the imperfect evaporation of the ether.

Rhamni Succus is seldom met with in a state of purity; generally it contains 50 per cent. of additional water, and sometimes more. True juice will have a specific gravity of 1·070, and sometimes, when expressed from berries in a dry season, it will be of the density 1·075. (This year the crop of buckthorn berries has been a total failure on account of the late spring frosts.)

Spiritus Armoraciæ Comp.—It is necessary in distilling one gallon, as directed in the Pharmacopœia, to add *three* pints of water instead of *two* pints. If two pints only be used, it will be found, that so much water is absorbed by the dried orange peel and horse-radish, that the gallon of distillate will be at least deficient some *fourteen* or *fifteen* ounces.

Syrupus Rhei.—It would be an improvement to continue the evaporation of the percolate to *fourteen* fluid ounces only instead of *thirteen* fluid ounces, or until the specific gravity be 1·026; and also to add, "The product should weigh *two pounds seven ounces*, and should have the specific gravity 1·310."

Syrupus Rhamni.—Although this is perhaps the least important of the syrups, still, since it has a place in the Pharmacopœia, it is advisable that the best and most uniform preparation possible should be made. The present formula I fear, on account of the various dilutions of buckthorn juice, and also from "five pounds of sugar *or a sufficiency*" being ordered, and from no weight being given for the perfected syrup, but merely a specific gravity 1·320, is scarcely the best that could be devised. I would suggest the following:—

Buckthorn Juice	4 pints or a sufficient quantity.
Ginger, Pimento, of each . . .	¾ ounce.
Refined Sugar	5 pounds.
Rectified Spirit	6 fluid ounces.

Evaporate the juice to two pints and a half, or until it is of specific gravity 1·100; add the ginger and pimento and digest at a gentle heat for four hours and strain. When cold add the spirit; let the mixture stand for 14 hours, then decant the clear liquor, and in this dissolve the sugar with a gentle heat. The product should weigh *seven pounds twelve ounces* and have a specific gravity 1·330.

INDIAN OPIUM.

From the higher price which Indian opium has realized at the public sales in Calcutta, there is likely to be a considerable increase on the estimated revenue to be derived by the Indian Government from this source. The sums realized at the monthly sales have been as follows:—

	Rupees.
April	5,170,250
May	5,186,513
June	4,926,325
July	5,099,875
August	5,196,250
	25,579,213

Equal to £2,557,921, or an increase of more than £400,000 thus far on the estimated amount in the Indian budget. The budget estimate was framed as follows:—

	£
44,175 chests Behar, at 1200 rupees	5,301,000
37,420 ,, Malwa, at 600 ,,	2,245,200
Opium supplied for retail sale in North India	152,000
Miscellaneous receipts, Bengal . .	1,800
	£7,700,000

The average prices realized at the opium sales in August in Calcutta were for 2000 chests Behar, 1470 rupees; for 1575 chests Benares, 1432 rupees, being a considerable advance upon the previous month's rates, which were 1439 and 1409 rupees respectively, and a little above the highest prices of the last five months. This narcotic drug brings into the Indian Government a larger revenue than tobacco does to the British exchequer.

CONNECTION BETWEEN CHEMICAL PROPERTIES AND PHYSIOLOGICAL ACTION.*

BY THOMAS R. FRASER, M.D., F.R.S.E., F.R.C.P.E.

(*Concluded from p.* 387.)

Among the organic compounds, however, a large class of substances may have their constitution modified in such a manner that a change to the original or any other form is effected only with the greatest difficulty, namely, the natural alkaloids. Their constitution is not fully known; but it is sufficiently known to prove it to be of the same type as that of ammonia, and to show that they resemble that substance in containing triatomic nitrogen. Thus ammonia = $N\left\{\begin{matrix}H\\H\\H\end{matrix}\right.$; strychnia = $N \equiv (C_{21}H_{22}NO_2)'''$. Like ammonia, also, they are converted by union with acids into salts having a different constitution—a constitution in which the nitrogen, in place of being triatomic, becomes pentatomic. For instance, in the formation of hydrochlorate of strychnia, the originally triatomic nitrogen takes up chlorine and hydrogen, and becomes pentatomic $N\left\{\begin{matrix}(C_{21}H_{22}NO_2)'''\\H\\Cl\end{matrix}\right.$, united by three bonds to carbon, by one to hydrogen, and by one to chlorine; just as the triatomic nitrogen of ammonia unites itself by two additional bonds to chlorine and hydrogen, and so becomes pentatomic in hydrochlorate of ammonia $N\left\{\begin{matrix}H\\H\\H\\H\\Cl\end{matrix}\right.$. But, by this change, hydrochlorate of strychnia is not rendered permanently or stably pentatomic; it easily loses the chlorine and hydrogen which it has acquired, and returns to the triatomic state. The action of alkalies, or, in many cases, even of alkaline carbonates, is sufficient to effect this, and to set free the alkaloid. It is obvious, therefore, that the change of constitution effected by the addition of an acid does not permit us to discover the corresponding change in physiological action. But if, instead of an acid, we make use of such a substance as iodide of methyl, we find that, while the triatomic nitrogen takes up methyl (CH_3) and iodine, and becomes pentatomic (just as in the former case it took up hydrogen and chlorine), it does not lose these

* Abstracted from a Course of Lectures delivered before the Royal College of Physicians, Edinburgh, and printed in the 'British Medical Journal.'

newly acquired atoms when treated with alkalies, but remains pentatomic even when subjected to attacks more violent than any to which it could be exposed in the system.

The type of the natural alkaloids is that of ammonia, but certain varieties of constitution are met with. In ammonia, the nitrogen is united to three equivalents of hydrogen. Now, one or two or three of these equivalents may be replaced by one or more radicals, and in this way we have amine, imine, and nitrile bases. Thus, one equivalent of hydrogen is replaced by $C\,H_3$ in the amine base, methylamia, $N \left\{ \begin{matrix} (CH_3)' \\ H \\ H \end{matrix} \right.$; two equivalents by the diatomic radical $(C_8\,H_{14})''$, in the imine base, normal conia, $N \left\{ \begin{matrix} (C_8\,H_{14})'' \\ H \end{matrix} \right.$; and three equivalents, by the same diatomic radical, and by $C\,H_3$, in the nitrile base, methyl-conia, $N \left\{ \begin{matrix} (C_8H_{14})'' \\ C\,H_3 \end{matrix} \right.$, or, to take another example of a nitrile base, by one equivalent of the triatomic radical $(C_{21}\,H_{22}\,NO_2)'''$, in strychnia, $N \equiv (C_{21}\,H_{22}\,NO_2)'''$. These various bases are distinguished from the bases derived from them in which nitrogen is stably pentatomic (called ammonium bases) by certain chemical characters common to them all. Their salts, for instance, are decomposed by caustic potash, so that the base is set free, and water and a salt of potassium formed; and a similar effect is produced by moist oxide of silver. The salts of the ammonium bases, however, are not acted upon by caustic potash, and, when treated with moist oxide of silver, a hydrated oxide of the ammonium base (in which nitrogen remains pentatomic) is formed, and the acid unites with the silver.

The powerful decomposition action which caustic potash is able to exert, does not, therefore, change the chemical constitution of these ammonium bases. It, indeed, has no effect upon their salts; and even when these salts are treated with moist oxide of silver the characteristic pentatomicity of their nitrogen is retained. In the living body, they cannot possibly be subjected to the influence of such powerfully decomposing agents; and hence, by studying their action, and comparing it with that of the nitrile or other base from which they are derived, the relationship between physiological action and a certain form of chemical constitution may be discovered.

It was owing to this consideration that Dr. Crum Brown and Dr. Fraser resolved to examine the action of a number of the ammonium bases derived from the vegetable alkaloids. Their experiments were made with the methyl, and, in a few instances, the ethyl, derivatives of strychnia, brucia, thebaia, codeia, morphia, nicotia, atropia, and conia, and more especially with their iodides and sulphates. The results obtained may, perhaps, be best illustrated by describing, with a little detail, several of their experiments with iodide and sulphate of methyl-strychnium.

It is well known that strychnia acts on the living economy in a distinctively defined and characteristic manner, and that it is one of the most active of poisons. When administered subcutaneously, doses varying from one-twentieth to one-fiftieth of a grain produced in rabbits the most violent tetanic convulsions, and in a few minutes killed the animal. Few poisons have been more carefully studied, and it is now almost undoubtedly established that the phenomena produced by strychnia are due to a localization of its action on the spinal cord.

The effects of iodide of methyl-strychnium were first examined by subcutaneous injection. It was administered as a fine powder suspended in warm distilled water, in which menstruum it is but sparingly soluble, though more so than in water at the ordinary temperature. In this way, by a series of progressively increasing doses, it was found that as much as twelve grains could be given to a rabbit, weighing three pounds, without any effect whatever. Fifteen grains, however, produced serious symptoms, though followed by recovery; and death was caused by the administration of twenty grains. In none of the experiments, not even in the fatal cases, were the symptoms those of strychnia-poison; no starts nor spasms occurred, nor did stimulation give evidence of the slightest increase of reflex activity. In fact, a condition exactly the reverse of that produced by strychnia was caused by iodide of methyl-strychnium. In place of violent spasmodic convulsions and muscular rigidity, the appearances were those of paralysis with a perfectly flaccid condition of all the muscles. The limbs of the animal first yielded; its head gradually sank until it rested on the floor; by-and-by, it lay in a perfectly relaxed condition; and when death occurred, it was due to stoppage of the respiratory movements. In the necropsies, further evidence was obtained to distinguish the effects of iodide of methyl-strychnium from those of strychnia. The heart was found acting with nearly its normal rapidity; the spinal motor nerves were either paralysed, or nearly so; and, in place of the early or almost immediate occurrence of rigor mortis that follows the action of strychnia, the muscles continued flaccid, contractile, and alkaline for many hours.

Administered internally, suspended and dissolved in warm distilled water, no effect was produced, although as much as thirty grains was given at one time. One-tenth of a grain of strychnia, however, also administered by the stomach, quickly produced violent tetanic convulsions, and in a few minutes killed the animal.

Sulphate of methyl-strychnium being a very soluble salt, it was anticipated that it would act with much greater activity than the iodide, and experiment confirmed this anticipation. One grain dissolved in water and injected under the skin of a rabbit caused its death in eighteen minutes. Half a grain, however, produced no marked effect. When eight-tenths of a grain were similarly administered, symptoms of a most serious character were produced, but death did not result. Some days afterwards, one-twentieth of a grain of strychnia, dissolved in very dilute sulphuric acid, was administered to this rabbit by subcutaneous injection; and it produced symptoms of strychnia action, followed by death fifteen minutes after the injection. Eight-tenths of a grain of sulphate of methyl-strychnium contain about six-tenths of a grain of strychnia; the effect of converting this nitrile base into an ammonium base by adding to it sulphate of methyl had been, therefore, to reduce its poisonous activity at least twelve times.

The symptoms produced by sulphate of methyl-strychnium were the same as those produced by the corresponding iodide, and suggested a close resemblance between its action and that of curari (wourali)—a resemblance, indeed, which had previously been pointed out by Professor Schroff, of Vienna. Dr. Brown and Dr. Fraser accordingly extended their research for the purpose of studying the exact causation of the paralysis, and found that in experiments where iodide of methyl-strychnium was substituted for sulphate, the results were the same, and that their mode of action is identical with that of curara. This result is an extremely curious and interesting one. It is difficult to imagine a more decided modification in the action o any substance than is produced by the change of chemical constitution resulting from the addition of iodide or sulphate of methyl to strychnia. The striking characteristic of the action of strychnia is the great and uncontrollable activity of the muscular system; that of curara, of iodide and sulphate of methyl-strychnium, and, as was also found, of other similarly modified alkaloids, is the flaccid and motionless condition caused by the impossibility of exciting muscular action through the nervous system. So opposite are their effects, that many physiologists look upon curara as a powerful counter-agent to strychnia, while physicians have employed it in the treatment of strychnia-poisoning and of tetanus.

The other vegetable alkaloids examined, all possess, though in varying degrees, the same peculiar spinal-stimulant action as strychnia. Brucia and thebaia exert this action with great energy; codeia and morphia with somewhat less power; and nicotia, atropia, and methyl-conia, in a still slighter degree, though quite obviously. The result of the combination of each of them with a salt of methyl is, as in the case of strychnia, to change their chemical constitution from that of nitrile bases with triatomic nitrogen, to stable ammonium bases with pentatomic nitrogen; and the change of physiological action following this change of chemical constitution has been found to consist of a removal of spinal-stimulant action, and addition of paralysing action restricted to the terminations of the motor nerves. The important general fact indicated is, that a change of chemical constitution, even when it is of a simple kind, may produce a very essential change in physiological action; and, although perhaps evidence is as yet insufficient to warrant any positive assertion, it is extremely probable that all the stable ammonium bases have a curara-like action.

It is necessary, however, to guard against the impression that the compounds of pentad nitrogen act simply as nerve-paralysers; their action is not necessarily restricted to these structures. In several cases it is, no doubt, so restricted; and notable examples of this are found in the salts of methyl-strychnium, methyl-brucium, and methyl-thebaium, whose nitrile bases have probably no other decided action than a spinal-stimulant one. In those cases, however, in which the salts of ammonium bases are derived from alkaloids that produce complicated effects, a restriction of action to the terminations of the motor-nerves does not occur. The original actions of the alkaloid, excepting the spinal-stimulant one, are retained by the salts of its ammonium base; and thus the salts of methyl-atropium not only act like curara, but they likewise paralyse the cardiac inhibitory fibres of the vagi and dilate the pupils, while the salts of dimethyl-conium retain the paralysing action on the vagi that is possessed by conia itself.

In considering how these various facts bear upon the connection between chemical constitution and physiological action, it is no doubt essential to remember that a change of composition as well as of constitution has been produced by the conversion of the nitrile into the ammonium bases. In the substances examined by Dr. Brown and Dr. Fraser, the composition of the original alkaloids was changed by adding to them a salt of methyl. Are, then, the subsequent changes of physiological effects produced by the action of the added salt of methyl? This hypothesis Dr. Fraser thinks so improbable as scarcely to deserve consideration, being opposed to the result of various experiments.

It might also be asked, if the processes by which these ammonium bases are prepared do not so profoundly modify the chemical nature of the alkaloids from which they are derived, that no actual relationship exists between the new substances and their original sources; that, for example, sulphate of methyl-strychnium, though derived from strychnia, is in no special manner related to sulphate of strychnia—the elements of the latter substance having been so disarranged in its conversion into the former, that the strychnia has been altogether destroyed. As an answer to this conjecture Dr. Fraser points out that the ordinary colour reactions of the alkaloids are retained by their methyl derivatives.

These various facts confirm the opinion that chemical composition bears some relation to the physiological action of active substances, and they also prove that this relationship is to an important extent due to the arrangement of the atoms in the substance. They appear, likewise, to point to the conclusion that physiological action is often, if not always, the result of a chemical reaction between the foreign body and certain of the constituents of the vital structures whose action is modified by it. The results of investigation with such substances as carbonic oxide show, indeed, that physiological action may be chiefly the result of chemical reactions. The effects of other substances have not been connected with chemical action in so direct a manner, but this is to a great extent explainable by the difficulties attending the demonstration of a connection of this kind. Although experimental research, in many cases, has discovered the exact histological elements which are acted upon, the chemical characters of these elements have not yet been sufficiently ascertained. We have no means of determining their normal conditions with the delicacy that is required, and we are, therefore, unable to investigate the chemical reactions that almost certainly accompany modifications of their normal physiological condition during the operation of active substances. Thus, although we know that the normal physiological condition of the terminations of motor nerves are modified by the salts of the ammonium bases derived from strychnia, brucia, thebaia, etc., and that this modification is produced by substances that have definite chemical properties, we cannot discover what chemical change is produced so long as we are ignorant of the special chemical properties possessed by these structures. The trustworthy observations of Kühne have shown that a recognizable change occurs in the physical characters of the nerve terminations—a change which renders their outlines more distinct; but we are unable to connect this change with any definite chemical reaction. In the course of time, reactions of a more delicate kind than any we yet possess will, no doubt, be discovered, not only for these structures, but likewise for each of the special structures on which the physiological action of active substances is localized.

PREPARATION OF THE BROMIDES OF QUINIA, MORPHIA, STRYCHNIA AND CALCIUM.*

BY GEORGE MACDONALD.

The bromides of the alkaloids may be readily prepared in small quantities by precipitating a solution of their neutral sulphates with bromide of barium.

Bromide of barium is not met with in commerce, but it can be made by saturating solution of hydrobromic acid with freshly precipitated carbonate of baryta. The following is a good method:—

Put 1 oz. by weight of bromine and 8 fluid ounces of water into a pint jar. Attach a sulphuretted hydrogen apparatus, being careful to so place the end of the delivery tube that it will touch the surface of the bromine, and pass a stream of sulphuretted hydrogen slowly through until the bromine is entirely converted into hydrobromic acid. Filter the hydrobromic acid solution into a capsule, and warm gently until it has lost all sulphurous odour.

To make the carbonate of baryta, to a boiling solution of 2 oz. of chloride of barium in a pint of water, add solution of carbonate of ammonia (to which a little ammonia has been added) in excess, wash the precipitate three or four times by decantation, and afterwards transfer it to a filter, and continue the washing until the filtrate ceases to produce any turbidity on the addition of a solution of nitrate of silver, to which a few drops of nitric acid have been added. Then remove the precipitate from the filter, and mix it with sufficient water to bring it to the consistence of thick milk.

To make the bromide of barium, add to the hydrobromic acid solution small portions at a time of the mixture of carbonate of baryta and water, until rather more than three-fourths of the mixture has been added. When this quantity has been added, apply a gentle heat and shake vigorously. Then filter a small portion and test

* From the 'American Journal of Pharmacy.'

with litmus paper. If it shows an acid reaction, more carbonate of baryta must be added until the reaction is neutral. When a sufficient quantity of carbonate of bartya has been added, filter and evaporate to 4 fluid ounces. It is not necessary to proceed to crystallization, as the salt is very soluble, and therefore difficult to crystallize in small quantities, and a solution of it is really what is wanted after all.

Bromide of Quinia.—To make this salt, dissolve 1 oz. of medicinal sulphate of quinia in 32 fluid ounces of boiling water, and add solution of bromide of barium until a precipitate ceases to be produced. (A little less than 5 fluid drachms of the solution of bromide of barium made by the formula given above, will be about the proper quantity.) Filter a small quantity of the solution, acidulate it slightly with nitric acid, and test for baryta with a few drops of diluted sulphuric acid. If a whitish turbidity is produced, it is an indication that too much bromide of barium has been added, and enough sulphate of quinia must be added to entirely decompose it. If, on the other hand, the presence of baryta in the solution was not indicated, slightly acidulate another portion of the filtrate with nitric acid, and add a drop or two of solution of bromide of barium. If this produces a whitish turbidity, it shows that there has not been enough bromide of barium added, and more must be *very carefully* added, until the sulphate of quinia is all or *nearly* all decomposed. It is better, of course, to have a little undecomposed sulphate of quinia in the solution than *any* bromide of barium.

When the precipitation of sulphate of baryta is completed, filter the solution, while still warm, into a capsule, and evaporate at a gentle temperature, until crystallization begins to set in. Then remove from the fire and set aside to crystallize. The bromide of quinia will be found to be aggregated in *globular clusters* of brilliant silky needles, and the singularly beautiful appearance of the crystallization is alone almost ample compensation to any one for the little trouble he may go to in making it.

Drain the crystals well, remove them from the capsule, and place between sheets of bibulous paper and set aside to dry. The crystals are soluble in about 40 parts of cold water, and appear to be anhydrous. At least I have had a small quantity exposed to the air for a couple of weeks, and they do not show the slightest appearance of efflorescence. I have not made accurate weighings, and cannot speak positively.

Bromides of Morphia and Strychnia.—These salts may be prepared after the same method as bromide of quinia, with slight modifications, which will readily suggest themselves. They both crystallize well, and are quite as soluble as the corresponding sulphates.

Bromide of Calcium.—The process of Mr. James R. Mercein, in the March number of the Journal,* is probably as good a one as could be devised. The majority of apothecaries, however, will find the following to be a more ready and convenient way of making it:—

Dissolve 4 oz. of bromide of ammonium in a pint of water. Put in a flask and bring to the boiling-point. Keep boiling, and add milk of lime† (made from *pure* calcined lime), in small quantities, until ammoniacal vapours cease to be evolved. The operator can easily tell when this point has been reached, by the sense of smell. Filter the solution, evaporate to a syrupy consistency, remove from the fire and stir until cold. This salt is quite deliquescent, and requires to be kept in well-stoppered bottles. In preparing this salt, care must be taken as to the quality of lime used, as some limestones contain a large percentage of carbonate of magnesia, and the salt obtained by using a lime burnt from limestone of that quality, would necessarily contain a correspondingly large percentage of bromide of magnesium.

* Pharm. Journ. [3] vol. ii. p. 878.

† In a note appended to this article, the Editor of the *Amer. Journ. Pharm.* points out that in decomposing bromide of ammonium by caustic lime, care must be taken to avoid an excess of the latter, since a basic bromide (oxybromide) of calcium is very readily formed, having a strong alkaline reaction. The term *bromide of quinia* has of late been frequently used in medical journals, but is incorrect. The salt being a combination of *hydrobromic acid*, with the alkaloid *quinia*, should be called hydrobromate of quinia. Its composition is analogous to that of hydrochlorate (muriate) of morphia, and its proper name is formed correctly only in perfect analogy with that of the latter.

VANILLIC ACID.*

BY M. P. CARLES.

After being preserved for a certain time vanilla generally becomes covered with crystalline needles. As this crystallization is considered to be a mark of good quality, sometimes it is sought to impart it to inferior vanilla, and this is done by simply putting some of the crystals already formed into the case containing it. The chemical composition of this efflorescence does not, however, appear to be perfectly understood.

Formerly, and the error has been repeated in recent works, Vogel asserted that it consisted of benzoic or cinnamic acid; Wittstein thought it to be coumarine. M. Vée,† comparing the melting-points of these various substances, detected the error and showed that it was a peculiar acid. About the same time, M. Gobley‡ investigated the chemical characters of these crystals, compared them with coumarine, and proposed for them the name vanilline, or aromatic principle of vanilla. Later, in Germany, Stokkebye§ took up the subject. He fixed the melting-point at 82° C., instead of 76° C. (Gobley), or 78° C. (Vée), and in virtue of its acid properties called it vanillic acid. Finally, while Gobley had attributed to it the formula $C_{20}H_6O_4$, Stokkebye represented it by $C_{34}H_{22}O_{20}$.‖ These differences in the formulæ and melting-points attributed to it seemed to show that even if their authors examined the same crystals, they were at least not of equal purity. M. Carles was therefore induced to undertake the present investigation.

Instead of extracting the vanillic acid directly from the vanilla, M. Carles preferred to purify the deposit found at the bottom of the cases in which vanilla had been kept. From a mixture of specimens from various sources he made a concentrated aqueous solution by boiling, and after the addition of animal charcoal, passed it through a moistened filter. Upon cooling, the acid was deposited, and it was submitted to two or three successive crystallizations. If cooled slowly the crystals appeared as colourless transparent prisms, sometimes more than two centimetres long. When fresh and very pure their odour was very feeble, but was increased by heat, and their taste was piquant. Vanillic acid, so obtained, melts at between 80° C. and 81° C. Heated on platinum foil it volatilizes without decomposition, but it distils with difficulty in a retort at about 280° C. It is very soluble in cold alcohol, ether, chloroform, sulphide of carbon and the fixed and volatile oils. Water at 15° C. dissolves 1·2 per cent., but in boiling water it is very soluble. It decomposes the bicarbonates with effervescence; and saturates perfectly the alkaline bases in the cold, and the earth bases with heat. Pure concentrated sulphuric acid turns it yellow in the cold, but if the acid contain traces of nitric acid a scarlet colour is produced, and the same result follows with pure sulphuric acid and resinous crystals. Dilute nitric acid attacks it feebly, but concentrated quickly converts it into oxalic acid. Chlorine, bromine, and iodine yield products of substitution. It is precipitated by acids from concentrated aqueous or alcoholic alkaline solutions

* Abstract of paper in 'L'Union Pharmaceutique,' xiii. 294.

† Journ. de Pharm. et de Chimie, [3] xxxiv. 412. ‡ Ibid. 404.

§ Zeitschrift für Chemie, 1865, p. 467.

‖ These formulæ are according to the old notation.

with little evident modification, even after being exposed for several hours to a temperature of 100° C. It colours the persalts of iron blue, reduces nitrate of silver and is precipitated plentifully by the acetates of lead. Its formula is given by M. Carles as $C_{16}H_8O_6$ ($C_8H_8O_3$).

	Found. I.	II.	Calculated.
Carbon . . .	63·14	63·13	63·15
Hydrogen . .	5·55	5·69	5·26

The author describes the following compounds of vanillic acid obtained by him:—

Vanillate of Lead ($C_{16}H_7PbO_6$).—Tufts of white crystals radiating from a common centre, deposited upon cooling after mixing a hot aqueous solution of vanillic acid and a solution of neutral acetate of lead.

Vanillate of Magnesia ($C_{16}H_7MgO_6$).—Colourless, inodorous crystals slightly soluble in cold water, insoluble in alcohol and ether. Obtained easily by double decomposition between fresh vanillate of baryta and sulphate of magnesia, or by saturating a boiling solution of vanillic acid with magnesia hydrate or carbonate, and allowing to cool slowly.

Vanillate of Zinc ($C_{16}H_7ZnO_6$).—Deposited in white crystals upon cooling a hot solution of vanillic acid, saturated by oxide or carbonate of zinc. Slightly soluble in boiling water.

Iodine Compounds ($C_{16}H_7IO_6$ and $C_{16}H_6I_2O_6$). — The first consisting of white pearly crystals of faint odour, slightly soluble in alcohol and ether, melting at 74° and subliming without decomposition, was deposited after some hours from a mixture of 2 grams of vanillic acid dissolved in 50 grams of water and 1·5 grams of iodine dissolved in 50 grams of alcohol. The second was obtained when iodine was used in excess, also as pearly crystals. It is slightly soluble in boiling water, insoluble in cold chloroform, soluble in hot ether and alcohol.

Bromine Compound ($C_{16}H_7B_2O_6$).— Pearly, yellowish, odourless crystals, very slightly soluble in water, more so in alcohol, ether and chloroform, obtained by gradually adding slight excess of bromine to a concentrated aqueous solution of vanillic acid, and crystallizing the precipitate first from alcohol and then from boiling water.

Vanillic acid being ignited with potash, and the mass afterwards treated with water, hydrochloric acid and ether, yielded small white inodorous prismatic crystals, which product the author considers to be a new acid, and proposes to call oxyvanillic acid, with the formula $C_{18}H_8O_3$. When vanillic acid was heated in a sealed tube with hydriodic acid, the methyl-hydriodic was obtained.

From these experiments M. Carles is led to conclude that the efflorescence on vanilla is neither of the substances that have heretofore been described, but is a peculiar acid, isomeric with anisic, formobenzoic, methyls alicyclic, creasotic oxytoluic, and many other acids.

MEDICAL EDUCATION OF WOMEN.*

We have seen it laid down as an axiom that the noblest principle of life is change. All things change. The steadfast mountain crumbles down and its particles of soil are carried away by the hillside torrent to refresh and fertilize the plains below. Man changes from the child to the adult; from manhood to old age; from the mortal to the immortal. Kingdoms, dynasties, and forms of social life change and alter their condition. To remain without change is impossible; changes constantly occur even under our own observation. Old things are passing away,—nay, in many instances, they have passed away. We do not now find the home-industries described to us by our elder relatives. The progress of arts and manufactures has rendered unnecessary the home arts of spinning, baking, and brewing. All these things are better done on the principle of division of labour, by organized agency specially trained for the purpose, each in its appropriate manufactory, in place of the individual efforts of the women of the family. No one would now don a homespun coat, or wear a knitted sock, when he can obtain a superior article at a less cost. Even were this not the truth, it is a fact that our girls are no longer educated with a view to the same after-life as was lived by their grandmothers. Some sixty or eighty years ago a woman was amply educated for an ordinary position in life could she read her prayer-book and write a letter. No doubt, in many ways, woman was then, as she has ever been, a "help-meet" for man; but how many a man must have regretted that the very one whose affection and respect would best fit her in every way to be his *alter ego*, was utterly unacquainted with even the elementary principles of the art, profession, or trade by which he made the daily bread of the household! Man has an intellectual as well as a physical and a moral nature. He needs sympathy with each part of his character and vocation to make his life substantially happy; and it certainly cannot conduce to his happiness to find his partner utterly unable to appreciate his labours, to exult in his successes or to sympathize, with true womanly tenderness, in his failings. Hence arose a desire among men that their daughters should be better educated. The old ideas passed away, and in a short space of time the girl's curriculum was well nigh as arduous as the boy's course of study, while it was a good deal more varied. Our daughters were taught to know and appreciate their own language, to read the history of their own and other lands, to converse in French and other modern languages, and to cultivate the accomplishments which serve as the recreation of life. Recently, during the past ten years or so, lectures have been given at all first-class schools on the elements of geology, botany, chemistry, and other physical sciences. The seed thus sown fared like other seed; in some "it yielded an hundredfold," springing up with such vigour as to beautify and adorn all the girl's future life. Henceforth she had ample resources within herself; no place could be dull; no time hang heavy on her hands; the stones, the flowers, the silent stars all suggested thoughts which were companions in any solitude or leisure hour. The thirst for knowledge once awakened is insatiable; and where the seed takes root thus kindly, the woman is a better, because a more intelligent, member of society, a fitter wife to her husband, a more capable mother and guide to her children. In other cases, of course, we shall find that the good effects of the impression once received remain all but passive in the mind, and yet the woman is fitted to sympathize with her husband, even although she may not have the power actually to aid him. Thus, something has been gained. The power, though passive, is still real; and it is clearly an improvement on bygone days.

The progress of manufactures and the changes in social economy have buried with the past the spinning, knitting, and sewing that filled up the leisure hours of our grandmothers, and that made their lives happy and useful in their day and generation. Our girls are no longer fitted for this work; nor is there any scope for such ability did the knowledge exist. The result is, in some cases, very sad. Our daughters are, in too many instances, aimless, idle, and unhappy. They have no proper or beneficial occupations; and the time which is so valuable, the young fresh hours of life, when every faculty is well strung, the imagination most vivid, and the physical constitution at its best, are frittered away in an objectless existence, or in the pursuit of so-called pleasure. This is not the case with our sons. Their school career, their college course, and the business of actual life demand their best energies. They become useful, earnest, and self-reliant; while the very girls who are to be the companions, the wives, and the mothers of the future, have no other device to wile away their precious time but the perusal of empty novels or

* From the 'Madras Journal of Medical Science.'

the absurd imitation of birds, beasts, and flowers, called "fancy work;" or, perhaps, they are driven to effervescent fits of pseudo-piety, the only alternatives to which are reckless flirtation and the slow poisoning process of uncontrollable ennui. There must be something essentially wrong in such a state of things. Why should all other labour have a definite end; all other seed-time an abundant harvest, and only the long years and hard earned money spent on a girl's education have no fruition? These considerations, even were there no others, should lead the present generation to seek some useful and honourable career for its daughters as well as for its sons. In some cases, perhaps in many, there is an absolute necessity for the girls of a family to aid in the common effort to earn the household bread. The daughters of our English mechanics, labourers, and small farmers know well that they must turn out into the world and do their best to maintain themselves in decency and comfort. They have no false shame in using, to the best of their ability and knowledge, the heads and hands that nature has given them. They are, as a general rule, diligent in their calling and faithful in the exercise of the little committed to them by the Great Master. It is when we come to a step higher in the social scale that we meet with sad instances of the want of an acknowledged career for the girls and women of the day. Perhaps one girl, braver or better endowed by nature than the rest, tries a situation as governess, but, notwithstanding all its drawbacks, the profession of governess is much overstocked in England, and there is no room for it in India. To take the lowest view of it, in the language of the old Jew, it does not pay. For many years, however, no other opening could be thought of at home; and thousands of ladies, well-born, well-bred, and well-educated, were sacrificed in this profitless manner. We are aware that these remarks are more applicable to the circumstances of England than to those of India, but the principles of education and its good or ill results are the same there as here. We are most thankful to find that there are now several openings at home to a useful and happy career for women, whose birth and education would render unbearable and irksome the duties of domestic servants, shop-girls, or needle-women. England, conservative and tenacious to the back-bone, hesitated long ere she followed the example set by foreign nations; but the real misery caused by want of means and want of employment has, at last, told its lesson, and we now find English women busy in printing-offices and book-binding rooms, directing the wondrous telegraph, or copying hard-worded folios in lawyers' offices. Many doors of honest and hopeful toil are thrown open to them; and the women of England, to their credit and advantage, have proved themselves both willing and able to avail themselves of these several sources of industry and honest bread-winning.

There is another sphere of usefulness to which we would now specially call attention,—one which, in its appeals to the best attributes of a woman's nature, far excels all others: one which has claimed the attention of women since the earliest historic ages, and of which one branch, at least, was under the direct protection and patronage of the ancient queen of heaven, Juno Lucina! We refer to the most humane of all—the healing of the sick, the soothing of the anguished, the comforting of the distressed. The medical profession is one of the noblest that man or woman can be called on to exercise. It appeals to our three-fold nature, and every one who, even in the humblest of its grades, exercises this calling aright should be better, more learned, and holier from the daily ministrations to suffering humanity. In the preliminary scientific examinations the mind of the embryo physician is strengthened, cultivated, and trained to a degree far beyond the mere book-knowledge he may acquire. In the subsequent course of lectures delivered by the heads of his profession, he is directed how to apply this knowledge, and by clinical experience, by patient watching and accurate observation by the bedside of the sick, and in the diligent prosecution of *post-mortem* studies he gains that insight into the construction of man and the workings of nature which truly fit him to be a high-priest of the healing art. "The eye only sees what it brings the power of seeing." From sharing in the labours, trials, and honours of this profession women have long been debarred—debarred, no doubt, as much by their own ignorance and want of system as by the objections raised against them by the members of the medical profession. All this is easily understood if we remember the class of women who professed to have any medical knowledge. They were, for the most part, aged women, to whom age had taught neither sobriety, honesty, nor the power of governing their tongue. They were utterly uneducated, and prejudiced to a fearful degree; women who eschewed cold water and fresh air, and who, in the hour of emergency, were altogether unfitted to aid the medical man in the simplest of operations. No wonder that the highly educated and refined doctor shrunk from being associated with those wretched specimens of womanhood, devoid of knowledge, ordinary sense, and common good-feeling. These women seldom set up, as the village barber did, to be "bone-setters," or "bleeders," or domestic surgeons; they confined themselves to midwifery and the nursing of the sick. How they were ever tolerated by medical men as their co-adjutors is a matter of marvel, but we must suppose that they were put up with simply because no fitter helpers were forthcoming. The case is altered, or, rather, is altering now; women of all ranks show themselves eager for medical tuition, from the uneducated woman, whose highest ambition is to be a good nurse, to the highly educated and well-born women who swell the ranks of the Sisters of Charity, sincerely desirous to render help in as intelligent and as perfect a manner as possible.

There have been many objections raised against the admission of women to a medical career—some of them, no doubt, of great weight and deserving of serious consideration: others, again, merely frivolous, and sprung from mistaken notions of propriety or from desire to let things be as they are. Some of the faculty are opposed to the medical training of women on the ground that they must share the class rooms of the male students, and that it by no means beseems a woman's modesty and delicacy of feeling to acquire from a male teacher, and amid male fellow-students, any knowledge of anatomy, midwifery and other kindred subjects. This is an objection that comes home to every woman desiring tuition; to every father who would like his daughter trained to the most noble of professions. We hold, however, that this objection is founded upon a mistaken notion as to what is and what is not true delicacy of feeling. We would put our opinion forward with due respect for the opinions of others, but to our mind the whole body is a monument to the greatness and wisdom of Him who made it; and no right-minded man or woman could make the highest manifestation of God's creative might the subject of unseemly jest, unholy thought, or undesirable allusion. We think that the evil, if evil there be, exists only in the imagination of the morbid, not in the subject which demands the best efforts of the mind. Further, we do not see how, in a properly conducted class-room, under the supervision of a teacher who himself felt the solemnity and responsibility of his profession, the pupils could ever behave in any but a becoming manner. Another objection frequently urged is that women are deficient in nerve and strength; as to the latter, we believe that skill is more in request than strength in a doctor; and for nerve, or quiet, silent stedfastness of purpose we think that women are, at least, as well endowed as men—if not more so. No doubt we shall find individual women, as well as individual men, who feel faint at the sight of a streaming wound or a repulsive sore. Perhaps more women than men might plead guilty to this charge; but no one chooses a profession without some regard for his, or her, personal feelings, and we may feel assured that a woman who willingly undergoes all the study and all the practical work demanded in hospitals may be trusted to have nerve enough for even an alarming crisis in after practice. Then, as to moral courage, as to whether a woman can have the heart to resolve on some painful treatment, and to carry it out firmly, steadily, and tenderly withal, not ceasing for the trying cries of her patient or the possible entreaties of those around her, we believe that there are many such gentle, yet firm-minded, women who will not shrink from duty merely on account of its disagreeableness. Again, few medical men, even those who bear the highest reputation, ever undertake an operation of extreme difficulty without the advice and co-operation of a brother professional, and we cannot suppose that any medical man would refuse his counsel and assistance because the individual seeking it was a woman instead of a man. Another objection frequently urged is that the training and profession of a doctor are utterly incompatible with the duties and responsibilities of a wife and mother. We are quite willing to admit the force of this objection in many cases; nor can we conceive a more undesirable and pitiable state of things than exists in the home where husband and children are neglected while the wife and mother, forgetful of her duties and truest pleasures, is engrossed with other pursuits, studies, and cares. We contend, however, that this is no valid objection against the admission of such women as desire it to a medical career. We know that all women do not marry, some, perhaps, never have the chance, and some, by a peculiar idiosyncracy, have no inclination. Now there can be no possible objection to these women entering the medical profession, and throwing into this channel all the energy and enthusiasm that will otherwise be frittered away in profitless pursuits, that can give no solid pleasure, but which tend more than any other circumstances to make them those peculiar, crabbed, and disappointed specimens of humanity called "old maids." Supposing, however, that a female medical student or a lady-doctor marries. Will she be a worse wife or a worse mother? Have her studies made her more or less competent for the general duties of life? We assume, of course, that she gives up all special prosecution of the profession as a matter of gain or constant occupation. We believe that she will make a better wife and be a better mother. The knowledge of the healing art will still remain, and husband, children, and friends may be the gainers by her kind and gentle ministrations. The arguments in favour of giving women a medical education are many. A sick man longs for the gentle touch and friendly sympathy that none can bestow so well as a woman. Woman, indeed, is man's natural nurse; she is the first that soothes his infant ailments; she is the one who composes his limbs and closes his eyes for the last long sleep. A woman's hand is peculiarly adapted for some operations, those especially where a small soft hand is preferable, and less liable to entail injury than one of larger size and rougher mould. In all circumstances knowledge is power, and in some cases the mere tying of a handkerchief and tightening the impromptu ligature with a twig may suffice to stay inordinate hæmorrhage from a divided artery, when the patient must assuredly die were assistance delayed many minutes. We do not mean that all women who study medicine should practise for gain; in the higher ranks it were most undesirable that a woman should do so; but no one is the worse for knowing what should be done in cases of emergency and knowing how to do it. No one will be more thankful than the doctor to have all things made ready to his hand. The last argument we shall adduce to-day is, that taught or untaught women will ever be employed, especially by the poorer classes, in one most important branch—midwifery. It is only necessary to look back on the past annals of midwifery in England, and the constant mal-practices by native midwives in this country, to make us all agree that, so far as this branch at least is concerned, women must be scientifically and thoroughly taught. A series of articles published in 'The Lancet' for April, May, and June last, will show us something of the horrible barbarities common in England so long as midwifery was practised by the so-called midwives. Here, in India, there is scarcely a medical man who could not confirm a well-known practitioner's statement to us, "They bring here women whom they have actually killed by their ignorance and cruelty, and then expect us to deliver them in safety, though the womb is ruptured, or other fatal injuries inflicted!"

DEODORIZATION OF EXCRETA BY SEAWEED CHAR.—CONFERENCE AT SOUTHSEA.

On the invitation of Colonel Synge, Commanding Royal Engineer at Gosport, a party of gentlemen assembled at the Southsea Pier Hotel on Thursday, for the purpose of considering a scheme for the removal and utilization of refuse by carbon.

Among the propositions laid down by the promoters of the scheme are these:—That a dry deodorant is preferable to water, inasmuch as the former transmutes the obnoxious and dangerous substances to which it is applied; that the application of water to refuse is extravagant in practice and erroneous in theory; that the difficulties and objections to the earth system (such as its un-remunerativeness and the tendency to attract worms and flies) disappear with the use of charcoal; that by the use of charcoal bulk is diminished, and application and removal are thus facilitated; that deodorization is instantaneous and complete; that the use of charcoal is more remunerative than that of earth, the material possessing an intrinsic value, and taking up completely and within a limited compass all the valuable qualities in the refuse; that charcoal may be obtained at about 30*s.* a ton, and that after use the compound can be sold for manure or re-burnt; and that by proper appliances for burning the mixed contents of closets, etc., in closed retorts, and saving the volatile products, the supply of charcoal, after the first, can be kept up without any fresh importation. All that is necessary in the application of charcoal is a layer of carbon to receive the deposit and another to cover it. With regard to the value of the refuse, it is alleged to be, according to the best authorities, 8*s.* 4*d.* per head per annum, while the carbon by which it is carried retains its own value.

The closet is in the first instance charged with seaweed or peat charcoal. When collected in sufficient quantity, the mixed compound is distilled in a retort; ammoniacal liquor, tar, and gas are yielded; and from the former, sulphate of ammonia and acetate of lime are obtained. Animal charcoal remains in the retort; and with this the process is carried on. The produce of a year's working on a population of 20,000 is estimated at £4680, and the expenses at £2530, which would leave a balance of £2150 to cover management, sales, incidental expenses and profit.

In the discussion which took place, the disadvantages of the water-closet system were pointed out by several speakers. Mr. Stanford and Mr. W. R. W. Smith said that the carbon system had been applied in a ship-building yard in Glasgow, and the latter gentleman said he had been in the vault and found it entirely free from smell; the excreta disappeared; the whole mass became black, and could not be distinguished from the charcoal, and when it was dry it was inodorous. It was also stated that when char was used, there was an absence of the flies and insects that accompany the earth system. On the other hand, it was urged by one or two speakers that some of the evils arising from the water-closets are capable of being remedied, and that the carbon system required more care than would be given by servants and uneducated people.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 23, 1872.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE ADMINISTRATION OF PHOSPHORUS.

THAT medicinal remedies are subject to the rule of Fashion is well known, and judging from numerous inquiries which have lately been made respecting the methods for the internal administration of phosphorus, that substance is about to have its turn of more or less lasting popularity as a remedy. A short notice of the principal preparations will therefore probably be of service.

And first, to correct an error. A few weeks since Mr. S. M. BRADLEY, of Manchester, writing to the 'British Medical Journal,' described a case of neuralgia which, after having been unsuccessfully treated by himself with every remedy he could think of, was immediately relieved by a homœopath with two drops of "mother-tincture of phosphorus." Mr. BRADLEY—apparently misled by the fact that the "mother-tinctures" of the Homœopathic Pharmacopœia are usually calculated to contain all the soluble matter of one grain of a drug in ten minims of the tincture, and that saline solutions are made up to a strength of 1 in 10—went on to say that this "mother-tincture" was "phosphorus dissolved in alcohol in the proportion of 1 to 10," a statement which has been reproduced in a contemporary circulating among chemists and druggists, and sometimes providing them with homœopathic news. Mr. BRADLEY has since found out that in using this remedy, he has only been giving his patients a preparation containing 1 per cent. of phosphorus instead of 10 per cent., and he has published a correction of his former statement. However, since many persons may see the original statement and not the contradiction, it will be as well to give the following from the Homœopathic Pharmacopœia, by which it will be seen that there are two recognized solutions of phosphorus, one in ether and one in absolute alcohol:—

"*Preparation.*—Trituration, using moist sugar of milk at first, and bruising the chips of phosphorus rather than rubbing them. Solution in ether, which, if very pure, will dissolve nearly 1 per cent. Solution in absolute alcohol. When making these solutions, the phosphorus should be cut into small chips, and, in the case of alcohol, at any rate, the mixture, in its bottle, with the stopper loose, should be plunged in hot water till the phosphorus melts, when the stopper should be made firm, and the melted phosphorus well shaken with the alcohol. The solution should be well secured in stoppered bottles and kept in the dark."

Phosphorated Oil (Huile phosphorée) is a preparation of the French Codex, of which the following is the formula:—

"Phosphorus	2
Oil of Sweet Almonds	100

"Put the oil into a bottle which it will nearly fill, and introduce the phosphorus. Heat in a water-bath for 15 or 20 minutes, agitating briskly from time to time. Keep the bottle closed during the operation, except at the commencement, when a passage for the air inside should be made by means of a paper placed between the neck of the bottle and the stopper. Let the solution cool and deposit, and then decant the clear oil into small well-stoppered phials exactly filled."

There is also an "Oleum Phosphoratum" in the new German Pharmacopœia, similarly prepared, in which, however, the proportions are "phosphorus, well dried, 1; oil of almonds, 80." The preparation should be "limpidum, fumans, phosphorum redolens."

The subject of the solvent of phosphorus best suited for internal administration was studied by M. DUJARDIN-BEAUMETZ in 1868.* He pointed out that phosphorus is soluble in sulphide of carbon, ether, chloroform, and oil. Of these the first, notwithstanding its great solvent power (according to VOGEL† dissolving eighteen times its own weight of phosphorus without losing its fluidity) is excluded in consequence of its effects upon the system. Alcohol, also, he rejected, in consequence of the small proportion it dissolves (according to BUCHNER, 1 part in 320 cold alcohol, sp. gr. ·799). Solutions in ether, chloroform, and oil, were tried in the form of capsules, made to contain 1 milligram of phosphorus in each. The quantity of ether required was found to produce injurious effects, and was quickly abandoned. It may be remarked here that a case was mentioned at the meeting of the Société de Pharmacie, in April, 1870, where severe symptoms of poisoning followed the administration of 4 grains of phosphorated ether.‡ It is also stated by BRUGNATELLI that the ethereal solution undergoes decomposition in the course of time. Chloroform, according to M. BEAUMETZ, dissolves easily two per cent. of phosphorus, and, therefore, 1 milligram doses could be administered in capsules containing 10 centigrams of the solution. Continued use of these capsules led, however, to considerable disturbance of the system, a result which, although at first referred to the phosphorus, he afterwards believed to be due to the chloroform. He considers the phosphorized oil to be the best preparation, and as many as twelve or thirteen capsules of this oil have been taken daily by patients without inconvenience. But an objection exists in the deposit of insoluble phosphorus which gradually forms in them; and M. BEAUMETZ has proposed to use phosphide of zinc, pre-

* 'Gazette des Hôpitaux,' 30 Mai, 1868, and Journ. de Pharm. et de Chimie, viii. (1868) p. 227.

† Neues Repert. f. Pharm. xvii. p. 449; Journ. de Pharm. et de Chimie, ix. (1869) p. 237.

‡ Journ. de Pharm. et de Chimie, xi. (1870) p. 416.

pared by bringing phosphorus vapour into contact with melted zinc in an atmosphere of dry hydrogen.

The deposit that occurs in the phosphorated oil of the French Codex was investigated by M. Méhu. In a paper read before the Société de Pharmacie, at Paris, in May, 1861,* he states that it is the result of the action of the phosphorus upon the albumen, resin, and other organic matters present in ordinary oil of almonds. These deposits are yellow, becoming reddish by exposure to light, and vary in quantity with the temperature and the quality of the oil; and since they carry down some of the phosphorus, the strength of the preparation is thus liable to variation. He proposes, therefore, to submit clear almond oil to a temperature of 150° C. in a porcelain capsule for about a quarter of an hour; then for ten minutes to 200° C. or 250° C. By this means water is at first driven off, and then instable organic matters are destroyed or volatilized. The superheated oil deposits slightly after standing some time, or it may be filtered; it will then produce an absolutely clear and stable solution of phosphorus.

According to M. Méhu, sweet almond, olive or poppy seed oils will dissolve easily one-eightieth of their weight of phosphorus. He therefore proposes that only one part of phosphorus to 100 parts of oil, instead of the two parts of the Codex, should be used. Phosphorated oil of this strength is strongly luminous in the dark; but this luminosity may be entirely destroyed by the addition of a small quantity of ether, or of any of the essential oils not containing oxygen, such as bergamot, citron, copaiba, lavender, mace, mustard, rosemary, turpentine, etc. Colza, rape, beechnut, linseed, and brown cod-liver oils each dissolve one-seventieth of their weight of phosphorus. Castor oil dissolves one part in one hundred and five.† Cacao butter dissolves one per cent.; but if a colourless product be required, it should be treated as recommended for the oil of sweet almonds.‡

Dr. Radcliffe has recommended the following formula for gelatinized phosphorus pills:—§

"Phosphorus	6	grains.
Suet	600	"

"Melt the suet in a stoppered bottle capable of holding twice the quantity indicated; put in the phosphorus, and when liquid agitate the mixture until it becomes solid; roll into 3 grain pills, and cover with gelatine. Each pill will contain [illegible] of a grain of phosphorus."

The following formul by Soubeiran of a "Potion phosphorée" is given by Dorvault as the best method of administering phosphorus internally:—

"Phosphorated Oil	8
Gum Arabic	8
Peppermint Water	100
Syrup	60

Make an emulsion."

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* Journ. de Pharm. et de Chimie, viii. (1868) p. 37.
† Méhu, Journ. Pharm. et de Chimie, ix. (1869) p. 94.
‡ *Ibid.* viii. (1868) p. 42.
§ Pharm. Journ., 2nd ser. vol. VII. p. 615.

The phosphide of zinc before referred to is a compound easily decomposed by weak acids, such as lactic acid, yielding phosphuretted hydrogen. It contains one-fourth of its weight of phosphorus; but it is said that experiments have shown that physiological effects equal only to half the weight of phosphorus result from its use, and that consequently it is necessary to use eight parts of the phosphide to obtain the effects of one part of phosphorus.

Professor E. S. Wayne, who, on the occasion of his presence at the recent meeting of the British Pharmaceutical Conference, was elected an Honorary Member of that body, has since his return to Cincinnati been entertained by the members of the College of Pharmacy there, of which he is President. Professor Wayne gave an interesting account of pharmacy in Europe as it had come under his notice.

THE CANTOR LECTURES.

The first course of the Cantor Lectures, in connection with the Society of Arts, for the coming session, will be commenced on Monday next, November 25th. It will consist of five lectures on "The Practical Applications of Optics to the Arts, Manufactures, and to Medicine," by C. W. Meymott Tidy, M.B. A second course on "The Energies of Gravity, Electricity, Vitality, Affinity, Light, and Heat, especially with reference to the Measurement and Utilization of them," by the Rev. Arthur Rigg is announced.

THE ROYAL INSTITUTION.

The following lecture arrangements at the Royal Institution for 1872–73 have been announced:—

Prof. Odling, M.A., F.R.S.—Six Christmas lectures (adapted to a juvenile auditory), "On Air and Gas," on December 28 (Saturday), December 31, 1872; January 2, 4, 7, 9, 1873.

Prof. Rutherford, M.D., F.R.S.E.—Twelve lectures "On the Forces and Motions of the Body," on Tuesdays, January 14 to April 1.

Dr. Debus, F.R.S.—Three lectures "On Oxidation," on Thursdays, January 16, 23, 30.

Dr. H. E. Armstrong, F.C.S.—Four lectures "On the Artificial Formation of Organic Substances," on Thursdays, February 6 to February 27.

Prof. A. Vernon Harcourt, F.R.S.—Five lectures "On the Chemistry of Coal and its Products," on Thursdays, March 6 to April 3.

Edward A. Freeman, Esq., D.C.L.—Six lectures "On the Comparative Political Institutions of Different Nations," on Saturdays, January 18 to February 22.

Prof. W. K. Clifford, M.A.—Three lectures "On the Philosophy of the Pure Sciences," on Saturdays, March 1, 8, 15.

Prof. Max Müller, LL.D.—Three lectures "On Darwin's Philosophy of Language," on Saturdays, March 22, March 29, and April 5.

John Morley, Esq.—Three lectures "On the Limits of the Historic Method," on Tuesdays, April 22 to May 6.

J. H. Parker, Esq., C.B.—Four lectures "On the Evidence for the Traditional History of Rome from Existing Architectural Remains." on Tuesdays, May 13, 20, 27, and June 3.

Prof. Tyndall, LL.D., F.R.S.—Six lectures, on Thursdays, April 24 to June 5.

Prof. Odling, M.A., F.R.S.—Four lectures, on Saturdays, April 26 to May 17.

Edward Dannreuthner, Esq.—Three lectures "On the Development of Music in Connection with the Drama," on Saturdays, May 24, 31, and June 7.

The Friday Evening Meetings will commence on January 17th.

Friday Evening Discourses during the season will probably be given by Wm. Spottiswoode, Esq., the Rev. Prof. T. R. Birks, Edward Dannreuthner, Esq., Robert Sabine, Esq., Sir H. Rawlinson, K.C.B., Prof. Clerk Maxwell, James Dewar, Esq., E. J. Reed, Esq., C.B., J. Emerson Reynolds, Esq., Prof. W. K. Clifford, Prof. Tyndall, Lord Lindsay, Prof. Odling, and others.

THE ROYAL SOCIETY.

The Royal Society has this year awarded the Copley Medal to Professor Friedrich Wöhler, of Göttingen, for his numerous contributions to the science of Chemistry. Royal Medals have also been awarded to Professor Thomas Anderson, M.D., for his various chemical researches, and to Mr. Henry John Carter, F.R.S., for his valuable and long-continued researches in Zoology. The Rumford Medal, given every two years, has been awarded to Angers Jonas Angström, for his researches on Spectral Analysis. The annual meeting of the Fellows for the election of officers and Council for the ensuing year will be held on the 30th inst. On that occasion a successor to Dr. Sharpey—who resigns his office after a long period of service as Secretary—will have to be appointed. Professor Huxley is nominated by the Council as his successor.

The vacancy in the faculty of the Philadelphia College of Pharmacy occasioned by the death of Professor Parrish has been filled by the appointment of Professor William Procter, jun., who formerly held the same chair (Pharmacy) for many years, but resigned it in 1866.

We have great pleasure in referring to the inauguration of a Chemists' Association at Carlisle (see p. 414). We understand that the movement has had a generous financial assistance from the employers in the town, and it is to be hoped that this will be supplemented by the exercise of their personal influence in supporting the new society. Rooms have been taken, and it is proposed to hold a class in chemistry and pharmacy, under the tuition of Mr. J. Hallaway, and one in materia medica under the care of Mr. W. Moss, the secretary.

The question of the medical education of women having a direct bearing upon a subject still under discussion in the pharmaceutical body, we desire to call attention to an able article from the 'Madras Journal of Medical Science,' printed at p. 408.

Mr. E. C. C. Stanford's scheme for deodorizing and utilizing sewage by means of seaweed char was recently the subject of an interesting Conference at Southsea. We may mention that Mr. Stanford is an old pupil of the school of pharmacy at Bloomsbury Square, and was at one time Demonstrator in the laboratory.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The second general meeting was held at the Royal Institution on the 24th of October; the President, Mr. E. Davies, F.C.S., in the chair.

Messrs. Pearson, Chambers and W. P. Lake were elected members of the association.

Mr. Charles Sharp presented to the museum a section of a Cycas stem from Queensland, and of Adelaide bark, used for tanning purposes. Mr. A. Redford presented a bark from Queensland, known there as the "bitter medicine."

The President invited members to subscribe to the John Cargill Brough Fund, remarking on the object and merit of the fund.

A discussion followed on the subject of Pharmaceutical Education, which was adjourned to the next meeting.

The third general meeting was held on the 7th of November; the President in the chair.

Messrs. E. H. Parnell and S. Wilde were elected members, and Messrs. Henry Case and Charles Clark Burman were elected associates of the association.

The adjourned discussion on Pharmaceutical Education was resumed by Mr. Shaw, but no definite resolution on the subject was proposed.

LEEDS CHEMISTS' ASSOCIATION.

The second meeting of the present session was held in the Clergy-room, Church Institute, Leeds, on Wednesday, Nov. 13, 1872; the President, Mr. E. Brown, in the chair.

The minutes of former meeting having been read and confirmed, Mr. R. Reynolds, F.C.S., read the paper of the evening, entitled "A Short Notice of some Leeds Worthies in Science," and afterwards gave some information respecting the proposed Yorkshire College of Science, shortly to be commenced in Leeds.

Mr. George Ward, F.C.S., was glad to hear that the scheme was being carried on. He should hail with pleasure the inauguration of such a college, and had pleasure in proposing the following resolution:—

"That this meeting desires to record its gratification at the proposal for a Yorkshire College of Science, and believes that it would materially assist in the education of students in pharmacy."

Mr. E. Thompson seconded the resolution, which was carried unanimously.

On the motion of Mr. Smeeton, seconded by Mr. S. Taylor, a cordial vote of thanks was given to Mr. Reynolds.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

The monthly meeting was held on Friday, Nov. 8. The first business was to fill up the vacancy caused by the resignation of the President, Mr. Masters, and resulted in the election of Mr. C. Hester. A vote of thanks was passed to Mr. H. J. Masters for his valuable services during his term of office as president.

Mr. C. Hester returned thanks for the honour conferred upon him. He said he would do all in his power to serve the best interests of the association, and much regretted that his business duties compelled him to be so frequently absent from their meetings.

Mr. Druce then read some correspondence, and said they had received a specific gravity bottle from Mr. Armitt, Ralph's 'Botany' from Mr. Tearle, Ilfracombe, and a number of prescriptions from local friends which were extremely acceptable as their book was not yet completed.

After some business connected with the working of the association had been transacted,

Mr. Druce read a paper on Chemistry, and the following note on Chlorate of Carbon:—

"Under the above rather sensational name a dark grey powder was sent for examination, which had been procured from New York for use in eclectic medicine. It appeared to be a mixture of a coarse white powder with some black substance, the mixture being very imperfect, patches of white powder being very plentiful, showing that a sieve had not been used in its preparation. Upon analysis it proved to be a mixture of chlorate of potash with about 10 per cent. of vegetable charcoal. As the price of this compound was twenty-one shillings per pound, an amount of profit almost equal to that on corassa was obtained by the person who prepared this 'elegant compound.'"

A vote of thanks to Mr. Druce was passed, and the meeting terminated.

CARLISLE CHEMISTS' ASSOCIATION.

The first general meeting was held in the rooms of the association in Barwise Court, on Friday evening, the 15th instant; Mr. Councillor A. Thompson, President, in the chair.

The report of the committee having been read by the Secretary, Mr. W. Moss, was unanimously adopted.

The President then called upon Mr. Hallaway, who proceeded to address the meeting as follows:—

Gentlemen,—It having devolved upon me to deliver an address at this the first meeting of the Carlisle Chemists' Association, I feel that I am not competent to deliver such an address as is worthy of the occasion; but as some one must take the initiative in all such associations, rather than it should not be done I have taken upon myself the responsibility. I beg of you that you will not look for nor expect anything great or grand, but look upon me as being one anxious to further the interests of pharmacy, and on what I shall say as an inducement and stimulus to our youths to acquire that knowledge which is essential, and without which it is impossible to carry on successfully our business.

Nearly all trades and professions have either their unions or associations, the objects of which are chiefly to look after trade matters and to further and protect the interests of their respective trades or professions, and I trust that this association, which we are now met to inaugurate, will be the beginning of a new era in Carlisle; that it will be the means of consolidating as a body the chemists and druggists of this town, and uniting us as it were into one friendly family. The medical profession of our two northern counties have their medical association, which association meets at stated periods, and at which meetings papers are read by members upon professional matters, to the advantage and edification of the whole association, and without in any way detracting from the dignity of, or yet in any way interfering with the private interests of its individual members, but, on the contrary, uniting together the profession more closely. Such, I trust, will be the case with the Carlisle Chemists' Association; its members have no private interests to serve more than to do that which they can to look after the interests of the trade as a whole, and in imparting and receiving information which in the end benefits the whole community.

One of the objects of this association is to advance pharmacy, and as a means to that end, the committee propose there should be a monthly meeting for the reading of papers, whether original or extracted, the discussion of subjects specially connected with the trade of pharmacy, and the bringing under the notice of its members new medicines. If each member will contribute a little of his time and experience, I believe we shall carry on the association successfully. I also trust that in the course of time we shall be able to have a museum and a library; and in order to do this, the committee will thankfully receive anything in the shape of books or specimens for that purpose, so that the youths who may come to Carlisle to learn their business shall not have to complain of want of facilities for so doing, and also that they may be places of reference in pharmaceutical matters for the whole town.

The other object of this association is for the mutual improvement of its members and the helping and stimulating of our apprentices to acquire a sound, thorough and practical knowledge of the higher branches of our business, so as to enable them in the first place to get through their examinations creditably, and, secondly, to fit them for filling the positions that may devolve upon them in the future with credit to themselves and honour to their old masters, an object which I am sure we all agree in and wish to promote.

Pharmacy is a trade that demands a great degree of conscientiousness. Just think for one moment what very often depends on us,—an issue of life or death. What does it avail how clever our medical men are, or what amount of skill they may possess, or how long they may have anxiously considered and pondered over what is the best remedy to give, if their prescriptions are not accurately prepared in accordance with the wishes of the prescribers? And it behoves us all, young and old, so to fulfil the important duties that fall upon us, that the profession may have confidence in our skill and conscientiousness, and that the public may rely upon us doing our duty faithfully. Here I would bring before the masters the necessity of so conducting their businesses,—I refer especially to the preparing and dispensing of medicines, taking the pharmacopœia as their guide and standard,—that a youth may have always clearly set before him the duty of a pharmacist to prepare and send out medecines in conformity with the instructions of the Pharmacopœia and the wishes of the prescriber; and may learn to have a horror of secret formulæ. By secret formulæ I mean the formulæ that are used when nostrums are prepared, such as preparing vin. ipecac. with spirit; the constant use of concentrated infusions and decoctions for fresh, and the use of half-and-half (spirit and water) for the true proof spirit, 5 of spt. and 3 of water; and a host of other abuses that I am afraid still retain their old places up and down the country,—bringing to my mind what a friend in the drug trade once told me, that he thought in old times when he was an apprentice, the thing was not how to make things properly, but how not to do it. The apprentice should be taught that he ought not to think how preparations can be cheaply made, but how they can be best made, and that he has a duty to perform that requires a great amount of conscientiousness.

Pharmacy, in its earliest ages, was in the hands of the physicians, who professed the healing art in all its branches, and prepared their medicines themselves, or superintended the preparation of them. I should neither like to make nor superintend such messes as were made in the period referred to; and I wonder what the youths here present would think if we set them to work upon such things as the fat and grease or suet of a duck, goose, eel, boar, heron, dog, capon, beaver, wild cat, stork, hedgehog, hen, man, lion, hare, kite, wolf, mouse of the mountain, hog, serpent, badger, bear, fox, vulture, album græcum, east and west bezoar, stone taken out of a man's bladder, viper's flesh, the brain of hares and sparrows, the rennet of a lamb, kid, hare, and a calf, and a horse too; the excrement of a goose, of a dog, of a goat, of pigeons, of a store horse, of swallows, of men, of women, of mice, of peacocks, etc.? What I have just read form a portion of the remedies enumerated in the Pharmacopœia of 1653; the science of medicine was so little understood, and so imperfectly cultivated, that it was in general practised empirically, and was often confounded with sorcery and witchcraft. No laws existed for the protection of the public from ignorant practitioners, and it was not until the year 1511 that in this country the practice of the profession was regulated by law. It is uncertain what time physicians gave up practising pharmacy, but we find that in 1617 the apothecaries, who were previously incorporated with the grocers, were separated from the latter, and obtained a charter which gave them the privileges of practising pharmacy, viz., the selling of drugs, and the preparing and compounding of medicines according to the physicians' orders and instructions. The first pharmacopœia was published by the college in 1618, and subsequent editions at various times, until we reach the last, and, I believe, the best that has been yet published, the 1867 British Pharmacopœia. The Edinburgh and Dublin Colleges also published pharmacopœias, but in the year 1864 a pharmacopœia was published that superseded the three pharmacopœias then in use, the London, Dublin, and Edinburgh, called the British Pharmacopœia, and which did away with the uncertainties and anxieties that so often troubled us, as to how a prescription was to be dispensed (not knowing by whom or where it was written) when it contained a medicine that was ordered to be prepared of different strengths by the different colleges. On the 18th of February, 1843, the Pharmaceutical Society of Great Britain became a corporate body, and in 1868 obtained from Parliament the object for which they had so striven and worked, the compulsory education of all who practise pharmacy on their own account.

The law has now said that every one who keeps open shop for the sale of such articles as are enumerated in certain schedules must pass an examination; and although it does not prevent any one from keeping open shop for the sale of three-fourths of what we do sell, still the one-fourth that is prohibited from being sold by any one who has not acquired the necessary privilege for selling is a total preventive to any one following the business of a pharmaceutical chemist.

As the law has said in its wisdom that all who keep open shop must pass an examination, I say before such examination can be passed, it is an essential requisite that every one must be educated, and the first thing, therefore, for any one going into the business to do is to begin to acquire the necessary education.

There are many schemes put forth for educating future pharmacists, and which have been fully explained and discussed in the PHARMACEUTICAL JOURNAL; they all have their friends and admirers, and I dare say they might be brought into practical working order. Still, I hold that it is the duty of an apprentice to pay for his own education, and that good practical pharmaceutical chemists can be made if young men will themselves study and make use of the advantages offered by such associations as this we are now met to inaugurate, with the practical training behind the counter, if with the help thus given they help themselves. Certainly they do not pretend to make a young man a pharmacist without his own help, but they offer rooms to read in, the assistance, help, advice, goodwill, and experience of their seniors, and, I trust, also, some practical and theoretical instruction in chemistry, pharmacy, materia medica, and botany that is not always met with behind the counter.

I wish to bring before your notice the desirability and the necessity of not taking apprentices without their having first passed the Preliminary examination, or, at any rate, it being made an essential feature in the agreement that it has to be passed within three, or at the latest, twelve months after entering upon their apprenticeship.

I think you will at once see the force of this when I say that a youth fresh from school is in a much better position with everything fresh in his memory to pass such an examination, than when he has been from school, say, two to three years, and perhaps forgot a good deal of what he did know. It also would have the effect,—which is the thing desired and inculcated by every one who wishes to see pharmacy occupy its proper position in our land,—of weeding out the uneducated, keeping out of our ranks those whose education has not fitted them for entering them, thus giving tone to, and elevating the whole body also. It will have the effect of lessening in the course of time the great number of businesses that at the present time abound, by putting greater difficulties in the way of, and increasing the cost to, those who wish to practise pharmacy, and eventually making our businesses more remunerative by their becoming so much larger. The time of the youth is taken up with the preliminary studies, if he does not pass before he enters, or immediately after, to the total exclusion of what he ought to be doing so as to enable him to get through his Minor after serving his apprenticeship.

In the few words more I have to say, I wish specially to address the youths whom I now see here, and for whose benefit this association has been chiefly got up. I wish to impress upon them the necessity of studying during their apprenticeship; not in a random way, but by hard downright work, being in earnest and determined to overcome all difficulties, using all the spare time that they have for the furtherance of their studies. And here I would remind them that they may consider themselves well off, as they will find very few towns in England that adopt such an early closing hour as we do here, which they will find a great boon, and as such, should prize it.

The examinations comprise a knowledge of chemistry, pharmacy, botany, materia medica, with the practical manipulation of the laboratory and dispensing counter; also the modes of ascertaining the strength and purity of drugs, the tests and antidotes for poisons, the doses of ordinary medicines and an acquaintance with the language of prescriptions. Rather a formidable programme, I fancy I hear my young friends say; but it is a programme that must be mastered by every one who wishes to pursue the calling of pharmacy and aspires to be in business for himself. And I can assure them, if they will only give their time, and take for their motto '*Labor omnia vincit*,' they will master it. I also wish to impress upon them the necessity of having a regular routine of study, to have nights or portions of nights set apart for particular subjects; say one night for chemistry, one for materia medica, another night for botany, another for history or general literature, and lastly, and I believe of the greatest importance, one night for reviewing what you have done in the preceding nights. And remember that the great secret of being successful and accurate as a student, next to perseverance and being thorough in all your studies, is the constant habit of reviewing, by which means you fix in your memory faithfully what you have learned. Here I would recomend a few books to your notice, and which, I think, you ought all to possess, viz., Attfield's 'Chemistry,' Oliver's 'Botany,' Roscoe's 'Chemistry,' Scoresby-Jackson's 'Materia Medica,' Fownes' 'Chemistry,' and Selecta è Prescriptis.' Now you must not let those nights that are set apart for particular subjects be interfered with. Make yourselves a programme, and stick to it; it may be irksome at first, but if you will only persevere you will find you will be as anxious to get to your studies, and be as annoyed if you are interfered with, as you are for getting to your dinner when you are hungry and called off before you are done. Practical pharmacy, not high scientific pharmacy, will engage a good deal of your time in the shop. I fancy at this last I hear my young friends saying, "All very well to say so, but, you know, we don't get much practical pharmacy in the shop." In answer to that I say, the shop is where you will get, although at present you may think to the contrary, most useful knowledge, and that practically, which will enable you at a future time to manage a business either for yourself or some one else. And it has been proved to be a fact, that without the practical training in a shop, it is almost an impossibility for a young man, no matter how full of theoretical knowledge he may be, to pass his examinations. For the want of practical knowledge gained in a shop, young men who have attended laboratory practice at Bloomsbury Square, who have been well up in all but practical experience in a shop, have been plucked. Professor Attfield inculcates the desirability of making it compulsory that before a youth presents himself for examination he must have been apprenticed a certain number of years to the trade; indeed, a young man who has received his education in a school of pharmacy, without any practical experience in the routine of a shop, would be unqualified to conduct a business, and not likely to succeed if he were to make the attempt. The judicious combination of the profession with the trade is the great object to be attained, for while it is of the highest importance that those who dispense medicines should be duly qualified as chemists, it is equally necessary to sustain their commercial character as druggists. Professor Redwood says the subjects involved in the Minor examination, and the extent of knowledge implied by the description of it given in the bye-laws, appear to him to be such as young men of average ability, with the scholastic acquirements indicated by the Preliminary examinations, ought to be able to acquire in a three or four years' pupilage with a competent master, and attendance during part of the time at lectures or classes for systematic instruction. Even without lecture attendance, if the pupil be properly aided in his studies, he may, as many do, successfully prepare for this ordeal; and to corroborate this view of the Professor's we have instances of young men not only passing the examinations, but seizing upon the highest prizes the Pharmaceutical Society has to bestow. Amongst such examples Mr. Betty, when addressing the chemists at Glasgow last week, mentioned the name of Mr. Talbott, who was the successful candidate for the first Bell Scholarship, and who resided in a small country town and had no help but his class-books; also Mr. Betty informed them that the present holder of the prize was self-instructed. Professor Redwood also says the examinations are not intended for the discovery of the extent of the candidate's knowledge so much as his want of knowledge; they are designed rather as a test of his weak points than of his strong points. "It is not," he says, "a high degree of scientific attainment in any of the branches of knowledge comprised in this curriculum that is most wanted, but a general proficiency in all, and great ignorance in none." In conclusion, I wish to impress upon my young friends that they must not expect too much from Mr. Moss or myself (but I can assure them we are both willing and anxious to assist them and to do all that we can to help and direct them so far as we are competent—still, they must bear in mind, that they who help themselves are best helped) and to thank you all for the patience with which you have listened to me.

The address was received with much applause, and at its conclusion, a cordial vote of thanks was given to Mr. Hallaway.

The thanks of the meeting were also voted to Messrs. Southall, of Birmingham, for their present of a collection of specimens of materia medica.

A vote of thanks to the president closed the proceedings.

Obituary.

Notice has been received of the death of the following:—

On the 21st of October, Mr. Frederick William Sanders, chemist and druggist, of Great Hampton Row, Birmingham.

Parliamentary and Law Proceedings.

Alleged Violence in Administering Medicine.

On Monday, November 11, an inquest was held at the Wandsworth Union Workhouse, before Mr. Carter, on the body of Rhoda Williams, aged 72, who died on the previous Wednesday evening shortly after a sleeping draught had been forcibly administered to her by the nurses. A patient in the next bed but one to the deceased stated that the nurses attempted to give deceased a draught on Wednesday evening. She spat it out. Nurse Ward then fetched another, and pinched or held deceased's nose and put the feeder in her mouth while the other nurses held her down. Deceased was conscious, and struggled to prevent the medicine being given. It was not more than five or ten minutes after the draught was given that death took place.

Dr. Ceely said deceased was suffering from dropsy, diseased heart and lungs in an advanced stage. Saw her on Wednesday afternoon. She was delirious, talking rapidly and incoherently. Prescribed for her a stimulant. Ward came to witness and described the patient's state, wishing to know if she should give her a night draught. It was not laudanum, but a sedative. Witness ordered her to give one. It was customary for the nurse to have a bottle of the draught under lock and key. It was a preparation of opium, supplied from the dispensary. Ward had a bottle. Witness supplied it, but did not make it up. Twenty minims was ordered to be given. It was in solution, containing tincture of opium. Ward did not come again till after the death of deceased. She said she had given the medicine, but did not say anything about the first draught. Witness understood from her there had been some difficulty in administering the dose. First heard about the second dose on Thursday following from Ward, who said she had attempted to give the first dose, that it was spilt, and she then administered the second. Witness saw deceased a few minutes after death. There was no appearance of violence. About two tablespoonfuls of water was added to the quantity of medicine ordered. Had made a *post-mortem* examination. Found no evidence of violence on the external parts. The stomach was empty, and there was no appearance of opium having been taken. The two doses, if taken, would have been a large, but not a dangerous quantity.

Mary Ward, the nurse, said deceased was in bed in a very bad state, delirious, and very noisy. She attempted to get out of bed, and made use of bad language. Witness went to Dr. Ceely, and asked if he would allow her to give deceased a night draught, as she was delirious. He consented, and witness obtained twenty drops of laudanum, which she measured in a minim measure, and added two tablespoonfuls of water. Attempted to administer it, but it was upset; none of it went into deceased's mouth. Prepared another draught, put some in her mouth, but she spat it out. Nothing was done by any one to make her swallow it. Her nose was never touched: her hands were held to prevent her knocking the feeder out of witness's hand. The coroner summed up, and the jury returned a verdict of Natural Death.—*Wandsworth and Battersea District Times.*

Attempted Suicide by a Chemist and Druggist.

On Saturday, November 9, Mr. Hannaford, chemist and druggist, of Irthlingborough, was found in a drowsy and partially unconscious state, he having taken a quantity of laudanum. The usual treatment was had recourse to, and on Monday morning he had nearly recovered. After being left for a short time, however, he was found with his throat stabbed in four places, and the bed saturated with blood. The wounds were at once dressed, and it is thought probable that he will recover.

Reviews.

A Manual of Chemical Physiology, Including its Points of Contact with Pathology. By J. L. W. Thudichum, M.D. London: Longmans. 1872.

An English work on Physiological Chemistry has long been wanted. The Cavendish Society's translation of Lehmann's excellent Manual was not accessible to all, and is now, moreover, out of date, and no other of anything like equal merit has succeeded it. It is true that the student who reads German can find several good books to aid him, and, in particular, Kühne's "Lehrbuch," which we rejoice to hear will shortly be published in an English dress by Professor M. Foster. But the fact remains that the English student has not hitherto had any trustworthy and sufficient guide in the difficult work of physiologico-chemical analysis. At the present time, even Kühne is out of print.

Such is the juncture at which Dr. Thudichum's book has appeared, and it would indeed have been satisfactory if it had supplied the want that students are feeling so keenly. But this want, we are sorry to find, is still unsatisfied. We are anxious to do full justice to Dr. Thudichum's ability and industry, and we gladly admit that there is much that is valuable in his book; but its faults of arrangement, selection and nomenclature are so grave, and its errors, and still more its omissions, so glaring, that it is not likely to be of much use as a text-book.

The first sixty pages of the book are occupied with a general outline of physiological chemistry, reprinted almost *verbatim* from one of the appendices to the tenth report of the medical officer to the Privy Council. Many of our readers are, no doubt, familiar with these annual reports, and will remember the lengthy and finely-illustrated memoirs which Dr. Thudichum has contributed to them in successive years under the title of "Researches Intended to Promote an Improved Chemical Identification of Diseases." Somehow, these researches have been received with not a little distrust by the medical profession. Perhaps the very number of the discoveries announced and the slender proof adduced in support of many of them are sufficient to account for this; but the feeling was certainly strengthened by the tone of originality—often too much like self-conceit—which induced the author to change many of the common names of chemistry, and to explain facts according to hypotheses of his own—hypotheses which had not received the adhesion of chemists, and which were often crude and improbable. It was felt that a public health report was hardly the place in which to re-write elementary chemistry. Such dogmas as that "all atoms possess chemism, dynamicity and polarity," and the constant use of such words as "chemolysis," "physiolysis," "hydrothion," for sulphuretted hydrogen; "rhodanate" for sulphocyanate, and "hydroxyde" for hydrate, are clearly out of place in a work of the kind, and are evidence of bad taste in the author.

The portion of Dr. Thudichum's reports here reproduced is interesting and suggestive, and much of it is valuable. But it has the great fault to which we have before referred; it is untrustworthy. No student in reading it could distinguish well-ascertained facts from the hypotheses, often mere guesses, which the author mixes with them. Difficult points in physiology are disposed of in a few lines, with dogmatic explanations, which would be most satisfactory if they were certain, but which as things stand are sure to mislead the student. Thus, the escape of carbonic acid from the lungs is explained (p. 30) by the assumption of a "hematic acid," which passes into the serum from the corpuscles and decomposes the carbonates "at the very moment when the blood-corpuscles arrive in the small breathing cells of the lungs." This idea, or one very like it, was started a few years ago by Kühne, and has some probability; but it surely is not right to give it to students as matter of fact. Elsewhere (p. 15), the formation of hydrochloric acid in the glands of the stomach is described as a simple reaction between water and salt, by which hydrochloric acid and caustic soda are simultaneously formed. Of course this *may* be the case, but considering the strong *à priori* improbability, who but our author would have ventured to state it dogmatically?

For examples of simple errors of fact, we may point to page 41, where neurine and choline are described and formulated as different substances, whereas they have long been known to be identical, and where the acid $C_{16}H_{32}O_2$ is described as margaric, instead of palmitic. It is, however, right to add that errors of this kind do not appear to be numerous.

The second portion of the work is an analytical guide, and is, therefore, wisely made "prescriptive, in the style and manner of pharmacopœias." But, most unwisely, it has been arranged in alphabetical order, so that the unhappy student who wishes to work systematically will find himself carried from acetic acid to albumen, from albumen to alcohol, from alcohol to allantoine, and so on throughout the book. Separate headings are of course given for such substances as bile, blood, milk and urine, but as the proximate constituents of those substances are scattered throughout the book, it is a work of some labour to collect the methods necessary for their examination. And the headings themselves are imperfect and arbitrary. Bodies as important as Viteline, choline and glycerine are omitted, whilst luteine gets six, and cruentine nearly three pages. In the separate articles too, we notice many remarkable omissions. Only one kind of albumen, globulin or lactic acid is mentioned. No allusion is made to the important researches of Miescher on pus, Städeler and Obolensky on the mucin of the submaxillary gland, or Jaffé on the bile and urine pigments. And, finally, in the article on urine, no notice is taken of the fermentation test for sugar, or to any necessity for purification of the urine before the application of the copper test.

It is no great compliment certainly to Dr. Thudichum to say that his book is at the present time the best the English student can use, but considering its manifold imperfections, we cannot help hoping that it will, ere long, be superseded by a more trustworthy, if less ambitious text-book.

Note Book of Materia Medica, Pharmacology and Therapeutics. By R. E. Scoresby-Jackson, M.D., Second Edition. Edited by Dr. Angus Macdonald, M.A.

Few students who make this, the second edition of Dr. Scoresby-Jackson's Materia Medica, their text-book, will complain that the difficulties of the British Pharmacopœia are not most thoroughly explained, and their path otherwise made easy and interesting.

In our review of the former edition* we quoted one or two extracts from it, which give a very good idea of the general method of treating the subject, and Dr. Macdonald has strictly adhered to his author's plan.

Nevertheless, much had to be rewritten and rearranged, especially the chemistry, of which the symbols are now in the new notation, the old formulæ being retained, as in the Pharmacopœia, "to facilitate reference to older works."

The work is divided into three parts; the first of which is introductory to the whole subject, and includes descriptions of pharmaceutical operations, together with a very useful list of officinal formulæ, with each preparation under its proper heading. Then follows an article on magistral formulæ or prescriptions, which contains

* Pharm. Journ., 2nd Ser. vol. VIII. p. 423.

much useful information, but in which too many long and comparatively obsolete words are used, as in the following description of one of the methods of exhibiting medicines, "*The Iatraleptic Method.*—This process requires more than mere opposition; the term signifies *to cure by anointing* (ἰατρεύω and ἀλείφω). It has also been called the *epidermic method, anatripsologia* (ἀνατρίβω, *to rub in*) and *espnoic medicine*." Under the heading of mental causes modifying the action of medicines, some lines of poetry are given, which seem strangely out of place so near to elaborate chemical formulæ.

The second part of the work includes the drugs from the inorganic kingdom, and the explanations of the preparations and tests of the Pharmacopœia are excellent. The long list of synonyms for each substance hardly deserve the importance given them; it can be very little good to know that hyposulphite of soda has been called "natrum oxidatum subsulphurosum," or that citrate of potash once went by the name of "salt of Riverius." No such objection can be made to the foreign synonyms, which are not sufficiently well known in this country.

Following the description of each drug is an account of its therapeutic qualities, and here, as in many other works on the same subject for the use of students, there is a want of definiteness, even more than the present state of therapeutics justifies; all the possible actions of the substances under consideration are put down one after the other, and no great stress is laid on the particular properties of each drug, which a small practical experience enables any one to obtain. For instance, ammonia is "medicinally employed as a diffusible stimulant and restorative, antacid, antispasmodic, diaphoretic, sudorific, expectorant, antidote, counter-irritant, vesicant, etc. It has been recommended in the later stages of febrile and inflammatory diseases, and in other cases where there is great nervous prostration; also to hasten the cold stage of intermittent fever and to promote the eruption in febrile exanthemata; in the later stages of pneumonia and in chronic bronchitis; in atonic dyspepsia, with acidity of the primæ viæ, and flatulence; in syncope; in spasms; to avert fits of epilepsy; in hysteria; in amenorrhœa and chlorosis; to dissipate the effects of alcohol; in delirium tremens; as an antidote to sedative poisons, such as hydrocyanic acid, digitalis, etc." And this is not all. This instance, taken at random, would seem to indicate to the commencing student that ammonia is a universal panacea; and yet how unfrequently does liquor ammoniæ appear in prescriptions, so that a very false idea is obtained of its importance.

Considerable stress is laid on the objection to the presence of nitric acid in the solution of citrate of bismuth and ammonia, but the acid is not free, the solution being generally alkaline, and it has never been shown that the presence of a nitrate is in any way injurious.

The third part of the work is occupied with the consideration of organic materia medica, and is brought up to the times by the introduction of the recent researches of Drs. Brunton, Frazer and Harley. Considerable space is occupied by botanical descriptions of the plants referred to, and the obsolete Linnean names are still retained.

The same remarks that have been made with regard to the therapeutics of the second part of the book apply to this one also in many of the articles. Some of the descriptions seem also to mislead. Thus, in discussing the use of quinine in simple intermittent fever, our author says, "it is only after visceral disease, or other complications when present, have been suitably treated by other remedies, that these remedies can be safely or profitably applied." This statement is peculiar, and though it may be true, does not give a clear idea as to the general way in which the drug is employed.

Notwithstanding the peculiarities above pointed out, this work cannot but prove a useful one to students of the subject.

Correspondence.

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

Commercial Morality.

Sir,—Will you allow me to reply through your Journal to the letter signed by Messrs Newham and Co., which appeared in No. 124, on the 9th of November. It is headed "Specimen of Commercial Morality," and refers to their purchase of two cases of sponge, of which they give full particulars as to their being deceived in the weights charged and actual weights, and also in the net produce of sponge when the sand was abstracted.

Now, Sir, allow me, as a sponge merchant of very many years' standing, to inform your correspondents that if they will buy original packages as imported, and turn dealers themselves, they must put up with the consequences. They cannot reasonably expect to buy fairly cleaned goods, such as a respectable firm would supply them with, at the same rate as that with the full complement of sand in, as received from Smyrna.

Any druggist can ascertain through the wholesale houses or drug brokers in London in what state the sponge is received from abroad, and he will then find where what he would term the "immorality" proceeds from. If he wants to purchase sponge, let him give the fair market value for it, and not buy the sand and sponge as it is imported; and if he finds too much of the former and too little of the real article in the package, cry out that he has been taken in. I am sorry to say that too many parties who retail sponge think, when they are offered the original goods at a low price, that they had been previously paying very long prices, and consequently give an order and then find their mistake out.

J. W. Pyke.

4, *Great Prescott Street, Goodman's-Fields, London, November 10th*, 1872.

Sir,—The reply of Mr. W. Judd in your impression of the 16th, to the letter upon Commercial Morality in that of the 9th, states very clearly and truly the process of loading sponge with sand.

Sponge in its natural state is found growing to the rocks, no doubt sometimes near a sandy bottom, but the sand is all (or nearly all) washed into it by those who find it to their advantage to do so.

Having visited some of the centres of the heavy sponge trade in the Mediterranean, and seen the sponge being prepared for the English market, we clearly see the advantage which the dealer gains over the English buyers; the former knows how much sand he has washed into his sponge, the latter has only to guess at it. It is a fact that you may purchase sponge at the average commercial weight, which is about 70 lb. of sand and 30 lb. of sponge to 100 lb. You may then order it to be doubly weighted, so that the 100 lb. contains only 15 lb. of sponge.

In France the custom is to have sponge perfectly light, and to "wash out" every impurity, instead of "washing in" sand. Having had considerable transactions in light sponges dressed after the Paris fashion, we arranged at the time of the Franco-German war to bring into our own factory workmen from Paris, accustomed to the process of cleansing sponges.

Many are still greatly prejudiced against it, and having been so long accustomed to the sanded sponges at from 2*s.* to 12*s.* per lb., they are with difficulty convinced that light sponge at 16*s.* to 40*s.* are decidedly cheaper. In purchasing light sponges, buyers see exactly what each piece costs.

All this is done to make the sponge nominally cheap per lb., and the retailers of this article are answerable for this state of things, for they too dearly love a cheap quotation. The light sponge reaches England direct from the fisheries in bales, with little freight, for it is tightly compressed, whereas the sanded sponge is opened and packed in cases at a far greater bulk, and consequently freight. Again, the labour of sanding is greater than that of washing, and requires considerable space to place each piece separate, and great patience to wait till the sand dries into it.

It remains only to be stated that the finer the texture of sponge, the lighter it will weigh, and that sponge that has once been sanded, requires greater time and labour to render it entirely free of sand, but the honest sponge which has not undergone the process of sanding, but has arrived in this country in its virgin state, requires but little washing, and not one grain of sand will be found in it. There is therefore now no difficulty whatever in avoiding the speculation which always attends the purchase of sanded sponge.

G. B. Kent and Co.

11, *Great Marlborough Street, Regent Street,*
November 18*th*, 1872.

Sir,—I wish to add my experience to that of Messrs. Newham and Co., in the purchase of sponge in sand. I have just cleaned a case and find the result to be far less favourable than theirs.

Invoice Weights.	Real weights.
Gross 138 lb.	136 lb 8 oz.
Tare 17 lb.	17 lb.
Allowed for sand 30 lb.	82 lb. 14 oz.
Net weight of Sponge 91 lb. . .	8 lb. 2 oz.

I would recommend chemists to avoid all such purchases however plausibly the case may be put before them. It would be well for all who have paid for experience in the same way to make the fact known, that the system may be at once put a stop to.

Spongia Usta.

Worcester, November, 12*th*, 1872.

Sir,—A grocer lately had some sugar returned to him with the following polite message:—"Too much sand for domestic but not sufficient for building purposes," and with some such message should your correspondents B. Newham and Co. have returned those wonderful cases of sponge which they describe in your Journal. B. Newham and Co. labour under a popular delusion when they say that they "are aware that sponge *naturally* contains a considerable allowance of sand." I respectfully beg to differ from them. It *naturally* contains nothing of the sort. I bought a short time since some pounds of compressed sponge, from a firm in London, which was absolutely free from sand, and more, it never had any sand in it; every pound of it was equal in quantity and saleability to 4 lb. as usually bought and weighted with sand. I no longer go to "the Children of Israel" for sponge. I buy it free from sand, and thus know exactly what I am buying. Newham and Co. should take the bull by the horns, and not be deterred from doing a legitimate trade because they have been once bitten.

November 13*th*, 1872. Nil Desperandum.

Early Closing.

Sir,—When is a chemist's shop closed? The question suggests itself after perusing the correspondence in late numbers of the Journal. As to Sunday closing, I have always considered Mr. Slugg's practice the correct one; and ever since my first situation, where from inexperience I made no special inquiries on the subject, and where in consequence I remained three weeks, I, for several years, invariably refused every offer of a situation (and I had several very desirable offers) where anything beyond work of genuine necessity was required on a Sunday. Since I have been in business I have had customers on Sunday who have looked at articles of perfumery, etc. while a prescription has been preparing, but when they have desired to take them, they have been courteously informed that such orders would be gladly executed on the following day. I have never had occasion to regret this line of conduct, and cannot trace to it any case of pecuniary loss.

But what is early closing? I know some chemists who "close at eight o'clock," but their door shutters are down until ten. Now my customers come in at the door, and hence it makes no difference to them whether the window shutters are up or down, so long as there is free ingress and egress through the doorway. Some of these early closing chemists are not averse from signing an agreement to close on holidays, and while their neighbours act upon the agreement *bonâ fide*, their door is open all day long, and they take all the gleanings. In tkis new movement, is early ciosing genuine? Would that the secret of combination for this and many higher purposes would reveal itself to us who live in country places.

Nov. 16*th*, 1872. Henricus.

Remuneration of Assistants.

Sir,—The view brought forward by your correspondent 'An Underpaid Assistant' as to the cause of the scarcity of assistants of the *right sort* is very different from those which we usually see advocated.

There has been a great cry through the trade, especially from the employers, for pharmaceutical education, and a great number of schemes and plans have been brought forward, in some of which it is sought to persuade, and in others to force the rising generation to study and qualify; but if it be true that there is no demand and proportionate remuneration for the trained and educated assistant, it is evident that we have begun at the wrong end of the matter. In order to see whether such be the case we have only to look through the advertisements for assistants in the Pharmaceutical Journal, and there the requirements we find as a rule to be "state height and salary required." Let the *former* be rather high and the *latter* very low, and a certificate of competence is of little more use than waste paper, unless one is prepared to take a salary which a carpenter or stone mason would look down upon with contempt.

Create first the demand, and then the supply will follow without any difficulty, as any man of ordinary ability can prepare by self-help for the examinations without any extraneous assistance; only show him that he will have a probability of being repaid for his time, trouble and expense. Before asking for more assistants of the right sort, it would be well to provide suitable employment for those we have, instead of compelling them to seek for it in foreign situations, hospitals and the like, where they are to a great extent lost to British pharmacy.

O. A. Reade.

Sir,—The difficulty of the assistants' co-operative question, which has never been underrated in these columns, does not diminish by examination. The more the matter is discussed, the more wide does the gulf appear to yawn between the just and the expedient. Months ago was sounded the note of warning against the pernicious counsels of professional agitators, and the warning is not less requisite at this date, though the circumstances of the case are changed.

Chemists generally have met reasonable demands by reasonable advances. It is an accomplished and indisputable fact that the assistant is distinctly better off than he was twelve months ago, and the denunciation of professional agitators is met with the reply, that the assistant has obtained an amelioration of his condition by the thorough ventilation which his grievances have obtained from time to time through the medium of your valuable Journal.

To say that justice would not have been done but for extraneous pressure, is to advance an assertion incapable of proof, and to malign a body of men who are certainly not more selfish than their neighbours in the transactions of business. The people who content their limited understandings with jargon about supply and demand, and labour being worth what it will fetch in the market, have yet to learn, and will be difficult to convince, that the chemist has raised the assistant pecuniarily, without knowing where he will recover the increased outlay, and with the prospect of having to pay it out of profits, which at the best are insignificant compared with the average profits of commerce. Yet this is strictly true, and where the master has spontaneously given a rise to competent men, we are hopeful that the work will be done with so much more care and diligence, that the bargain will prove profitable to both parties.

There is no better solution of the difficulty to offer than this, mutual forbearance and consideration, sympathy and toleration, instead of distrustful antagonism.

104, *The Strand.* A. Courtenay.

Sir,—In reply to "Underpaid Assistant," allow me to say that the fault is our own; I have often wondered why it should be tolerated when the remedy seems so simple. Why not have a society of our own, by which we could claim our rights? "Unity is strength;" let us be united. This society might be termed the "United Chemists' Assistants' Society." Through its influence many benefits might be derived, viz., providing for old age and illness, etc.

Wm. W. Lindley.

[*** Such a society as that suggested by our correspondent, provided its efforts were devoted to proper objects, might undoubtedly render great services to its members and to the trade generally.—Ed. Pharm. Journ.]

Patent Medicine Licence.

Dear Sir,—In reply to Mr. Taplin, I will pass over his *reductio ad absurdum*, and merely ask the name of the chemist at Sandown, and the date when he was fined for selling Ess. Zingib.

Personally, I have no wish for any alteration in the licence, but if any change should be made, I appeal with confidence to the majority of the trade for support of my scheme.

George Brown.

Sandown, I. W., November 11th, 1872.

*** [We have communicated with Mr. Taplin respecting the above question, and have received information from him which has satisfied us that his statement was correct.—Ed. Pharm. Journ.]

Sir,—The flagrant injustice manifest in the imposition of this tax has been freely commented on by several of your correspondents.

All are agreed that the sale of patent as well as officinal medicines legitimately belongs to chemists and druggists, and the assumption of this business by stationers, grocers and others ought to be put a stop to.

While residing in a large manufacturing city the amount of trade I did in these articles was about £300 per annum, the licence being 10*s.*; now, however, as I live within a certain distance from the metropolis, and the amount done in patent medicines is comparatively small, I have to pay two pounds for the privilege.

It should be remembered that wholesale dealers, whatever the extent of their transactions, are placed on the same footing with the retailers as regards the medicine duty—the princely (!) Holloway pays no more—and country wholesale manufacturers and wholesale dealers may sometimes be exempt from the payment of 10*s.* or even 5*s.* per annum.

Would it not be possible for Government to make a more equitable adjustment of the duty, still realizing a satisfactory return?

Sirius.

Educational Labelling.

Sir,—Seeing many letters in the Journal upon Pharmaceutical Education, I take the liberty of sending you from Dieppe a few labels similar to what we have upon all our bottles. When I arrived in France I was quite ignorant of the contents of the French pharmacopœia, and not having any time to study (our hours being from a quarter to seven a.m. till nearly eleven o'clock p.m., the early closing not having yet arrived here) have been obliged to read up as best I could, but with the help of the labels I have been enabled to learn the composition of most of the various wines, pommades, and syrups, which are very numerous.

The labels contain nearly all the information (with the exception of the compounds they enter into) that is required for the materia examination. First you have the plant, then the family to which it belongs, then the natural order, if poisonous or not, the mode of employment, dose, and if poisonous, the antidote.

With regard to wines, syrups, etc., you have the composition, if poisonous, mode of employment, dose, etc.

I think, could these labels be placed upon the bottles, that apprentices and all desirous of learning would be greatly facilitated, as I have been.

P. Vincent.

[*** The labels forwarded by our correspondent are printed in black on white paper, $2\frac{1}{2}$ by 2 in. or less. We give translations of two of them for specimens.—Ed. Pharm. Journ.]

LEAVES OF PURPLE DIGITALIS.

Digitalis purpurea.
Family.—Scrophulariaceæ.
Source.—Europe.
Poisonous in large doses.
Properties.—Diuretic, sedative.
Not sold without "ordonnance."
Used internally in *infusions*, in the proportion of 1 to 4 grams to a litre of water, for dropsy, palpitations, etc.

Cost, per 500 grams.		To sell at
per gram.	per 5 grams.	per 30 grams.
per 125 grams	per 250 grams.	per 500 grams.

Observations—

PASTILLES OR TABLETS OF IPECACUANHA.

Formula.—Ipecacuanha powder, 30; sugar, 1470; mucilage of gum tragacanth with orange-flower water, q. s. To be made into tablets weighing 6 decigrams.
Properties.—Emetic, expectorant.
Sold with "ordonnance."
Used internally.
Dose.—3 to 6 daily as expectorant. (Each tablet contains 12 milligrams of Ipecacuanha).

Cost per 500 grams.		To sell at
per gram.	per 5 grams	per 30 grams.
per 125 grams.	per 250 grams.	per 500 grams.

Observations—

Condensed Milk.

Sir,—It would, I think, interest some of your readers to learn that so far from condensed milk being a new preparation, a kind of condensed milk was in constant use by the army of Chinese Tartary in the thirteenth century, as this paragraph from Marco Polo's Travels will show:—

"They also have milk dried into a kind of paste to carry with them; and when they need food they put this in water, and beat it up till it dissolves, and then drink it.

"It is prepared in this way; they boil the milk, and when the rich part floats on the top they skim it into another vessel, and of that they make butter, for the milk will not become solid till this is removed; then they put the milk in the sun to dry, and when they go on an expedition, every man takes some ten pounds of this dried milk with him, and of a morning he will take a half pound of it and put it in his leather bottle, with as much water as he pleases, so as he rides along, the milk paste and the water in the bottle get well churned together, into a a kind of pap, and that makes his dinner."

Doncaster, October 23rd, 1872. C. Parkin.

C. D. P.—The loss is only one-eighth the quantity of phosphate of iron which is held in solution. We are not aware of any better mode of precipitating it than the Pharmacopœia process, where the soda of the acetate neutralizes the sulphuric acid in which the phosphate of iron is dissolved. The acetic acid thereby set free scarcely dissolves any phosphate of iron, and consequently it is precipitated.

L. W. Marshall.—We think both your preparations of iron must have contained some basic oxide in solution—probably not the same quantity in each. This we find is easily precipitated by many salts and by acids, except hydrochloric, unless these be added in excess.

H. H. Pollard.—It is intended that the Bell Scholar should avail himself of all the privileges provided for him; he must therefore commence his studies at the commencement of the session. See the resolution of the Council recorded on p. 188 of the present volume.

"*Bluff.*"—*Succus Taraxaci.*—We have never seen the juice of dandelion after one-third of its volume of rectified spirit had been added to it become so solid that it could not be poured from the bottle. Such an appearance might have been brought about either by an unusual amount of Inulin being present in the Taraxacum root, or by the roots being much drier than usual, and consequently the expressed juice stronger. The specific gravity of expressed juice of Taraxacum from autumn gathered roots should be about 1·080, and when the spirit is added (before filtration) 1·035. Have these specific gravities been determined? Try to remove the liquid from the solid by placing in a cloth and applying the gentle pressure of a screw press.

"*Piper.*"—(1) We know not what is meant by the term "Nepaul Pepper." Capsicum is sometimes called "Indian Pepper." (2) "Phu" is an old name for Valerian.

"*A Pharmaceutical Chemist.*"—We are unable to find any record that it has been used medicinally.

"*Fair Play*" is referred to the rule respecting anonymous communications.

Editor of the 'Wandsworth and Battersea District Times.'—We are obliged for your communication.

The report of the meeting of the Sheffield Pharmaceutical and Chemical Association, on the 13th inst., and that of the meeting of the Bristol Pharmaceutical Association, on the 15th inst., have been received too late for insertion this week.

Communications, Letters, etc., have been received from Dr. Hardwicke, Mr. M. Lee, Mr. Taplin, Mr. Mildren, Mr. Lutwyche, Mr. Metcalfe, Mr. Crooke, "Digby Grand," "Justice," "Student," "A Minor Minor," "Unus ex Alumnis," "Chemist," A. P. S.

ON CALABRIAN MANNA.

BY DANIEL HANBURY, F.R.S., F.L.S., F.C.S.

Read before a meeting of the British Pharmaceutical Conference at Brighton, August 14th, 1872.

Manna, it is stated in the *British Pharmacopœia* (1867), is a concrete saccharine exudation from the stem of *Fraxinus Ornus*, L., and *F. rotundifolia*, DC., which trees are cultivated for the purpose of yielding it chiefly in Calabria and Sicily. Of the method of collecting manna in Sicily there are tolerably exact accounts; and the manna plantations of that island have also been fully described.*

Having never heard of manna plantations in Calabria, nor seen any modern account of manna-gathering in that region, I wrote in 1868 to my friend Colonel Yule of Palermo to inquire if he could furnish me with any particulars. Colonel Yule being unable to answer my questions, communicated them to Mr. Grant, British Consul at Brindisi, who in his turn sought to obtain the desired information from some of the British Vice-Consuls (Italians) in Calabria. But except the statement that the site of its production was the province of Calabria Citra, and especially the territory of Rossano on the shores of the Gulf of Taranto, I was unable to gain any very precise knowledge on the subject.

Here I may remind you of an investigation into the history of manna which I made in 1869,† and that one conclusion to which it led was this,—that manna was collected in Calabria for hundreds of years prior to its being a commercial product of Sicily, and that the earliest accounts of manna-gathering in the latter, only date from the second half of the 17th century.

It will be well now to consider some remarks that have been made by travellers regarding manna as an object of industry in Calabria: though they are only passing allusions, they suffice to show that this drug was at least a well-recognised production of the country in question.

Baron Riedesel, a German nobleman who made an interesting journey through Sicily and Southern Italy about a century ago, and whose travels have been published both in German and English,‡ travelled from Cotrone to Cariati, small towns on the eastern coast of Calabria. Of the latter he remarks that "it is a bishopric of Calabria, * * "round which they collect the best manna and "in the greatest quantity. The owners of the "manna-trees are obliged to sell their manna to the "king for a fixed price: the better sort, or what is "commonly called *in cannole*, for 2 *carlini* [8*d*.], and "the worse, or *in frasca*, for 8 *grani* [3¼*d*.] the "pound. These revenues are farmed for 32,000 "ducats [£5533] per annum. The greatest quan-"tity is collected about Cariati and Strongoli."

About 20 miles west of Cariati is the small town of Corigliano, where, says the Baron, they also collect "*vast quantities of manna*."

Half a century after this traveller, an English-man, the Hon. Richard Keppel Craven, made a journey through Calabria, visiting among other places Cariati, the vicinity of which was at that period still famous for manna. The following is from his published journal*:—"The mountains near "Cariati abound with game, and the forests which "richly clothe their summits furnish quantities of "that species of ash which produces the manna, a "considerable branch of commerce in this province, "and more particularly esteemed from this district."

The foregoing notices, scanty as they are, are yet of interest as coming from eye-witnesses, or at least from inquiries on the spot. Let me now add a few observations of my own, the result of a short journey during the present year through a portion of the province of Calabria Citra.

First, when at Florence I inquired for *Calabrian Manna*, addressing myself to the principal firm of wholesale druggists in that city:—the answer I got was that Calabrian manna was an article they never purchased, but that if I wished to see the drug it was possible, as it so happened that a small keg of it had been sent to them for disposal. Of this offer I availed myself: I found to my surprise that the drug was a soft viscid mass containing small tears, mixed with fragments of leaves, sticks, and dirt,—in fact I regarded it of such very bad quality that I declined a sample which was kindly offered me. I thought also that if I travelled into Calabria I should easily obtain much better, as well as all desired particulars respecting the trade in manna, of which, according to the latest edition (1868) of Murray's *Handbook for Southern Italy*, Calabria Citra is the "principal seat." I accordingly proceeded southward.

Around Florence I may remark, and especially between that city and Pisa, the manna ash (*Fraxinus Ornus*, L.) is frequent, being one of the small low trees grown as a support for the vine. Except these examples I hardly saw the tree until I reached the shores of the Gulf of Taranto, when I observed some very tall specimens in the strip of humid forest a little south of Policoro.

Journeying onward I arrived at Rossano, a town in Calabria Citra, of about 10,000 inhabitants, situated 3 or 4 miles from the sea. Here I learnt that the manna trees, which are called *Ornelli*, grow on some of the adjacent mountains,—that they are of large size, and are *not* cultivated,—that manna is obtained from them by incisions in the trunk made by the peasants in July and August,—that the manna got is mostly of the soft or fatty kind, very little of it being obtained in long white pieces or *cannoli*, and in some seasons none at all.

The collecting of manna about Rossano is at present, I was assured, a very small and insignificant branch of industry. Few persons among those from whom I sought information knew anything of the gathering of manna, or even of the existence of the manna-ash in the neighbourhood. One gentleman a principal inhabitant of the town and holding an official position, to whom I had a letter of introduction, assured me that the incising of the stems of the trees had been since the last four or five years forbidden by the Government; and the same statement was made by others. It is plain, however, that manna *is* still gathered about Rossano though

* See in particular a paper by Dr. Cleghorn on the Botany and Agriculture of Malta and Sicily—*Transactions of the Botanical Society of Edinburgh*, vol. x. 1868–69.

† PHARM. JOURN., XI. (1870) 326.

‡ *Travels through Sicily and that part of Italy formerly called Magna Græcia*, translated from the German by J. R. Forster, F.R.S., London, 1773.

* *Tour through the Southern Provinces of the Kingdom of Naples*, London, 1821.

the amount is quite insignificant, for I obtained from a pharmacien in the town a specimen, being part of some he had purchased from a peasant the previous season.

Hoping for more information and that I might at least obtain better specimens, I went to Corigliano, a small town, the mountains around which produce according to Murray's Handbook, "the finest manna in Calabria,"—a fact without doubt perfectly true a century ago. Here I was told that no manna is now brought in for sale, the collection having entirely ceased. I called on five pharmaciens in the town: three of them had in stock no manna whatever; the fourth had some which he had purchased in Naples, but the fifth (Signor Giuseppe Guidi) had a box containing a pound or two of manna of the country, of which he kindly gave me a sample. He told me that it was old, none being now collected. This manna is a moist, semifluid, saccharine mass, of a dirty yellowish grey.

On the 5th May (1872) I reached Cosenza the the capital of the province, situated at the head of the valley of the Crati, in passing through which I observed a few trees of *Ornus*. The locality was anciently renowned for manna. Here I repeated my inquiries in several pharmacies, but in vain. At length I found one, the proprietor of which showed me some soft manna which he said had been got near Cotrone. I discovered also in another pharmacie manna of two qualities, *scelta* and *in pasta*, both of which the pharmacien stated he had bought of peasants who had collected it at Rossano. The collecting of manna about Cosenza was quite ignored by most of the persons whom I asked for information. Those who had any acquaintance with the drug declared it was no longer an object of industry in that part of Calabria. One pharmacien asserted that the collection of manna had been prohibited for the last six or seven years.

The course of my journey having led me to Messina, I had the pleasure of making the acquaintance of Mr. Robert Sanderson, a merchant of that city of long standing, whose business in Italian produce includes the shipment of manna. On asking this gentleman about Calabrian manna, he informed me he was ignorant of such a commodity; and on my showing him some of the drug in the soft form in which I had procured it at Cosenza, he expressed much surprise, and declared it to be unlike any Sicilian manna he had seen.

No specimen of Calabrian manna was contributed to the Italian Exhibition held at Florence in 1861; but there appear to have been three samples from Rogliano in the London Exhibition of the following year.*

From what I have already stated, the conclusion is I think irresistible,—that Calabrian manna as an article of commerce has practically ceased to exist, and that the collection of manna in that part of Italy is on the verge of extinction.

I regret that when at Rossano I was unable to visit the woods of *Ornus* which undoubtedly exist in that vicinity. But the habits of the Calabrian peasantry are such that it is impossible for travellers to quit the high-roads without personal danger.

The better to inform myself of manna-industry, and especially that I might become well acquainted with the tree, I afterwards paid a visit to the manna plantations at Capaci near Palermo. I also inspected the trees which are cultivated at the *Istituto Agrario Castelnuovo* near that city*, and in the park of La Favorita. But as the time of my visit (May 16–22) was not that for collecting the drug, I have no details of particular novelty to communicate.

Respecting the manna-ash itself, however, I wish to say a few words. It has often been stated, as in the *British Pharmacopœia* (for which in this case I presume the *Prodromus* of De Candolle is the authority), that there are two species of manna-ash, namely, *Fraxinus Ornus*, L., and *F. rotundifolia*. Many modern writers on pharmacology admit but a single species, *F. Ornus*, L., of which *F. rotundifolia* is stated to be a cultivated variety peculiar to Calabria and Sicily, and propagated by grafting.

I do not think either statement satisfactory. *F. Ornus* is very variable even in its wild state, and in the same locality. As to the tree which is cultivated in Sicily, and of which I have examined specimens from all parts of the island†, it likewise presents great variations, but no special form that can be singled out as deserving the name *rotundifolia*, or even that can be recognised as *par excellence* a cultivated variety. It is true that the tree in some manna plantations is occasionally grafted, certain trees yielding a poor supply of saccharine matter being thus replaced by others of a more productive nature. But I observed no grafting at Capaci where the trees are grown like coppice oak in England, and where such a plan of treatment would therefore be hardly worth the trouble.

[The paper was illustrated by several specimens of Calabrian manna procured at Rossano, Corigliano and Cosenza, and by a large suite of botanical specimens of *Fraxinus Ornus*, L., and a stem of the latter showing the incisions for manna.]

EXAMINATION OF SOME SAMPLES OF FERRUM REDACTUM.‡

BY A. N. LITTLE.

Ferrum Redactum, defined in the British Pharmacopœia to be "metallic iron with a variable proportion of magnetic oxide of iron," is described as a fine greyish-black powder soluble in hydrochloric acid, with evolution of hydrogen. Ten grains digested at a gentle heat in an aqueous solution of fifty grains of iodine, and fifty grains of iodide of potassium, leave not more than five grains undissolved, which should be entirely soluble in hydrochloric acid.

In consequence of the difficult nature of the preparation of this substance, the pharmacopœial authorities have permitted an adulteration, or rather a sophistication, with the magnetic oxide of iron to the extent of 50 per cent. The quantitative test of the Pharmacopœia is based upon the insolubility of this oxide in a strong solution of iodine and iodide of

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* They were contributed by Signor Giovanni Morrelli of Rogliano, Calabria.

* A most interesting agricultural college founded by private munificence, where 22 lads are studying scientific and practical husbandry under the able directorship of Professor Inzenga.

† Many of them courteously presented to me by Professor Todaro of the Botanical Garden, Palermo.

‡ Read at a meeting of the Bristol Pharmaceutical Association, Nov. 15, 1872. See *post*, p. 437.

potassium, which attacks only the metallic iron; any larger proportion of magnetic oxide than that allowed being thus detected.

In accordance with the pharmacopœial directions, ten grains were digested in the solution of 50 grains of iodine and 50 grains of iodide of potassium for about fifteen minutes and filtered; the residue was then dried, and in order to ensure uniform results slightly ignited, dissolved in hot hydrochloric acid, sufficient nitric acid being added to oxidize any protosalt; the solution was boiled, and ammonia added in excess; the precipitated ferric hydrate was then dried and ignited, and from the resulting ferric oxide the weight of magnetic oxide originally present was calculated. By this method the following percentage amounts of magnetic oxide were obtained:—

No. 1. 49·16.	No. 3. 58·40.	No. 5. 69·75
„ 2. 52·60.	„ 4. 59·32.	„ 6. 90·75

or negatively, the percentage amounts of uncombined iron (the standard being 50 per cent.) were as follows:—

No. 1. 50·84.	No. 3. 41·60.	No. 5. 30·25
„ 2. 47·40.	„ 4. 40·68.	„ 6. 9·75

Nos. 1 and 2 agree with the Pharmacopœia in being of a greyish-black or slate colour; Nos. 3, 4, and 6 are of a dull black, and No. 5 of a chocolate brown colour.

If, in the manufacture of Ferrum Redactum, the temperature be not raised sufficiently high, the reduction of ferric oxide to metallic iron does not take place, which probably accounts for the brown colour of No. 5.

Traces of sulphates, chloride, sulphides, and carbides were found in each. Cyanide of potassium, an impurity mentioned in the 'Year Book of Pharmacy,' as resulting from the reprehensible practice of preparing Ferrum Redactum from the residue of the ferrocyanide of potassium manufactories could not be detected. Lead, also mentioned as an impurity, was absent.

The colour of the majority of those samples which have come under my notice is distinctly black, which, if my experiments be correct, is due to the increased admixture of magnetic oxide of iron; hence, most reliance is to be placed in those specimens of a slate or greyish-black colour. An excessive proportion of magnetic oxide in any sample is readily shown by dissolving a little of the suspected substance in dilute sulphuric acid, filtering if necessary, and adding ammonia in excess; if the specimen contain much magnetic oxide, it dissolves with very feeble effervescence and gives a black precipitate on the addition of ammonia, but if prepared according to the B.P. it effervesces briskly, and ammonia produces a dirty green precipitate. Ferrum Redactum, from its liability to become oxidized, should be preserved in well-stoppered bottles.

WOMEN AS CHEMISTS.*

If there is one thing more than another which may be predicated with tolerable certainty it is that commerce, with agricultural and other scientific industries, is destined to attain to a comparatively greater importance than the professions, and will be preferred to them or to salaried service as affording a more ready outlet for energy and application, as being more elastic in development, and as promising larger and quicker pecuniary returns. As instruction becomes more general, it will be less distinction than it now is to be known as an educated man, and the difference between employments which are "genteel" and those which are supposed to be otherwise will cease to be sharply defined. Perhaps we may attain to the condition of things which prevails among the Vril-ya, and our retail shops will be served by children of all ranks "exceedingly intelligent and courteous, but without the least touch of importunity or cringing." Many young men of birth have done very rough work indeed in the colonies, and have enjoyed doing it, and there is even now a good deal of blue blood engaged in wholesale trade. If mental cultivation is worth anything, it ought to fortify the reasoning powers and develope the habit of sagacious foresight. It is, therefore, probable that while the sons and daughters of butchers, bakers, agents, etc., will still continue to swell the ruck of needy professionals, clerks, secretaries, or salaried Government employés and governesses, where, in the nature of things, incomes are fixed and hope lags behind, those who are poor, but better born and more highly educated, will apply themselves to trade, agriculture, and industrial pursuits.

We noticed lately that a new business, at once scientific, privileged, and profitable, is open for the acceptance of educated women who choose to avail themselves of the opportunity. The Pharmaceutical Society has voluntarily offered to admit women to its lectures and examinations. As the subjects treated of are botany, chemistry, and the knowledge of drugs, there are no objections worth naming against the sexes being instructed together. Henceforth any young woman who passes her examination obtains her first-class pharmaceutical certificate, and is free to establish herself in business as "Pharmaceutical chemist and druggist." It is true that this calling, which may be described as science and trade combined, requires method, exactitude, knowledge, great carefulness, and sense of responsibility; on the other hand, it is lucrative, and sufficiently scientific to be highly interesting to intelligent persons. But the shop? Whether woman's good sense will float her over that obnoxious word remains to be seen; and yet between penurious gentility and education, respectability and an established independence in trade, there seems to us no sort of comparison. Of shops kept by druggists and chemists there are two kinds. Those who study the physiognomy of our streets must have observed that in poor and densely populated districts druggists' shops spring up with amazing rapidity, and appear to meet with a tolerably uniform success. One which is at first represented by a few bottles, plasters, and half-a-dozen tooth brushes may be seen before long adorned with plate-glass, coloured jars, etc. This is an "over-the-counter business." Proprietary or patent medicines, pills, plasters, horse medicine, rat poison, and specific remedies for every known disease are sold; but the pennyworth or two-pennyworth of physics are paid for on the spot, and form the staple of the trade and profits. The men who keep these shops are often exceedingly ignorant; but they, nevertheless, prescribe largely for the poor, the advice being as it were thrown in gratuitously with the medicine, and paid for in ready money; it need hardly be said that young and needy medical men are in this way very heavily handicapped. But by the recent change in the law certain drugs may not be sold at these shops, nor may the owners assume the title of pharmaceutical chemists. The other class is that presided over by those who pass the prescribed examination of the Pharmaceutical Society, and is chiefly employed in compounding and dispensing the prescriptions ordered by medical men. To these persons certain privileges are secured, and they are legally entitled to announce themselves as pharmaceutical chemists.

Women are generally very neat and handy dispensers. They may be supposed to have more sense of responsibility than the doctor's apprentice or the druggist's boy

* Reprinted from the 'Pall Mall Gazette,' Nov. 11.

and, as a matter of fact, the wives of many country medical men do almost regularly compound for their husbands' patients. To commence business in the higher branch of the drug trade may require from £200 to £400 in the provinces, rather more in London; but the stock of a druggist has this advantage over many others, it does not eat, it is not perishable, and, if stored in proper vessels, and carefully looked after, it loses none of its qualities by keeping. We have said that it is a lucrative trade. Take, for instance, a prescription containing six doses to be made up in a six-ounce phial; for this the druggist charges 1*s.* 6*d.* or 2*s.*, according to the style and standing of the shop. Now in all mixtures of this kind the proportion of actual physic used is one fourth or one-sixth, but generally much less, the rest being made up of distilled water, of which the cost is almost nominal; and the profit on the drugs generally ranges from 400 to 600 per cent. Again, pills are charged 6*d.*, 9*d.* or 1*s.* per dozen, but there never yet was made a pill of a size to be swallowed by mortal man which could possibly contain one halfpennyworth of drugs. Soda, in nearly all its forms, is bought by the gross, and retailed by the ounce or by the pennyworth, and the same with other substances. There is still another road open to the really intelligent and industrious chemist, by which he may reduce his expenses with the wholesale dealers to a minimum, *i.e.*, by the skilful use of instruments, such as the hydrometer, microscope, etc., by which to test the strength and purity of drugs, and by himself preparing his own infusions and decoctions. If he chooses to advance further, and becomes a proficient in practical analytical chemistry, his assistance will almost certainly be sought in questions of professional research affecting the public health, sanitary reform, river pollution, and so on. All this may now be obtained by any pharmaceutical chemist, whether male or female. Such being the facts of the case, we do not wish to charge the sex with a general perversity and a deficiency of good sense; but if, while women continue to knock at the closed doors of the hospital lecture-room, they decline to avail themselves of the open portal of the Pharmaceutical Society, we shall think it looks very like both one and the other.

THE ADULTERATION OF FOOD ACT.

At a recent meeting of the Commissioners of Sewers for the City of London, Dr. Letheby, the Medical Officer of Health for the City of London, was requested to draw up a report upon the provisions of the Adulteration of Food, Drugs, etc., Act, and the method of enforcing them. He has, therefore, in conjunction with Mr. Baylis, the solicitor to the Commissioners, prepared the following Report, which will be taken into consideration at the next meeting of the Commissioners:—

Gentlemen,—In accordance with your request, we have the honour to report to you on the subject of the Adulteration of Food Act, 1872. The Act was passed on the 10th of August last, and it is entitled 'An Act to Amend the Law for the Prevention of Adulteration of Food and Drink and of Drugs.' The Act differs in several important particulars from the Adulteration of Food Act of 1860, of which it is an amendment, and with which it is incorporated. The chief points of difference in the two Acts are the following:—

First.—In addition to articles of food or drink, as mentioned in the old Act, the adulteration of drugs is strictly prohibited, and the sale thereof is the subject of severe penalties. Besides which, the Pharmacy Act, 1868, is incorporated in the new Act, and with it all the provisions relating to the sale of poisons and the adulteration of drugs.

Second.—In the old Act of 1860 the question of adulteration is confined to the sale of adulterated articles in fraud of Her Majesty's subjects, and to the great hurt of their health; but in the new Act the person who admixes, or causes others to admix, the adulterating ingredient with any article of food or drink or drug is subject to penalty; and a clause is introduced which gives a very precise meaning to the kind of adulteration—namely, the fraudulent admixture of any substance with any article of food or drink or drug for the purpose of increasing its weight or bulk.

Third.—The penalties for adulteration are very different in the two Acts, for in the old Act of 1860 the penalty—for selling any article of food or drink with which, to the knowledge of the dealer, any ingredient or material injurious to health has been mixed, or for selling as pure or unadulterated any article of food or drink which is adulterated or not pure—was for the first offence a sum of money not exceeding £5, together with the costs of the conviction, and for the second offence the publication of the offender's name, place of abode, and offence, in any manner that the justice might deem desirable, and at the expense of the offender, while in the new Act of 1872 the penalty for this offence is increased to £20, and it likewise applies to those who are convicted of selling adulterated drugs. Again, in the old Act, there is no penalty for mixing, or causing others to admix the adulterated article, but merely for selling it; whereas, in the new Act, the persons actually engaged in the process of adulteration are subject to a higher penalty than those who sell the adulterated article; for the penalty for the first offence is a sum of money not exceeding £50, together with the costs of conviction, and for the second offence he shall be guilty of a misdemeanour, and be imprisoned for a period not exceeding six calendar months.

Fourth.—The execution of the Act by local sanitary authorities is no longer permissive, but is compulsory whenever the authorities named in the 5th section of the Act are required to put it in force within their respective districts by the Local Government Board in England; and thereupon the local authorities shall appoint and remove in their respective districts one or more persons possessing competent medical, chemical, and microscopical knowledge as analysts of all articles of food, drink, and drugs purchased within the said districts, and shall pay to such analyst such salary or allowances as they may think fit, but such appointments and removals shall at all times be subject, in England, to the approval of the Local Government Board. For the City of London and the liberties thereof the authorities are the Commissioners of Sewers.

Fifth.—The method of procedure in the new Act is greatly enlarged from what it was under the provisions of the old Act of 1860, for in the latter case the power of prosecuting rested entirely with the purchasers of articles of food or drink, who were entitled, on payment to the analyst of a sum not less than 2*s.* 6*d.*, nor more than 10*s.* 6*d.*, to have any such article analysed by the analyst, and to receive from him a certificate of the result of his analysis, specifying whether in his opinion such article was adulterated, and also whether it was so adulterated as to be injurious to the health of persons eating or drinking the same, and such certificate, duly signed by such analyst, was, in the absence of any evidence to the contrary, sufficient evidence in any court of justice of the matter therein certified, and the sum paid for such analysis and certificate was to be deemed part of the costs of the proceedings. But in the new Act of 1872, in addition to this method of procedure, which is still retained and even extended to drugs, the local authorities must institute proceedings. This is to be done through the inspector of nuisances, or the inspector of weights and measures, or the inspector of markets, one or all of them, as the local authorities appointing them shall think fit to determine; and such inspectors shall procure within their districts, by purchase or otherwise, samples of articles of food or drink and drugs suspected to be adulterated, and shall submit them for analysis to the analyst appointed for the district, and shall, on receiving a certificate stating that the articles in question are adulterated, cause a complaint to be made before a justice of the peace, and thereupon such justice shall issue a summons requiring the seller or the adulterator to appear before the justices in England to answer such complaint, and such summons shall be served by delivering the same, or a true copy thereof, upon the premises where such articles were obtained or sold; and the expense of such prosecutions, if not ordered to be paid by the party complained against, shall be deemed part of the expense of executing this Act. Certain precautions, however, must be taken by the inspector or the purchaser in the conduct of their proceedings, for as proof will be required of the identity of the article purchased and analysed, it is necessary that directly the article suspected to be adulterated is obtained from the dealer, and before it is removed from the place of sale, the purchaser or inspector shall give notice to the dealer or person serving him of his intention to have such article analysed, so that the dealer may have the opportunity of accompanying the purchaser to the analyst, or of securing the article in such a manner as to prevent its being tampered with by the purchaser or inspector. This is especially provided for in the 3rd clause of the Act of 1860, and in the 8th clause of the Act of 1872. Again, in the 10th clause of the new Act the mode of retaining samples for further analysis is prescribed, inspectors being required to receive all articles of food, drink, or drugs, to be analysed by the analyst appointed under the Act, and in the presence of the analyst to take samples from such articles, and having sealed them in his presence, to retain them, and produce them in case the justices shall order other analysis to be made by such skilled persons as they may appoint, in accordance with the provisions of the 5th clause of the old Act of 1860.

Sixth.—In case the dealer considers himself aggrieved by any conviction of the Justices under these Acts, he can appeal to Quarter Sessions, in accordance with the provision of the 6th and 7th clauses of the old Act of 1860, or he can, even when convicted of selling an adulterated patented article of food, drink, or drugs, have a case stated for the opinion of a superior court.

Seventh.—The new Act provides that the analysts appointed under the Act shall report quarterly to the local authorities appointing them the number of articles of food, drink, or drugs analysed by them under the Act during the foregoing quarter, and shall specify the nature and kind of adulteration detected in such articles, and all such reports shall be read at the meetings of the aforesaid local authorities.

Lastly.—The expense of executing the Act within the City of London and the liberties thereof is to be borne out of the consolidated rates raised by the Commissioners of Sewers of the City of London.

Reviewing, therefore, the provisions of the new Act, it appears to us that the following points are deserving of notice:—

A. The third section of the Act declares that "any person who shall sell any article of food or drink, or any drug, knowing the same to have been mixed with any other substance with intent fraudulently to increase its weight or bulk, and who shall not declare such admixture to any purchaser thereof before delivering the same, and no other, shall be deemed to have sold an adulterated article of food or drink or drug, as the case may be, under this Act." Now, the question which, in our opinion, is open to considerable doubt, is the exact meaning of the words "such admixture;" and by way of illustration we will take the case of the following articles, which are notoriously and almost universally the subjects of admixture with other substances for the purpose of increasing their weight or bulk—tea, coffee, cocoa, mustard, and milk. In some cases the admixture is undoubtedly fraudulent, as when exhausted tea, or spurious leaves, or iron filings, are mixed with tea; or when chicory or other roasted vegetable substance, is mixed with ground coffee; or when water is added to milk; but in others—as when cocoa is mixed with sugar, or farinaceous matter, for the purpose of reducing its fatty constituents, which are not always digestible in the pure and concentrated state; or when mustard is mixed with flour or other harmless substances in order to make it an acceptable condiment—it can hardly be said, unless the proportions of the diluents are excessive, that such admixtures are made with intent fraudulently to increase the weight or bulk of the articles. Assuming, however, that they are, is it enough for the dealer to declare at the time of sale that the article is a mixture, or must he name the several ingredients of which it is composed? Or must he even go further, and state the proportions of the several ingredients of the article? It is manifest that until these questions have been settled by some competent legal tribunal, it will not be possible to proceed with any certainty of conviction against those who admix, or cause others to admix, or who sell an adulterated article; or, if it be, that by the mere declaration at the time of sale that the article sold is a mixture, without specifying approximatively the proportions of the constituents, the fraud of adulteration may evidently be practised to any extent and with perfect impunity.

B. As to the adulteration of drink, it is proper to mention that in the Licensing Act, 1872, provision has been made in the 19th and following clauses for the analysis of adulterated intoxicating liquors, and for prosecution thereon, the analyst being a person appointed by the Commissioners of Inland Revenue, and the persons who are to purchase, or otherwise obtain, samples of such liquors for analysis are the police, acting under the orders of the Commissioners of Police or other police authority, or any officer of Inland Revenue. It is a question, therefore, whether the analyst appointed under the Adulteration of Food Act can undertake the analysis of any drink that can be called an intoxicating liquor. Again, the examination of chicory, coffee, and tea for adulterations already committed to the Excise by various Acts of Parliament, dating from the 11th of George I., cap. 50, to the 26th and 27th Vict., cap. 22, and the relation of their powers and the duties of the food analyst is somewhat uncertain.

C. With respect to the appointing of an analyst under the 5th section of the Act of 1872, it is proper to remind you that the medical officer of health was so appointed by the Commissioners of Sewers on the 2nd of October, 1860; but, as from that time to the present, notwithstanding the inducements offered to the public by your extensively circulated notice of the first of February, 1861, there have been but 57 analyses made by him under the provisions of the Act of 1860, if the provisions of the Acts of 1860 and 1872 are to be carried fully into operation it will, in his opinion, be necessary to reconsider the original appointment with the view of providing for the additional work it will entail.

D. It will also be necessary to give instructions to the inspector of nuisances, or the inspectors of markets, or all of them, to obtain samples of articles of food, drink, and drugs, under the direction of the analyst, and in accordance with the provisions of the Acts of Parliament.

NATIONAL CHAMBER OF TRADE.

The adjourned meeting of the chemists and druggists' section of this association was held on Tuesday last at the offices of the chamber, 10, Duke Street, St. James's, to confirm the resolution passed at the previous meeting on the 10th October last, and to adopt measures accordingly.

Mr. A. F. Haselden took the chair.

Mr. F. Morrison, the Secretary of the National Chamber of Trade, having read the minutes of the proceedings of the previous meeting, Mr. Haselden said, as some misconception had arisen in consequence of his title as President of the Pharmaceutical Society having been introduced into the advertisement and notices of the meeting, he wished it to be distinctly understood that he took part in this and the former meetings in his private capacity.

The meeting was numerously and influentially attended,—amongst the number were Messrs. Newbury, Sainsbury, Crispe, Matthews, Pope Roach, Greenish, Carteighe, etc. etc.

The question before the meeting being the action of certain wholesale houses in reference to their supplying the Civil Service Co-operative Societies, it was resolved, after a lengthy discussion, upon the motion of Mr. J. Crispe, seconded by Mr. Hemingway,

"That this meeting use every endeavour in its power to induce the wholesale trade not to supply the co-operative stores, and to solicit their assistance in support of the retail traders."

Mr. Robert Hampson moved, and Mr. Greenish seconded, that the foregoing resolution be sent to all the wholesale houses and manufacturers supplying the retail trade, which was also carried unanimously.

A vote of thanks to the chairman concluded the meeting.

THE BROUGH FUND,

For the Maintenance and Education of the Five Children who have been left unprovided for, by the untimely death,—at the age of thirty-eight—of

JOHN CARGILL BROUGH,

For Ten Years Editor of the 'Chemist and Druggist,' and the First appointed Editor of the 'Year Book of Pharmacy.'

First List of Subscriptions.

	£.	s.	d.
Alexander, John, Liverpool	0	10	6
Anonymous	0	2	6
Attfield, Professor	5	5	0
Atherton, John, Nottingham	1	1	0
Atkinson, G., and Co., Aldersgate Street, per F. Barron	10	10	0
Atkins, S. R., Salisbury	1	1	0
Baildon, H. C., Edinburgh	2	2	0
Bailey, J. B., Reading	1	0	0
Barnaby, H., Rochester	0	10	0
Barron, Harveys and Simpson, Giltspur Street	5	5	0
Barron, F., Bush Lane, E.C.	10	10	0
Batchelor, C., Fareham	0	5	0
Beddard, John, Churton Street, S.W.	0	10	0
Bell, John, and Co., Oxford Street	10	10	0
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Bevan, C. F., Harwich	0	10	6
Boorne, Mr., Bristol	1	1	0
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Bottle, Alex., Dover	1	1	0
Boucher, Mr., Bristol	1	1	0
Brady, H. B., Newcastle	10	0	0
Bradley, E. S., Ashbourne	0	10	0
Bremridge, Elias, London	1	1	0
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Burch, Robert, Saffron Walden	1	1	0
Burdge, Mr., Bristol	0	10	0
Burrow, W. and J., Great Malvern	2	2	0
Butcher, Thomas, Cheltenham	1	1	0
Butler, Mr., Bristol	1	0	0
Caley, A. G., Norwich	2	0	0
Carter, William, Cheetham Hill, Manchester	0	5	0
Carteighe, Michael, 172, New Bond Street, W.	10	0	0
Churchill, J. and A., New Burlington Street, W.	10	10	0
Clarke, G. B., Woburn	1	1	0
Clay and Abraham, 87, Bold Street, Liverpool	2	2	0
Davenport, J. T., Great Russell Street	5	5	0
Deane, H., Clapham	2	2	0
Delf, F. D., 14, Hardman Street, Liverpool	1	1	0
Down, R. H., Torpoint	0	2	6
Duncan, Flockhart and Co., Edinburgh	2	2	0
Evans, H. Sugden, Bartholomew Close	1	1	0
Fairlie, J. M., Glasgow	0	2	6
Farre, Dr. F. J., London	1	1	0
Floyd, James, Bury St. Edmunds	1	1	0
Fowler, W. H., Boston	0	5	0
Frazer, D., Glasgow	2	2	0
Friend, A, to Orphans	1	1	0
F. W. N., London	0	1	0
Gale, S., 338, Oxford Street	2	2	0
Garle, John, Bromley	1	1	0
Gardner and Ainslie, 58, George Street, Edinburgh	1	1	0
Gibbs, William, Ryde	0	5	0
Gordelier, P. W. G., Sittingbourne	1	1	0
Goodwin, J., Lower Clapton	0	10	6
Greenish, T., 20, New Street, Dorset Square	1	1	0
Groves, T. B., Weymouth	2	2	0
Hanbury, D., Clapham	10	0	0
Harvey, W. R., Leicester	0	5	0
Haselden, A. F., 18, Conduit Street	2	2	0
Heath, John, Birmingham	2	0	0
Herrings, John B., 40, Aldersgate Street	2	2	0
Hills, T. Hyde, 338, Oxford Street	10	10	0
Holdsworth, T. W., Birmingham	0	10	0
Hooper, Bartlett, King William Street, E.C.	3	3	0
Horncastle, J., London	0	10	0
Howden, R., 78, Gracechurch Street, E.C.	5	5	0
Howell, The Rev. Hinds, per Mr. Sutton, Norwich	5	0	0
Hughes, Edward, Llanelly	0	10	0
Hughes, John, York Glass Company	1	1	0
Hunt, Thomas, per Mr. Abraham, Liverpool	0	10	6
Ince, Joseph, London	5	5	0
Jones, John, Aberdare	0	10	6
Jones, Richard, Chipping Sodbury	0	10	0
Johnson, Mathey and Co., London	3	3	0
King, Mr., Churton Street, Pimlico	1	1	0
Knight, J. A., Stockton-on-Tees	2	2	0
L. B., London	1	0	0
Long, Mr., Bristol	0	10	0
Macfarlane and Co., J. J., Edinburgh	5	0	0
Mackay, John, 119, George Street, Edinburgh	2	2	0
Margetson, Mr., Bristol	0	10	0
Martindale, W., London	0	10	6
Matthews, Henry, Gower Street	10	10	0
Matterson, E. H., Dewsbury	5	0	0
Meatyard and Sapp, Basingstoke	0	10	0
Meggeson and Co., Cannon Street	2	2	0
Morson, T. N. R., London	1	1	0
Morson, T., London	1	1	0
Muter, Dr. John, Kennington	2	2	0
Negus, Samuel, Northampton	0	10	0
Parnell, J., Peterborough	0	10	0
Parsons, William, Portsmouth	0	10	0
P. Q. Z.	1	1	0
Paul, Dr. B. H., 17, Bloomsbury Square, W.C.	5	5	0
Pitman, Mr., Bristol	1	1	0
Portway, John, Bury St. Edmunds	0	5	0
Raimes, Blanshards and Co., Edinburgh	2	2	0
Radley, W. V., Sheffield	1	1	0
Reboul, A. P., 60, Liverpool Road, N.	1	1	0
Reynolds, Richard, Leeds	10	10	0
Richards, Henry, Cherry Hill, York	5	0	0
Ringrose, George, St. Georges's Street, E.	0	10	6
Rimmington, F., Bradford	0	10	0
Robertson, Jas., and Co., Edinburgh	2	2	0
Robbins, John, and Co., London	2	2	0
Robinson, John, Norwich	0	5	0
Sandford, G. W., London	5	5	0
Sanders, Mr., Bristol	0	10	0
Schacht, G. F., Clifton	1	1	0
Schweitzer, J., Brighton	3	3	0
Skoulding, W., Wymondham	0	5	0
Smith, A. W., Rye	0	10	0
Smith, William, Sutton Coldfield	1	1	0
Southall, Son and Dymond, Birmingham	2	2	0
Sparrow, W. C. F., London	0	10	6
Stanford, E. C. C., Glasgow	5	0	0
Stephenson, J. B., Edinburgh	1	0	0
Stoddart, W. W., Bristol	1	1	0
Stroud, Mr., Bristol	0	10	6
Sutton, Francis, Bank Plain, Norwich	5	0	0
Taplin, Mr., Bristol	0	10	0
Tichborne, R. R. C., Dublin	1	0	0
Townsend, Mr., Bristol	1	1	0
Tryon, W. J., Landport	0	10	6
Turner, G., Aylesbury	0	5	0
Umney, C., 40, Aldersgate Street, E.C	0	10	6
Vigo, C., Worcester	1	1	0
Wade, John, 174, Warwick Street, Pimlico	2	2	0
Wade, Mrs., 174, Warwick Street, Pimlico	1	1	0
Walsh, Edward, Oxford	1	1	0
Wallworth, D., Maldon	0	10	6
Walker, Robert, Birmingham	0	10	6
Warren, A., Bristol	1	1	0
Watts, John, D. Sc., University Laboratory, Oxford	1	1	0
Webb, E. Alfred, 60, Bartholomew Close	1	1	0
Wilkes, D. T., Upton-on-Severn	0	10	6
Wilkinson, W., Cheetham Hill, Manchester	0	5	0
Wilkinson, G., High Town, Cheetham	0	5	0
Williamson, James, North Shields	0	10	6
Williams, John, 10, New Cavendish Street, W.	5	5	0
Willson, Edward, Brunswick House, Sheffield	1	1	0
Woolley, G. S., Manchester	1	1	0

Subscriptions by cheque (crossed London and Westminster Bank), or P. O. Order, are invited, and will be received by Mr. Bremridge, 17, Bloomsbury Square, London, W.C., or they may be forwarded to the honorary secretary, Michael Carteighe, at 81, Mornington Road, London, N.W.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 30, 1872.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE ADULTERATION ACT.

So far as it is possible to judge from what has been made known as to the steps hitherto taken with a view of carrying this Act into operation, it would seem merely to have given rise to a multitude of doubts, difficulties and questions, without offering any prospect of being serviceable to the public. In the report to the City of London Commissioners of Sewers, published at page 424, it will be seen that Dr. LETHEBY, the Medical Officer of Health for the City, and Mr. BAYLIS, the solicitor to the Commissioners, raise a very important question as to the meaning of the words "such admixture," in the third Section of the Act, and they express their opinion that the meaning it conveys is open to considerable doubt, illustrating their view of the case by reference to the articles, tea, coffee, cocoa, mustard and milk. Some of these articles, notoriously, always contain admixtures, and it might become matter of opinion whether or not they were added with the intent of fraudulently increasing the weight or bulk of the article sold. The provisions of the Act do not appear to offer any assistance in settling this question, nor do they indicate the limits within which such well-known cases of admixture are permissible.

Again, it is suggested in the report that if it be sufficient for a dealer, in selling such articles, to declare they are mixtures, the fraud of adulteration might evidently be practised to any extent and with perfect impunity. These are, indeed, most startling obstacles to the working of the Act, and it would appear they alone offer more than usual opportunity for the proverbial coach-and-four being driven through this Act.

But the difficulties of the case are far from being exhausted; there is still the important question as to who shall be the analysts. Medical Officers of Health have, in some instances, with questionable eagerness, put forward the opinion that they should seek and accept the appointments of food analysts; and a proposal has been made to establish two laboratories in London where all the analyses required for the metropolis should be conducted. It is satisfactory, however, to find that the medical press has in nowise favoured either proposition; and the *Lancet* has, with commendable courage, declared that "Medical officers of health are not, as a rule, properly competent to perform the chemical and analytical work required without special assistance." We may also add that even under these circumstances, it would be impossible for them to perform the duties appertaining to the office of analysts under the Act; for supposing analyses were made by competent chemical assistants, the lack of competent chemical knowlege would render the official analysts unfit to appear in court and undergo examination in cases of prosecution.

Doubtless there are exceptional instances of medical men being fully competent to carry out all the duties of analyst under the Adulteration Act, and in such instances we readily acknowledge no one could more advantageously occupy the office; but we protest altogether against the notion of making medical officers of health analysts under the Act without regard to such considerations. Moreover, there are besides the point of competence, very many other reasons which render the tenure of such an office by medical men undesirable; and as regards some of these, we cannot do better than quote the words of a medical man, Mr. R. S. POWER, of Dartmoor, who writes to the *Medical Times and Gazette* as follows:—

"If analysis is to constitute part of the duties of our future health officers,—and without analysis I do not see how they could venture to recommend measures which would frequently entail considerable expense,—it appears to me that the combined duties of medical officer of health and general practitioner are incompatible. The number of hours that the most energetic man can work is limited, and already the profession is overworked without any additional duties. Analytical processes involve a large expenditure of time, perhaps more than may be generally supposed; and if it be so with the professed chemist in a well-ordered laboratory, how much more with an amateur (for the majority of general practitioners must be amateurs in chemical manipulations)! As an example—suppose water is the suspected source of disease,—a scientific man would scarcely venture an opinion on its quality without at least applying the simple permanganate test. Yet see what this involves to approximate accuracy! There is the preparation of a test solution (for the permanganate will not keep at a constant strength, and must be frequently re-made), and the testing of this by another standard solution to ascertain its accuracy before use. Then, suppose the test ready, the suspected water must be raised to a certain temperature (testing cold water is most tedious), not by boiling in the tea-kettle, but with the aid of a spirit-lamp in a clean glass vessel—a process that occupies a good deal of time, as a small quantity of water will not be expedient to operate on. The dropping in of the permanganate follows, and is necessarily tedious; when, perhaps in the midst of the most anxious part, a peal of the bell—Mrs. Smith is in labour, and must be attended at once! No more analysis that day; and worse, the whole must be recommenced with a new sample.

"But our conscientious Health Officer may not be content with this general analysis should he have time to perform it. Comparatively innocent matter may decolorize the permanganate; and, before condemning the water-supply of a house, street or town, he naturally is anxious to know what is this oxidizable matter which he has detected. It may be nitrites; ammonia, indicative of poisonous water, or it may be of vegetable origin, comparatively innocent; perhaps some chalybeate spring is at the bottom of it. The investigation must be carried further, and evaporation, incineration, the application of other tests—and probably their manufacture—take up a great portion of the day; for be it borne in mind that these delicate testings must as a rule be completed without interruption—they cannot be taken up and put down to suit convenience.

"Let any one who has a doubt on the matter take a litre of water and evaporate it in a glass or earthenware vessel to dryness, and note the time it takes—not, of course, requiring the constant presence of the operator, but necessitating frequent looking after.

"Besides the consideration of time comes that of apparatus; and it is surprising the number of appliances such a simple analysis requires.

"But water, though probably the item most frequently needing investigation, is but one of a long list; and when the question involves the possible condemnation of food, implicating perhaps a tradesman's character, one would feel very chary indeed of giving an opinion unless supported by the unchangeable evidence of scientific facts.

"In making these remarks, I speak from practical experience; and every practical man will, I feel, concur with me—that, short and easy as a simple analysis appears in print, it needs apparatus, care, and time in performance.

"Now, with the general practitioner apparatus is purchasable; care is voluntary; but what about the time?"

The justice of these remarks will, we are sure, be recognized by every one at all conversant with the technical details of chemical analysis; and we trust that the Local Government Board will not fail to exercise a careful discretion in confirming the appointments of analysts made by local authorities, so as at any rate to ensure the efficient performance of the duties they may be called on to perform, and at the same time prevent the very possible misapplication of the Act, as a means of persecution, quackery, or mere trade purposes of advertising.

Adopting the view that this Act will be generally brought into operation, it seems that some greater attention should be paid to its prospective working from the tradesman's point of view than has hitherto been the case, and in the first place the thorough fitness of the analysts appointed seems to be especially important in that respect, for it would be impossible to over-estimate the amount of injury which might be suffered in consequence of frivolous or unfounded charges being made. Moreover there seem to be very great and grave defects in the provisions of the bill as to procuring samples of food, drink, and drugs, and submitting them to analysis. We should like to see the power of "suspecting" entrusted to some more definite and responsible authority than the Act indicates, and some better guarantee of *bona fides* on the part of "any purchaser" than the mere payment of a sum ranging from two shillings and sixpence to half a guinea.

As regards the readers of this Journal more especially, we may point out that the incorporation of the Pharmacy Act and the Act to Regulate the Sale of Poisons in Ireland with the Adulteration Act, would seem to have some graver possible effects than appear on first sight of this provision, and we think this aspect of the matter well worthy the consideration of the trade.

In connection with this point it is somewhat curious to note what were the reasons for incorporating the Pharmacy Act, given as follows by Lord Eustace Cecil, one of the active promoters of legislative enactment against adulteration.

"A definition of articles injurious to health was thought to have been sufficiently provided by the incorporation into the Act, of the Pharmacy Act which contained a schedule of poisonous ingredients."

This would seem to leave a wide field still for adulterators, and fully justifies his Lordship's suggestion that, if there was any difficulty as to the interpretation of the statute, a case should be stated for the decision of one of the superior courts. The Pharmaceutical Society has already adopted this course in regard to the question of eligibility for the office of analyst. In so doing it seems to have roused the indignation of the Executive Council of the South-Eastern Branch of the British Medical Association, and to have induced that body to pass a resolution that the ordinary dispensing chemists and druggists of the county are not qualified for the offices of analysts, as well as to decide upon sending a deputation to Mr. Stansfeld, the President of the Local Government Board, with the object of impressing upon him the importance of this and other resolutions they had passed. This proceeding, which seems to have had in reality much of the "hole and corner" character, has, however, been magnified into appearing as a deputation of the entire British Medical Association, and was so reported in the *Times* of Friday, 22nd inst., without this mistake having as yet been rectified, so far as we are aware.

It would not be difficult to point out that it is scarcely pertinent for a small knot of medical men to constitute themselves judges as to qualification for an office which they are admitted to be unfit to fill; but we refrain from entering upon a *tu quoque* controversy on this subject. We must, however, express our surprise that Mr. Stansfeld should so readily have acquiesced in this resolution, and still more that he should have done so as a matter of course. We freely admit that under existing conditions the qualification for conducting analytical work is not universally possessed by members of the trade; but we can at the same time assert without fear of contradiction that in its ranks there are very many who are in every respect qualified to hold the office of analyst under the Act, and to perform its duties with benefit to the public as well as credit to themselves. We trust this apparently very foolish ebullition of jealousy will meet with the repudiation it deserves from medical men in general, and that it may in no way lessen the mutual cordiality existing between two classes so closely connected together.

The next Evening Meeting of the Pharmaceutical Society will be held on Wednesday, December 4th. The following papers are announced to be read on that occasion:—"Note on a Macerating Stand," by Mr. R. W. Giles; "The Extracts containing Chlorophyl," by Mr. J. B. Barnes; "Dispensing Note on Chloral Hydrate," by Mr. J. G. Plumer; "Sulphurated Antimony, Official and Commercial," by Mr. John Moss, F.C.S.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

November 20th, 21st, and 22nd, 1872.

Present on the 20th—Messrs. Allchin, Barnes, Carteighe, Cracknell, Davenport, Edwards, Gale, Haselden, Ince and Martindale. Dr. Greenhow attended on behalf of the Privy Council.

Present on the 21st—Messrs. Allchin, Barnes, Carteighe, Cracknell, Davenport, Edwards, Gale, Haselden, Ince, Linford and Martindale. Dr. Greenhow again attended.

Present on the 22nd—Messrs. Allchin, Barnes, Carteighe, Cracknell, Edwards, Gale, Haselden, Ince and Martindale.

Major Examination.

Five candidates were examined. *One* failed; the following *four* passed and were declared duly qualified to be registered as Pharmaceutical Chemists:—

Butterfield, Edward.......... London.
Saunders, Thomas Bealby .... Cheltenham.
Clarke, George Ernest ...... Stowmarket.
Robertson, Fred. Freer Leslie London.

Minor Examination.

Sixty-five candidates were examined. *Twenty-six* failed; the following *thirty-nine* passed, and were declared duly qualified to be registered as Chemists and Druggists:—

*Mackinna, John .... Dumfries.
*Tearle, Walter.............. Ilfracombe.
*Anthony, David .... Cardiff.
*Colley, John................ Ripon.
*Bothamley, William Parkinson Nottingham.
*Faraker, John Joseph........ New Brighton.
Equal. { *Davies, Richard Morgan, jun. Carmarthen.
{ *Sumner, John Joshua........ London.
*Butler, John Harsant .... High Wycombe.
Manlove, Richard Joseph...... Slough.
Weeding, William Samuel .... Hastings.
Russell, George Hannah...... Frome.
Equal. { Pattinson, Dan .... Whitehaven.
{ Wardle, James .... Bootle.
Allen, Charles Bowen .... Penzance.
Taylor, George William ...... Louth.
Elmitt, John Henry .... Horncastle.
Markham, William Charles.... Bristol.
Horrax, John .... Keswick.
Equal. { Duncalf, Thomas Henry...... Macclesfield.
{ Stibbs, James .... London.
{ Young, Horatio Thos. Barmby Hull.
Parris, Thomas Watkin ...... Taunton.
Morton, Henry.............. London.
Equal. { Chesterton, William Peter .... Walsall.
{ Crew, William Thomas ...... Manchester.
{ Johnson, Fletcher Atkinson .. Driffield.
{ Williams, Thomas .... Welshpool.
Griffiths, Evan .... Cardiff.
Ferriday, William............ Ardwick.
Urwin, Matthew .... South Shields.
Shakerley, Benjamin .... Liskeard.
Vigis, Joseph Lewis.......... Shepton Mallet.
Equal. { Birrell, George .... Kensington.
{ Wilkerson, William James.... Epsom.
Crundall, Augustus Horton .. Cirencester.
Gatenby, Robert .... Beverley.
Buswell, Arthur .... Winchester.
Sale, Thomas John .... Ipswich.

The above names are arranged in order of merit.

* Passed with honours.

Preliminary Examination.

The Certificates of Examination of the undermentioned were received in lieu of the Preliminary:—

Certificates of the University of Cambridge.

Bothamley, William Parkinson Nottingham.
Dear, Theophilus .... Hornsey Rise.
Marson, William .... Stafford.

Certificate of the University of Oxford.

Wood, Henry Thomas Gibbons .. Hull.

Certificate of the Society of Apothecaries.

Hart, Alice Marion .... London.

Certificates of the College of Preceptors.

Bellingham, Sydney .... Worcester.
Colling, Herbert .... Brighton.

NORTH BRITISH BRANCH, EDINBURGH.

The first meeting for session 1872–73 took place in the Society's new rooms, St. Giles Street, on Friday evening, February 22nd, at 8.30. There was a good attendance; Mr. H. C. Baildon, president, in the chair. Apologies for absence were read from Professor Balfour and Professor Archer.

The following introductory address was delivered by the President:—

Although I should have preferred to have seen the presidential chair of the North British Branch of the Pharmaceutical Society occupied this year by some one more able than myself to fulfil the duties devolving upon the occupant of this honourable office, yet, as a mark of your continued confidence, I return you my best thanks for the honour you have again conferred upon me.

In my address at the opening of the last session, I alluded to the prospect we had of obtaining a suite of rooms worthy of the position of the North British Branch. The Council found it no easy matter to obtain premises in all respects suitable, and after a very exhaustive search the rooms we are now in were, all things considered, thought the most eligible for our purpose. The situation is central; and if there is a difference in the convenience to our members, it is in favour of the Old Town, and this the Council thought a recommendation, as hitherto the rooms occupied have been situated at a considerable distance from the places of business of our friends on the south side. These rooms were originally taken to be entered last May, but at that time they were found in such an unfinished state as to determine the Council to postpone taking them until the present term. This has necessarily delayed the formation of an enlarged museum, and considerable additions to our library, but immediate steps will, I hope, now be taken to supply both, when we have ascertained the accommodation afforded by our cases for the proper reception of books and specimens, and when we have reported the same to the London Council. I hope this session will be quite equal to its predecessors in the arrangements for our evening meetings for scientific purposes. Our indefatigable honorary secretary informs me that Professor Crum Brown has promised a paper for our December meeting, Dr. Stevenson Macadam a lecture in January, Dr. Mackendrick in February, Professor Archer in March, and Dr. Arthur Gamgee for April, when our session closes. This arrangement by no means precludes our own members from reading papers between those periods. That vexed question, "What is the best mode of providing for the education of the rising generation of pharmacists has been discussed both at the Pharmaceutical Conference at Brighton, and in the Pharmaceutical Journal by the numerous letters which have appeared in its pages, but I do not think the problem is yet solved. I have carefully read the various and conflicting schemes proposed for effecting this most desirable object. For my own part I should be sorry to see any steps taken by the Society which would place our students in a position of dependence upon external pecuniary aid. If taken from the right class in society, I cannot see why they should not be as able to obtain a proper knowledge of pharmacy in the same way as the students in medicine, and of the other professions do. And although the expense of attending lectures may prevent a few from selecting pharmacy as their profession, I can see no disadvantage in this, but on the contrary, those who enter will be drawn from a class who have had a better preliminary education, able at once to pass the initiatory examination, and whose parents and friends are able and willing to provide the means to enable them to acquire a theoretical as well as practical knowledge of pharmacy.

It appears to me that the only legitimate way in which the London Council could assist pharmaceutical education in the provinces, whilst preserving the independence of the student, would be by providing rooms, a museum, and library in convenient centres, and even in smaller towns, when an earnest desire existed to make good use of these expensive but necessary accessories. To go beyond this would tend to enervate rather than brace the generality of our students. Self-help and self-reliance should by every means be encouraged. As a rule what costs nothing is little valued. As you will have seen by the programme, an opportunity will be given this evening of having this important subject discussed, and it will be introduced by Mr. Mackay reading a short paper expressing his own views on this vitally important subject.

No city out of London affords greater facilities for acquiring knowledge than does Edinburgh, and the arrangement made by our honorary secretary as to lectures should be taken advantage of to a much greater extent than has been the case in previous years. Mr. Mackay reports that at this date he has issued fourteen tickets for Dr. Macadam's lectures, one ticket for analytical and three for practical chemistry.

I am very pleased to see the example first set, I believe, in Edinburgh, of making it incumbent upon all youths to pass the Preliminary examination before the indenture is prepared, is now being acted upon in other places. It not only affords a test that the youth has been sufficiently educated to fit him for his future career, but it relieves him from a weight of anxiety which would otherwise press upon his mind until he passed this examination, and enables him at once to enter upon studies directly connected with pharmacy. I would also suggest that every indenture, in cities where they can be obtained, should make it imperative for the apprentice to attend during its continuance a class of chemistry, materia medica, and botany, which, with the practical knowledge acquired in his place of business, should enable him to pass the Minor examination at the termination of his apprenticeship.

The Act of Parliament for preventing the adulteration of food, drinks and drugs, which passed on the 10th of August, renders it doubly imperative on our members to test carefully every drug and chemical before taking them into stock. The time has long since passed away when with some wholesale houses adulteration might be said to be the rule, especially as regards essential oils and powders. Still there are ample reasons for testing the more expensive class of chemicals. A good many years since a parcel of one of our most important alkaloids, the muriate of morphia, upon the purity of which human life frequently depends, came into my hands direct from the manufacturer, and answered all the usual tests satisfactorily, except the test of experience. A lady, who had long been obliged to have recourse to it, having obtained her usual supply, after taking a few doses, declared it was adulterated, and was so positive that I placed a sample in the hands of one of our largest and best makers of morphia here, and although they were satisfied there was adulteration, still it was not discoverable by the usual tests. But upon separating the morphia, it was found to be adulterated to the extent of 25 per cent. The adulterant was eventually proved by an eminent London maker to be white sugar.

In 1842, the 'Journal de Chimie Médicale' offered four silver medals to be awarded to the authors who should furnish to the journal the best notices on adulteration not yet made known, and on the means of detecting them. I believe adulteration in America has been, and still is, practised to a great extent. In this country some articles of large consumption, such as tea and spirits, have been found in London and Glasgow to be frightfully adulterated. Nay, in some instances, deleterious *substitution* was practised—neither tea nor spirits being found in the samples analysed. It is to be hoped the present Act will be so carried out as to greatly lessen, if not remove this evil.

I would now submit to the inspection of the members some interesting vegetable products of the East, sent to me from Singapore by my friend Mr. Jamie, and I shall simply read extracts from Mr. Jamie's letters, describing them in his own words. He writes, "The first specimen is a stump of what I fancy is a tree-fern (*Cibotium*), which the natives on the east coast of the Malay peninsula, at a place called Sangora, use for the stopping of bleeding. It was brought to me by a gentleman who was in that direction prospecting for tin, etc., where it was exposed for sale in the Sangora bazaar."

In reference to this specimen I would refer you to two very interesting papers contributed to the 1st series of the PHARMACEUTICAL JOURNAL, vol. XVI. by Mr. Daniel Hanbury and Professor Archer. It is known by the name *pengawar-djambi* or *pulu*. By some of the old authors it is considered to be the 'Scythian Lamb,' 'Frutex Tartarus,' or 'Vegetable Lamb.' "It was said to spring from a seed like a plant, and be attached to the earth by a root, whilst in its animal nature it rejoiced in a sort of flesh and blood, browsed upon the surrounding herbs by turning round upon its axis, or root, until, having devoured all within reach, it perished a victim to hunger." It has a place in the Dutch Pharmacopœia. As a styptic, the hair of the stipes may be employed in the same way as cotton, wool, tow, or the nap of a beaver hat. The styptic action is supposed to be simply mechanical. Professor Archer says, "The most striking feature is the abundant clothing of long, sparkling, golden-brown, moniliform hairs, with which the outer part of the stipes is thickly covered, and which, at the first glance, suggest for the drug an animal rather than a vegetable origin."

The second specimen "is a bottle containing the hairy down of the leaves of a jungle-tree." Mr. Jamie writes, "I am very sorry indeed that my botanical education will not enable me to send you the regular orthodox description, but I have done the next best thing, that is, I have sent you by post some of the leaves, from which I think any botanist will readily class it. As far as my knowledge goes, I should say it belongs to the Thalamifercus class. The tree, or rather sapling, I took the leaves from was not high, but it grows to a large tree. This hairy down only grows on the young branches and leaves. As the tree grows so does the down leave it. To see the hairy down on the trunk of the tree just reminds me of a hare's foot; to the feel it is exceedingly soft, and if burnt puts one in remembrance of amadou burning, or somewhat like nitre paper, for it scintillates. It is a good styptic, and might become useful in stopping bleeding. I have prepared a little with carbolic acid, and use it for slight cuts, which it heals quickly. Under the microscope it has very much the appearance of cotton fibre. Whether it could be put to any economic use will greatly depend on whether quantities could be got. I have no doubt the tree grows all over India and Java, as well as in the Malay peninsula. The leaves yield large quantities, for what is in the bottle came off six leaves. One day, being in the jungle, I observed the same kind of leaves, but very much destroyed by being full of round holes, and as I was wondering what could have produced such an effect, I saw an insect come and cut a piece out of a leaf and fly away, probably to build a house for itself; so that the hairy down is useful to insects, whether it is or not for animal life." I submitted these leaves to Professor Balfour, who, however, was unable to classify them, although he took great pains to do so. I then forwarded them to Professor Bentley, who, in reply, writes, "I am sorry I can give you no positive information as to the plant yielding the leaves you forwarded to me. I did not recognize the leaves, but thought they were derived from a species of *Ficus*. I therefore went to the British Museum, and submitted them to Mr. Carruthers and his assistants, but no one could identify them. Mr. Carruthers thinks they are derived from *Ficus tomentosa*, but as there were no specimens of this plant in the British Museum herbarium, no positive data existed by which they might be traced to that plant. Unless, therefore, some botanist from India could recognize them at sight, the only way to trace their botanical source would be to obtain specimens of the flowers, etc., with the leaves of the plant. Judging from the down from the leaves, it seems to be probable it might be useful." Since receiving Professor Bentley's letter I requested Professor Archer to examine them, and he has pronounced them to be the leaves of *Ficus lasiophylla*, from a young plant. The hairy down decreases with the age of the tree.

Mr. Jamie takes great interest in our Society, and he fully expected to have made a very interesting contribution for the opening of last session. He wrote me, "You will be sorry when I inform you that I am unable to forward you an article to read when you are president, which is disappointing to myself, as I made every effort and went to considerable expense to be able to send you something both new and rare. It was to be on essential oil as an article of perfumery; but not getting a sample of it made through not knowing the nature of the flowers, I thought it useless to write an account of it without being able to place before the Society a sample of the oil. Now that I am on the subject I shall just mention the plant of which I thought the oil would be a valuable product. The natives here call it Champaka Putch. 'Putch' is Malay, and means white. There is another kind called Champaka Kiming (yellow), the flowers of which have a strong and not unpleasant smell, and are very much used by the natives in the East for the perfume, for which they pay a high price. The white flowers are still more valuable, and give a far pleasanter perfume. In 'Gray' you will find a very short account of it under the Sanskrit name, and in the 'Treasury of Botany,' under the botanical name *Michelia champaka*, you will find a condensed account of it. In these I think the yellow is meant. The yellow is propagated from seeds, but the white is cultivated from grafts. I had collected about 50 lb. of flowers of the white, and expected a beautiful sample of oil; but before I could get them distilled, fermentation began and completely destroyed the whole. I hope better success will attend my endeavour next time if I should again venture on the same experiment. I do think it would be worth the while, and shall try to keep it in mind. The Ilang-Ilang of Manilla, in my opinion, cannot be compared to it."

Mr. Jamie, in his last letter, writes, "I am very sorry to say that I have had no opportunity of again trying the flower of the Champaka for the oil, as this year we have had no flowers, nor has anything occurred to my observation worth communicating through you to the society. I suppose the museum is not to be confined entirely to one branch, but that every branch of the animal and vegetable kingdom will be represented as well as inorganic specimens. In the expectation that minerals will be acceptable, I have bespoke a specimen of galena found on the east coast of the Malay peninsula, between Sangora and Patani, from the gentleman who brought me the tree-fern. He was successful in discovering three mountains of galena (sulphide of lead), rich in silver. It is said on very good authority that ten years will not take away one of them, though wrought night and day. A gold company also has been formed in Malacca. The assay of gold to the ton is 4¼ oz. I shall try to obtain a piece of the quartz. A tin mining company has been formed also near to the gold. When once they have begun I shall try to obtain a specimen of it. Should you think the tree-fern and the hairy down and leaves worth presenting to the museum, by all means do so."

Thus far Mr. Jamie: I am sure you will agree with me that it is very gratifying to find a zealous worker in so distant a place as the Malay peninsula. I shall no longer trespass upon your time, but ask our honorary secretary to read his paper on "Pharmaceutical Education."

At the close of the address Mr. Mackay proposed that a hearty vote of thanks should be tendered to Mr. Jamie at Singapore, who, though so far distant, yet had remembered the Society's museum here, and that Mr. Baildon should be asked to transmit the same on the first opportunity when writing to Mr. Jamie. This was carried by acclamation, and the President said he would have much pleasure in acceding to the wish just expressed.

Mr. John Mackay then read the following paper on "What course ought the Society to follow in reference to Pharmaceutical Education?"

There is no subject of more importance at the present time than the question of pharmaceutical education. So much has been said and written regarding the best means of giving an impetus to the educational department of pharmacy, that it occurred to me as a right and proper thing, on this the opening night of our session, to give the members of our society an opportunity of expressing their opinion in connection with what has been for so long a keen object of discussion.

I do this all the more readily that while so much has already been written, printed, and circulated, no fixed plan has, up to the present sime been received, adopted, or recommended by the London Council.

My remarks will not extend to any great length, because my desire is chiefly to draw the attention of those hearing me to the leading facts in connection with this question, and by so doing induce a discussion, in the course of which some new views may be evolved, and thus add to the existing and expressed ideas as to the best mode of improving the means of educating those whose daily work is connected with pharmacy.

In very shortly reviewing our position, let me remind you, that the primary object sought for in establishing the Pharmaceutical Society was that of advancing chemistry and pharmacy, and thus promoting an uniform system of education among those who carried on the business of chemist and druggist. With what energy this has been done, and what amount of success has resulted from the anxieties and labours of the founders and their successors, is known to many of you. I am one of those who think the Society has done its work ably and well. But I also believe that the time has now come, when the system hitherto pursued ought to be modified and changed. At the opening of the session last year in London, I ventured to hint that ere long our Society would cease to be an educating body, and I fancy that prediction will ere long be fulfilled.

Glancing at the Acts of 1852 and 1868, and the bye-laws formed in accordance with them, we have very specific and stringent clauses, not only regarding the appointment of examining boards, but also indicating the nature and extent of the powers so conferred. Now, I admit freely, that during the early part of our existence, under the operation of the laws just referred to, there existed a real necessity that the funds of the Association should be spent, and that freely, in furnishing opportunities and appliances of which all those requiring to prepare themselves for examination might, if so disposed, fairly take advantage. At the period to which I have referred, schools of pharmacy were unknown, and lecturers or teachers in the requisite sciences were comparatively few, while the difficulties in the way of attending chemistry, materia medica, and botany was considerable. Hence lectures, and paid lecturers, in connection with the Society in London, were established, and, along with an excellent laboratory, have existed up to the present time. I do not stop to inquire the amount of money which has been thus spent during the last thirty years as a part of our own school in the metropolis, because good fruit has been borne from the seed implanted by the labours of such men as Thomson, Pereira, Redwood, Bentley, Attfield, and others; but leaving the past, and looking to the future, the great question now almost forced upon the members of our Society is—Are we to continue in perpetuity the machinery which has been kept in motion so long, or are we to make a change; and, if so, of what character, and to what extent, and in what form, are we to carry this out?

In connection with this subject, the nature of existing fees and subscriptions promises to open up a field for argument and debate. The money now accumulated, belonging to the funds proper of the Society, and amounting to many thousands of invested capital, is considerable, and I am quite ready to admit that there is no necessity for us to go on increasing this sum; but I feel there is as little call to diminish either examination fees or annual subscriptions. Our weekly Journal is almost self-supporting, notwithstanding so many thousand copies are sent free every week throughout the year to all parts of Great Britain. But the feeling becomes stronger and stronger that, without encroaching at all on our funded capital, we are bound in the same way out of our yearly profits—if I may be allowed to call the annual balance by such a name—to make provision for and assist those who are disposed to help themselves, or who may be prepared to take advantage of certain proposed arrangements, by annual grants of money. Now we come to the difficult and knotty point, and I hope many here will express their feelings freely upon it.

Several propositions have already been made, but as yet no one course has been considered sufficiently correct or practical to be acted upon. Let me summarize the principal of these:—

1. It has been proposed that several central schools of pharmacy should be formed in various towns throughout the provinces, and money voted for this purpose from the Society's funds.

2. That certain examinations should be conducted simultaneously throughout the country, and that payments as well as prizes ought to be made according to certain results.

3. That two great schools ought to be formed, one in London, and the other in Edinburgh, and that pharmaceutical students be urged to find their way to one of these centres, and there prosecute their studies.

4. That sums of money be voted in cases where a certain local amount is subscribed, and the money so given be spent in any way thought best, by those in the locality, so long as it promotes and assists pharmaceutical education.

5. That compulsory attendance at certain courses of lectures should be insisted upon before any candidate be admitted for examination, and that proof of such attendance be given by the exhibition of class tickets, comprehending chemistry, materia medica, pharmacy and botany.

Other ideas have been promulgated, but the foregoing will serve to bring to your recollection some of the leading features of schemes long before us. I do not quite agree with any of these proposals.

Referring to London, I think we would do very wrong to give up our habitation in Bloomsbury Square. Among the very first steps taken in connection with the foundation of our Society in London was the formation of a library and museum. Both these departments have been carefully tended, and in point of value and interest continue a credit to our Association. These, therefore, I would continue to foster and increase. Plenty of space and accommodation must also be secured for examinations, as well as for the operations of our Council Government, Secretary and Registrar. I would further grant the name of professor to our lecturers in London, but would abolish their annual salaries. The use of the lecture-room might, however, be given free. All pupils who attend the prelections, or who occupy benches in the laboratory, ought, I think, fairly to pay such fees as would render each department self-supporting. By such an arrangement young men resident in or visiting London, would always be sure of good sound instruction at a fair remunerative value, with the immense advantage and privilege of having the free use of a good library and excellent museum.

But having referred to our great centre, we now glance at the position of the provinces. How are they to be treated? I submit the following for consideration:—

Let all towns, large and small, where chemists and druggists are to be found, be looked upon as places requiring some assistance, more or less, in aid of pharmaceutical training. Admit this as a principle differing only in degree, but taking our London establishment as a type of what might be fairly imitated. Books, specimens, and a place of meeting ought, I think, to be accessible to all connected with pharmacy, in every place were there are a few connected with our business, who express a desire to keep pace with the advancing state of pharmaceutical literature, as well as doing justice to those young men, who, if they follow out their daily occupation, will require to fit themselves for their examinations.

I know many young men who go up for their Minor are often puzzled with some of the drugs submitted to them for recognition. For instance, I have heard more than one declare he never saw jalap root, and and others equally at a loss when ipecacuanha was presented to them. Some may smile at this, but these parties on being asked from what source they obtained material for preparing the tincture of the one and the wine of the other, promptly replied that in both cases they used the powder. And so with many other articles, but more especially botanical specimens. Now, if sets of the various substances in materia medica and chemistry were made available, it is not, I think, too much to believe, that the examination of many of the articles externally, might lead to the getting up of the habitat and other particulars, such as uses and doses of root, plant or gum. Again, there are many establishments in country towns, and even in large cities, where there is a great paucity of books. In all such cases, I conceive a well-assorted library might prove of very considerable advantage. Further, accommodation might fairly be given free to any gentleman who was disposed to give a short series of instructive lectures, on the understanding that so far as his own remuneration for such services was concerned, he would be paid by the fees of those who attended his demonstrations.

But the cry with many is still give us lectures, and let the funds of the Society be spent in paying, or, at all events, assisting to pay gentlemen for giving lectures in different places. No one can more appreciate the advantages of such instructions than I do, yet I am equally certain that in many, I would almost venture to say the majority of instances, young men have not the opportunity, while others have not the inclination to attend such courses of lectures. I refer, of course, to the great mass of our apprentices and assistants scattered up and down the country throughout England, Scotland and Wales.

Further, we must remember some do not go to the lecture-room at all, and that though attendance there is *desirable* yet it is not a *necessity*, for we have constant proof of young men who with books and specimens and earnest study fit themselves for our Minor and Major examinations, passing both, not only creditably but sometimes in honours. And it is for this reason I enter my protest against making it *compulsory* to attend certain courses of lectures and producing certain tickets of attendance on such lectures, before candidates can be admitted to examinations. To insist on this, as has already been seriously proposed by a most able and intelligent teacher, would be to destroy altogether the present constitution of chemists and druggists. Not only so, but I have great doubts whether if such a course were acted upon, the desired end would be obtained. The earnest pupil who has opportunity would doubtless be much benefited by attending classes; but I feel assured that there would be many cases where a ticket for regular attendance might be produced without a corresponding benefit. In other words, I would rather have the application of a diligent student at home, than the mere attendance under compulsion, of the careless or indifferent youth. Cases have been known where young men not caring to study, but compelled to go through a stated course, have spent their time in the lecture-room otherwise engaged than paying attention to their teachers, but yet entered an appearance in order that class-ticket and certificate of attendance might not be wanting when called upon. I do not detract in any way from the value of scientific teaching either in lecture-room or laboratory, for I consider it a most laudable and praiseworthy thing for any young man, who from position, inclination and circumstance can take advantage of systematic study and class teaching to do so to the full, as by so doing he is in the highway, not only to improve himself, but also raise the standard of true pharmacy. What I demur to, is making certain courses of such study not optional but compulsory. Now I trust I am not misunderstood in what I have just enunciated. I am desirous that legislation should be effected more for the present than for succeeding pharmacists. The constitution of our body is such, that until many things change in regard to our daily occupation, we can scarcely at the present time dare to compel a higher scientific standing than what has been, and still is, insisted upon as being possessed by all who wish to be placed upon the Government register. The day will doubtless come, and that perhaps sooner than many expect, when the true value and position of a dispensing chemist may be properly and duly recognized. But we all know the almost miserable pittance which at present many of our brethren make, even though they toil from early morning till the latest hour of night. Go where you will, in large city or country town, and you will find that the very few have comfortable incomes, while the many have just enough to do. It is, therefore, I submit, self-evident that no increase in compulsory education will in the meantime be a cure for this state of things. Prices as a rule must advance, assistants must be better paid, and druggists' shops must become fewer before even the commencement of this improved condition of things; and I would, therefore, ask for a gradual improvement in these points before insisting on such a radical change in the education of our young men as I know many are desirous of making.

In connection with pharmaceutical training, I may mention what I believe will interest all here. In lately glancing over the minute-book of our North British Branch, I found the following which I give *verbatim* as it is to be there found. It refers to a meeting held in Edinburgh in 1853 to discuss the operation of the Pharmacy Act of 1852. Jacob Bell was present, as will be seen from the following:—

Extract from minute of meeting held in Edinburgh in March, 1853.

"Mr. Mackay moved the following resolution:—

"'That it is expedient, in order to assist in carrying out the provisions of the Pharmacy Act, to render it imperative that all future apprentices to pharmaceutical chemists in Edinburgh, Glasgow, Aberdeen, St. Andrew's, and other places where lectures are delivered, shall attend at least one course of materia medica and one course of chemistry; and resolve that this meeting strongly recommends an especial clause in each indenture to that effect.'

"This was seconded by Mr. Bremner, and agreed to.

"It was further proposed by Mr. Jacob Bell—

"'That this meeting recommends that pupils attend a course of instruction in practical chemistry and botany wherever they have an opportunity of so doing.'

"This was seconded by Mr. Flockhart, and agreed to."

Here let me remark, judging from the above in regard to educational requirements, our position does not much differ at the present time from what it did twenty years ago, for had the above recommendation been carried out, cramming and other forced modes of instruction would not have bulked so largely as they do at the present day.

I dare say many of you have read the excellent address of our friend Mr. Savage, at the opening of the Brighton Association of Pharmacy, which appeared in the Journal of the 16th inst. The remarks speak for themselves, but you could not fail to be struck with that portion where he says that "in the evening of Tuesday last I attended a meeting of the General Purposes Committee in Bloomsbury Square, when a deputation of five members of the Examining Board met us, and Mr. Carteighe, as their exponent, went most fully into the proposed change, whereby the Minor after this year will become the principal practical examination, etc." Now it appears to me that you only require to increase the stringency of your examination as thus hinted at, and at the same time increase your money payment as I believe is already contemplated, to cause many to leave the business, and also prevent many others from entering it. I do believe the existing Minor and Major examinations as conducted in London and Edinburgh are fair tests of the ability of the candidates to be admitted to the higher or lower grade of our Society; and I unhesitatingly affirm that I for one will oppose so far as I can increased stringency or additional money payments in connection with either examination. No young man can go through the Minor in less time than three hours' constant and unceasing work, while the Major requires at least seven or eight hours to complete the examination. Let us know our business well, practically and fairly, but do not insist upon a knowledge far above and beyond what Minor or Major examined man may be expected to possess.

I promised at the outset that my remarks would be short, and I dare not therefore extend them, for I trust the whole subject will be fairly discussed. I may, therefore content myself with simply indicating what I think the course of all pharmaceutists ought to be at the present moment, keeping in view, that the time may yet come, when there will be a necessity both for extension and change in the system at present followed in training our youthful friends.

1. I think every master is bound to see that his apprentices pass the Preliminary examination of the Society before they become bound by indenture.

2. In every indenture there ought to be a mutual obligation between master and parent or guardian, that the former will afford time to the apprentice to attend at least one course of chemistry, materia medica, pharmacy, and botany, while the latter becomes bound to furnish the necessary funds to enable the youth to take advantage of the time so given.

3. As such a system could only be carried out where

lectures are delivered in connection with University, College, or School of Pharmacy, time should be given in the absence of such opportunities in country towns for the systematic study of these important subjects, either in the morning or evening, as might be found most convenient with business arrangements.

4. As a rule, let the term of apprenticeship be five years.

5. That the study of the different departments should be aided as much as possible by the use of books and specimens of drugs and chemicals.

6. At the close of such an apprenticeship, let each young man devote as much time as he can to the study of practical chemistry, and by keeping up his reading, so fit himself to pass his Minor examination.

Now these propositions are very simple, and will at once convey an indication of the kind of aid which I think the parent Society ought to extend to her children, especially if it can be proved that they are in want of, or desire such needful assistance. I have already plainly hinted my own feeling as to the direction in which the funds of the Society should for the present be spent, and if thus taken advantage of, I feel that with our examinations continuing as they now are, there can be little fear that either uneducated or illiterate men will ever be found filling up the ranks of the pharmaceutical army, and so bring down, as many have feared, disgrace upon all connected with our profession.

Already we have in our pharmaceutical horizon many bright constellations, men well known for high intellectual and scientific attainments; but I conceive it is equally certain that with facilities already given, and still to be acquired, young men generally may be fairly educated, and with ordinary application and perseverance, prepare themselves to occupy their important and responsible position of dispensing medicines to the sick, and thus carefully and correctly fulfil the intentions of the prescriber.

A discussion then followed on the subject of the paper.

Mr. D. R. Brown (Macfarlane and Co.), said he was now of the same opinion that he had been all along—that a thoroughly furnished pharmaceutical chemist required a much wider and more extensive education than the great majority had hitherto got. He thought a very great advantage might accrue to them if they looked to what was past. In former days, the apothecary had a much wider education, and a much better pay than the ordinary pharmaceutical chemist of the present day. He held a very respectable position, indeed, and if they just recollected, there was scarcely a branch of science but took its origin from the old apothecary. The present degraded position of pharmaceutical chemist arose from the fact that they permitted science to be taken out of their hands by men more competent than themselves. There was not an article in the possession of the old apothecary—if it were plant or mineral—but had been gathered by himself, and if it were a pharmaceutical preparation, but had been prepared by himself. The pharmaceutical chemists of the present day had permitted all these things to be taken out of their hands. They went to the manufacturer and bought an article, and, very much like the grocer, they sold it in retail. The result of that was, that an uneducated class of men had come amongst them whose only object was to live and make money. That was all very right and proper when carried on in moderation, but those he spoke of pursued it too eagerly, and tried to do it at the least possible expense to themselves. He held that progress was absolutely necessary for them. The world was progressing, and what had happened, had happened because they allowed themselves to remain stationary, whilst others were moving forward. He believed the time would come when the making up of prescriptions would pass from their hands if they did not take better care of themselves. Medicine just now was in a transition state, had become a science, and knew that chemistry was one of its best handmaids. Medicine had been investigating the healthy condition of all the organs of the body, examining their secretions, knowing what was in them in their normal condition, and learning what they became in their abnormal. Another step in the practice of medicine, and the pharmaceutist will vanish. No such a thing as pharmacy will then be in existence. It would become a dead art; and the reason was this, that the physician having the science at his finger ends would not be content to work on uncertainties. He would compel the pharmaceutical chemist to eliminate the active principles of everything he dealt with, and to put them into his hands that he might measure them with perfect accuracy. To prevent all this, he held that pharmaceutical education should be a much wider one than it was at present. He acknowledged one of the best steps was the Preliminary examination. He next held that they could not make their examinations too stringent, but he also acknowledged that Mr. Mackay was right in saying that in the present condition of the profession it would be wrong to insist upon it. He thought that if a man took a lad and bound him apprentice for five years, and took his services, as they were taken, for a very few pounds indeed, that master was bound to see that his apprentice was educated in his profession, and educated at his expense too. It was utterly impossible, scattered up and down the country as they were, that many of their young men could attend lectures. He thought that each master should provide his own museum, and spend some time upon his apprentices. Why should he not undertake various pharmaceutical operations for himself, if for no other purpose than that of educating his apprentices? Why should he not undertake some chemical experiments and make a good many of the substances in which he dealt. Multitudes of them were easily made, and did not need to be manufactured in large quantities. The cost would be very little. He saw no other way of educating the profession as it ought to be educated unless the master took the apprentice in hand. It was his duty. In a great many places, such as Edinburgh, Glasgow, Aberdeen, St. Andrew's, where large numbers were to be found willing to attend classes, these should be provided. He was adverse to the Pharmaceutical Society of Great Britain providing anything for the apprentices but examination.

Mr. Frazer (Glasgow), said the difficulty he felt was brought out by Mr. Mackay. It was impossible to hit upon a scheme that would be acceptable to all parts of the country and all circumstances. He had tabled his proposal in the month of March. They had a surplus sum of money of £1500 or £2000. He wanted the Council of the Society to set aside what they could spare for educational purposes. It was impossible for every druggist in the kingdom to go to London for what he wanted. Let them put their hands into their pockets in each locality, and for every 20*s.* which they subscribed, let them ask the Council in London for other 20*s.* or 10*s.*, and spend it on pharmaceutical education as they thought would best suit their circumstances. Mr. Reynolds's scheme was to have educational centres in Leeds, Edinburgh, Liverpool, Bristol, and so on; but he held that was but a modification of the evil of one institute. They had no right to accumulate money as they were doing without applying it to any useful purpose. He thought they ought to spend it in educating their young men; that they ought to reduce their examination fees, for, compared with other and larger learned societies, they were much too large. By these means they would get rid of their surplus funds. He would not reduce the standard of the examinations. It was a wrong thing that they should have to educate their young men. But they had got their young men into a fix. The masters had passed this law for a conservative purpose,—to keep the trade into fewer hands. Whatever was the motive, that was the result of it? They had got their young men into a cage, and they ought to help them out of it. The young men had no means of educating themselves to the standard the masters had raised. They were therefore bound to give them every facility they had in their power to attain this standard. His proposal about the examination fee, which had not been ventilated yet, he should like considered. He proposed that where a young man was able to do it, he should be allowed to take the Minor and Major examinations at one step. Where a young man was able to take it at one step, they had no right to say, "You must take the Minor first," and make him pay for that five guineas, when he was able to take the two for six. He was satisfied that the examination fees, considering the rate at which the young men in Scotland were remunerated, were too high. The effect of this was that many left the trade. The passing through examinations at their time of life had a deterrent effect on many, altogether irrespective of their power to pass them, and therefore the examinations ought to be made as few as possible. If they did as he proposed, they would find a large proportion taking the Minor and Major at once. The Society could only lose about £300 by this being done, and by many more taking the Major than now did, that sum would be made up. He thought the suggestion of Mr. Brown that each chemist should have his own museum was one of the best practical hints that he had heard.

Mr. Mackenzie thought that Mr. Mackay's paper contained some good suggestions. He quite endorsed, he remarked, what that gentleman had said about the present manner of education—that it was contrary to the spirit of the age, and must sooner or later succumb. It should be altered so far, that any young man coming up to be examined, no matter how or where he got his education, should be placed on an equal footing with all others, if he proved himself possessed of the requisite knowledge. He believed that the standards of the examinations were already as high as they prudently should be made. He was not exactly prepared to admit what Mr. Brown had said regarding the present pharmaceutical chemist. The old apothecary was a sort of mongrel. He was neither a druggist nor a doctor, but a little of both. He was an educated man because he had graduated at the university. He thought that Mr. Brown's ideas were rather Utopian regarding the master's duties to his apprentices. He would gladly see this, but where could they find a master, with a good business, who had time to do all this? He thought with Mr. Brown, however, that each master should have his museum; but it could not be expected in many cases that he could turn schoolmaster for his apprentices. It had been asked how were the apprentices in rural districts to be enabled to compete with those who were able from their situations to attend colleges and lectures, for the examiners allowed no difference between the two classes when they came up for examination? They had heard a great deal about the money that the Society had accumulated also. He did not think it wise that this money should be allowed to go on accumulating without any definite or good purpose. He thought the fees should remain as they were, but he would most decidedly have the young men who were prepared to pass both examinations at once permitted to do so. But returning to the question how the young men through the length and breadth of the land were to be put on an equal platform, he suggested that the Society, instead of paying certain learned men to be lecturers, should pay them or other competent men to compose or edit a work of the nature of 'Cassell's Popular Educator,' containing the information imparted in the lectures so that the young men should be able to educate themselves. The lessons might be graduated as in the work he had mentioned, and one number or part might be published every week. The progressive lessons might gradually lead the student up to the Minor and then to the Major examination. This might be done by a system of question and answer, embracing chemistry and botany amongst other things, and leaving to the master that sound practical work which he was bound to teach his apprentices. Let them consider what had been done in all the different departments of knowledge by means similar to those he suggested. It would place the young man in the most secluded part of the country upon an equal platform with those employed in the towns and cities. If they were going to apply the surplus funds of the Society to a general educational scheme, he thought this was the best way they could do it.

Mr. Ainslie (Gardner and Ainslie) said he fully concurred in most of the remarks made by Mr. Mackay. He thought they were sensible and practicable. He had a suggestion to make in regard to the examinations. On the occasion of almost every examination they had young men coming before them who were ignorant of the names of certain drugs and preparations. He believed that one great cause of this was, that these young men had been, perhaps, but a short time at the trade. He thought it would be an improvement if every young man before he came up for examination had been not less than four or five years at the business. He thought the idea of having a museum and library of reference in most towns a very good one, and although it would cost a good deal of money, it would be the best way the Pharmaceutical Society could help the young men in their course of study. A great deal had been said about the difficulty of passing the Minor examination; this was much exaggerated. A young man who went systematically into the study of chemistry, matéria medica and botany need have no fear of the examination. He thought the young men of the present day wished to have too much done for them. He thought they did not exert themselves as they might do, especially with their shorter hours of labour in most towns. He suggested the plan that he himself adopted when an apprentice, of getting up at six in the morning and having about two hours' study before commencing the work of the day. He thought if every young man of average ability were to do so, we would not hear so many complaints of the difficulty of the Minor examination. He thought that examination very well as it was; some thought it not scientific enough, but he thought it was quite sufficient to make them correct dispensers of medicines, as well as persons in whom the public might place the utmost confidence.

Mr. Kemp (Portobello) thought it should be understood in the discussion of that night, that they were not proposing any immediate revolution, but that what they proposed had all relation to the future. Any change that took place would, he believed, reserve all rights, so that those already in the trade would pass under the present examinations. The question before them was, Should the Society expend any money for the education of future pharmaceutists in the provinces? It was admitted that the Society had all along had a desire to do this, had already done something in this direction, and was anxious to discover how it could do more. The question was, Is the education to be brought to the student or the student to go to the education? He thought it would be utterly impossible to have a great many centres of education. As regarded the Minor examination he thought Mr. Mackay was right in saying that the Minor examination was quite within the reach of any young man who was disposed carefully and perseveringly to study his business. They had had many examples of students passing with the greatest credit who had never attended any lectures. But he thought that the two sides of the question did not hang together. Mr. Mackay had admitted that this examination was quite within the reach of the ordinarily industrious student. But then there was a proposal to spend a great deal of money in providing centres of education, and another proposal had been made to make the Minor examination more stringent. If it was made more stringent it would become the Major examination; and if they made the present Major more stringent the students would have to attend lectures. In a letter he sent to Professor Attfield, he hinted that at some future time the Minor examination should be abolished. It was intended as an examination for assistants. Now he thought the employers were the best examiners of their own assistants. The result of the continuance of the present Minor examination was, that they had two qualifications existing amongst those who had set up business perhaps in the same street. By-and-by the public would inquire what was the cause of the difference in their designations, and would discover that the one who had passed the Major examination was the better man. Instead of making the Minor examination more stringent, he thought the students should at once pass to the Major, and in the course of a few years they would have nothing but pharmaceutical chemists.

Mr. Kinninmont, of Glasgow, thought that the best mode of disposing of the surplus money of the Society was to reduce the examination fees. At the present moment they had a surplus of £16,000, and this was the cause of their quarrels and discussions. If this money were capitalized, it would bring £600 a year, which they might employ according to the suggestions of Mr. Frazer. He thought a fee of one guinea for the Preliminary, two guineas for the Minor, and two for the Major examinations were sufficiently high fees. He thought it a ridiculous idea to ask that the apprentices before they were bound should be made to pass the Preliminary examination. If this were enforced, they would find it impossible to get young lads. He should protest against the alteration of the present Minor examination, which, in his opinion, included everything that a druggist ought to know. He might learn as much after as he pleased, but it should not be compulsory. He maintained that the higher branches were not absolutely necessary to a man who had merely to carry on the ordinary business of a chemist and druggist. A voluntary examination they might, however, make as stringent as they pleased. This question of education could be settled very easily by every master minding his own apprentice. There was nothing in the Minor, and scarcely anything in the Major examination, but what private study would enable a young man to pass. But if they made examinations more stringent, they would just prevent young men from coming forward.

Mr. Gilmour (Lindsay and Gilmour), pointed out the necessity for a good Preliminary education for boys coming into the trade, so many having failed to pass the Preliminary education, and so many others having passed it only by the skin of their teeth, as he said; and also the necessity of every assistant making an honest effort for himself. It was proposed to start education centres, but where these centres would be placed were the very places that least require them. The examinations had long been spoken of as the end of a young man's education, but these examinations should show the young man what he was ignorant of. He was suspicious of this whole question of education as brought forward by men in and out of the Society, because he did not think that those who had as yet attempted to settle the matter were in a position to legislate for the great mass of the trade. To aim at a common platform for all in the trade would only end in disappointment. The main thing they should aim at was to establish a higher moral tone among the young men. He thought the present examinations were quite sufficient for the requirements of the present day, and that all they required was the establishment of proper museums, proper libraries, and proper consulting rooms in as many places as possible, without interfering with the independence or the proper privileges and duties of the young men. As to "cramming," he did not think it existed to nearly the extent that was thought, at least in Scotland. The examinations showed that it did not exist. He suggested to put an end to this absurd cry about cramming, that the examiners should publish the questions monthly. He concluded his remarks by again pressing the necessity of a higher moral tone amongst the young men.

Mr. W. Leitch: I beg to state that I coincide generally with the remarks of previous speakers, and homologate most of Mr. Mackay's statements; but I am decidedly of opinion that no great change in the mode or means of education is either probable or desirable. I believe that twenty years hence it will be found as now that chemists will receive their primary education in the country districts, and be naturally drawn as assistants to the great centres where they may have better opportunities of perfecting themselves in their art. At the same time, allow me to remark that, in my opinion, you are very apt to overlook one of the main elements of the case. You speak only of education, but I ask where are you to obtain the pupils? It is well known that even now there is an absolute dearth of apprentices and assistants. This may be due partly to the stringent provisions of the recent Act; but I insist that it is mainly due to the fact that there is no adequate object held out for the student of pharmacy to attain. It is absurd to suppose that young men of good education and position will be found to enter on a career involving such high and varied attainments, and offering so small an ultimate object, so few chances of advancement, and so little opportunity of cultivating the social amenities of life. It is only the favoured few who are fortunate enough to succeed to good dispensing businesses; and the remuneration of assistants generally is so manifestly inadequate to their position, and to the long time and considerable outlay necessary for their due qualification, that many otherwise able young men have already left the profession, and numerous others are deterred from commencing so inauspicious a career. To remedy this state of matters, I boldly affirm that the hours of labour must be considerably abridged, that the remuneration of qualified men must be trebled or quadrupled, and more encouragement given to scientific studies. Now to do this, masters must of necessity receive what they are already entitled to, viz., a very large increase in the present scale of charges; and considering that they have now an almost perfect monopoly in dispensing, there should be no difficulty in at least doubling all their dispensing charges. When this is done, and a due object and position held out for the attainment of any assistant, you will find the right class of youths come forward to the profession; and when once within the ranks, it is for the Society to decide where four or five centres should be established, where assistants may be helped by lecture tickets at recognized schools of pharmacy, so as to enable them to pass the Major examination with at least as much ease and credit as others not superior to them may do the medical curriculum. I may conclude by saying that, unless some such advance as I have advocated be made, the number of those choosing pharmacy as a profession will go on decreasing, as other occupations of greater relative monetary value are of easier attainment and equally honourable. I feel that I have not been discussing the point from a purely educational view, but certainly from one we cannot afford to overlook.

Mr. Young (Macfarlane and Co.) said that at this late hour he would not trespass, important as was the subject under discussion. He had given some attention to the various schemes which had been proposed, and he felt bound to say that the one which Mr. Mackay had that night brought under their notice was the one which commended itself most to his mind. He recognized the importance of the Bloomsbury school as a great central institution, and it would be matter of regret to him that any change should lessen its value. Change, however, of some kind was before them, and he thought no safer mode of transition could be effected than that contained in Mr. Mackay's proposal. It would give a standing to the Society in the principal centres of the country, it would recognize the teaching powers in many localities, and would tend to cement and foster that kindly feeling which is already springing up in connection with members of the medical profession. As to the examinations, he was content with them as they were, though he did wonder sometimes that while the Preliminary examination fee at the universities of Edinburgh and Glasgow was 10*s.* 6*d.*, it was with us £2. 2*s.*; and in the knowledge of this he did feel that when a parent presented himself offering his boy as an apprentice the first demand made was this examination fee. He thought a change might be made here with advantage, for he agreed with Mr. Gilmour in the necessity of a good education, and with Mr. Ainslie in a compulsory term of apprenticeship. Mr. Mackay could tell them that the Minor examination was originally intended as the assistants' examination, and he had no doubt the time would come when it would be held exclusively as such.

Mr. Mackay, in reply, said that the late hour prevented his answering, as he felt quite prepared to do, some of the remarks which had been made. He felt much gratified, however, that the opening of the Society's new rooms had been inaugurated by a discussion on such an important subject. He could not help stating in regard to the £2. 2*s.* fee for Preliminary examination, and to which exception had been taken by more than one speaker, that so long as the existing fees remained, there could be no better division than £2. 2*s.* for the first, and £3. 3*s.* for the second examination, thus making up the aggregate five guinea payment for the Minor examination, because before the classical examination was insisted upon, candidates passing the Minor paid at once the lump sum of £5. 5*s.* One word is also necessary to explain that the Minor examination was originally intended only for assistants and not for masters, but the Privy Council insisted that the Minor should form the test for qualification to admit to the position of chemist and druggist, and thus enable the party who passed to be placed on the Government Register.

A vote of thanks was awarded to Mr. Mackay for having so ably brought the subject of pharmaceutical education before the meeting, and giving an opportunity for free discussion in connection with it.

The following donations to the museum and library were then laid on the table:—

Specimen of leaves of *Ficus lasiophylla*, Singapore, by Mr. Baildon; specimen of hairy down from the leaves, of *Ficus lasiophylla*, Singapore, by Mr. Baildon; specimen of chemically pure bromide of potassium in large crystals (French manufacture), by Mr. Baildon; specimen of Pengawar-djambi or Pulu, *Cebotium*, *Scheidiarum*, by Mr. Baildon; specimen of Bassia nuts the fruit of *Bassia latifolia*, by Mr. Harry Hyne; Pharmacopœia Germanica, Berolini, 1872, by Mr. H. C. Baildon; the 'Pharmacist,' from America; 'The Year Book of Pharmacy,' from the Conference; 'Ashworth's Binder and Pharmaceutical Journal,' from the Society; bound volume of Journal, 1871–72; five volumes of 'The Proceedings of the Royal Society,' by Mr. John Mackay; five volumes of the Journal of the Chemical Society, by Mr. John Mackay.

The Secretary then intimated the arrangements which had been made by the Council in regard to the use of the room as follows:—

On and after Monday the 25th of November, arrangements have been made whereby the museum and library will be made available to all connected with the society, during the day from 10 A.M. till 4 P.M., and in the evening from 6 till 10. On Saturdays the hours will be from 10 till 3.

Any one wishing to examine the specimens in the case may have an opportunity of doing so by applying for the key of the cases to the party in charge of the rooms.

Books will be given out and taken back at any time during the hours above named, but in the meantime no volume will be given out unless by order from the Secretary, to whom application must be made.

The council hope that ere long the library and museum will both be considerably enlarged. In the meantime they have set aside one of the Society's rooms as a reading-room, open to all, and on the table of which will be found constantly lying the following weekly and monthly publications:—The 'Lancet,' Pharmaceutical Journal,' 'Chemist and Druggist,' 'Chemical News,' 'British Medical Journal,' 'Scientific Journal,' 'Nature,' and the 'Food Journal.'

A vote of thanks to the President closed the proceedings.

Provincial Transactions.

BRISTOL PHARMACEUTICAL ASSOCIATION.

The monthly evening meeting for November was held on Friday, the 15th; Mr. Stroud, vice-president, in the chair.

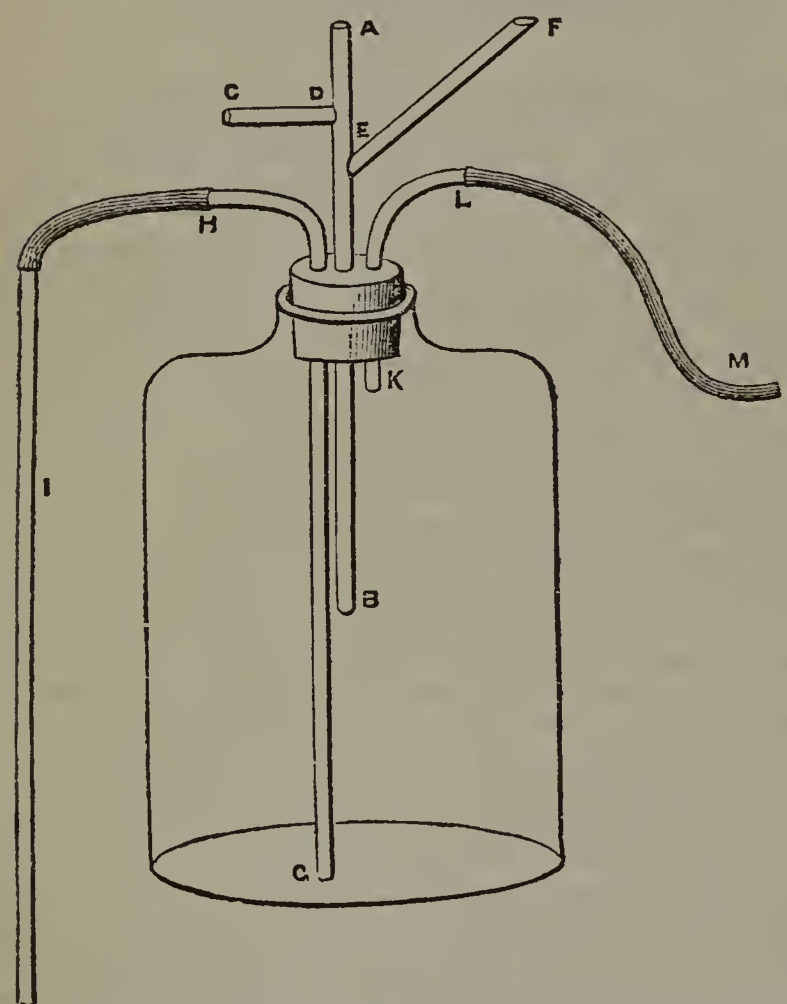
After a few introductory remarks from the Chairman, Mr. Giles read a paper upon the "Syrups of Phosphates," in which he referred to the difficulties sometimes experienced of obtaining a satisfactory and *permanent* solution of the phosphates of which the syrups were composed, and of avoiding a tendency to discoloration. Specimens of syrup of phosphate of iron and syrup of phosphates of iron, quinine and strychnia were exhibited, which had been kept for upwards of a year without material deposit or discoloration. He considered that these inconveniences might be avoided by the following simple precautions, viz.:—To accomplish the process with the greatest possible rapidity of manipulation, to exclude every source of impurity, and to dissolve the sugar without heat. With this object *distilled* water should be used *copiously* for washing the precipitates, which should then be dried by strong pressure, and the purest loaf sugar (in the state of rough powder) should be used for completing the syrup. If likely to be kept long, the syrup should be bottled in sizes convenient for use. In the preparation of syrupus phosphatis comp., Professor Parrish's published formula was stated to produce a syrup harsh to the taste and objectionable to patients, particularly to children, for whom it is largely employed. This appeared to be overcome in the American manufactured syrup by the substitution of a sensible proportion of hydrochloric acid for its equivalent of phosphoric, which equally well retains the phosphates in solution, and gives a soft saline taste to the product. The presence of arsenic in phosphoric acid, to an extent capable of communicating irritating properties to phosphatic syrups, was also stated. The author was indebted for this information to the careful observation of Mr. Randall, of Southampton. The arsenic probably finds its way into phosphorus in consequence of pyritic sulphuric acid (which is commonly contaminated with arsenic) being employed by the phosphorus manufacturers on account of its cheapness.

Mr. Stoddart exhibited two samples of British brandy which he had prepared, one from rags and the other from Iceland moss. They appeared to be exceedingly good imitations of the veritable Cognac and to have a large percentage of alcohol.

Mr. Stoddart then availed himself of the opportunity for showing his method of percolation, because so many had doubted its applicability to those substances that contained much resin. A large glass cylindrical tube was placed upon the table, containing powdered ginger in the course of percolation. The "*dark skin-deep ring*" of resin was seen plainly as it gradually descended, from the spirit being displaced by a column of water.

Mr. Schacht exhibited in action a piece of apparatus designed to supply a continuous blast of air for blow-pipe or other purposes. It consisted essentially of a tin tube (provided with a branch tube open to the air) through which water was driven from a supply tap into a properly fitted bottle. Air was thus entangled with the water in its course through the tube, and carried with it into the bottle. The water was then got rid of by means of a siphon, and the air was conducted by an elastic tube to the blow-pipe.

Mr. Schacht said the instrument was figured in the appendix to Eliot and Storer's 'Inorganic Chemistry,' and some exact measurements for its construction were given in the explanation, but he had found in practice that the length of the tin tube could be reduced by at least one half, and by so doing the apparatus was rendered much more manageable, whilst, as the meeting saw, its efficiency was in no degree diminished.



A.B.=Tin tube, eighteen inches long, half-inch diameter.
C.D.=Do. do., three inches long, one-third inch diameter, inserted at right angles.
E.F.=Tin tube, long enough to reach the level of A, one-third inch diameter, inserted at an angle of 45°.
G.H.I.=Siphon, half-inch diameter.
K.L.=Air tube, one-third inch diameter.
M.=India-rubber tube to convey away the air.

To set the apparatus in action, connect the tube CD with a water tap, by means of a piece of elastic tubing, and turn on the water; pinch the tube M for a few moments between the thumb and finger, until the siphon has begun to act. A blast of air will at once be felt at the extremity of M.

Mr. Little, a student, then read a paper entitled "Results of an Examination of some Samples of Ferrum Redactum." Mr. Little said he felt that he owed some apology for venturing to bring before the Association a subject which was certainly not original, and which probably did not possess that amount of general interest, which it was at least desirable should characterize communications submitted at such meetings. But finding it a difficult matter to produce anything original, he had thought that students, like himself, might do much useful work by examining, from time to time, some of the more important chemical preparations of the Pharmacopœia as they are met with in commerce, with the view of determining how far they correspond with or differ from the standard indicated in that work.

He had been thus induced to make an examination of half-a-dozen specimens of Ferrum Redactum, obtained from different sources, and to bring the results before this Society. [The paper is printed at p. 422.]

SHEFFIELD PHARMACEUTICAL AND CHEMICAL ASSOCIATION.

The second monthly meeting of this association was held on Wednesday, Nov. 13th; Mr. W. V. Radley, president, in the chair.

During the evening a lecture was delivered by W. Baker, Esq., F.C.S., on "Volumetric Analysis and Alkalimetry." The lecturer ably described the apparatus used in volumetric analysis and also the process of standardizing, describing in the course of his lecture several of the most important methods of conducting analysis by those means, during which he performed numerous beautiful experiments to illustrate his remarks. In concluding, Mr. Baker said, "I would urge upon students the importance of making standard solutions for themselves; by so doing they would gain a ready and useful acquaintance with the equations, and also an idea of the importance of accurateness in all processes employed in chemical investigation."

A vote of thanks was unanimously accorded to Mr. Baker for his interesting lecture, when, in briefly responding, he again urged upon the young men to try the processes for themselves, as, in his opinion, there are times when the druggist or dispenser will feel it very necessary to have at hand some such ready method of ascertaining the purity or commercial value of his chemicals.

The election of several associates concluded the business of the meeting.

LIVERPOOL CHEMISTS' ASSOCIATION.

The Convictions under the Adulteration Act.

The fourth general meeting of the session of the Liverpool Chemists' Association was held on Thursday, Nov. 21st, at the Royal Institution, Colquitt Street, Mr. E. Davies, president, occupying the chair. The council of the society had adopted the following resolution:—"That the council of this association, whilst sympathizing with the objects of early closing, does not consider it within its province to call a meeting of the chemists and druggists of Liverpool to discuss the question."

Mr. Abraham, in reference to this resolution, said the members of the council would individually be glad to do anything in their power to promote the earlier closing of chemists and druggists' shops, but they did not consider that the society could take action in the matter. He would gladly see an effort made to obtain earlier closing.

Mr. Shaw expressed a similar opinion.

Mr. Shaw afterwards called the attention of the society to the two prosecutions on the previous day for selling adulterated milk. He suggested that the stipendiary magistrate, Mr. Raffles, was wrong in his interpretation of the Act when he said that persons were liable to a penalty for selling adulterated articles whether they were aware or unaware that there was adulteration. He (Mr. Shaw) understood the third clause to mean that before persons could be convicted of the offence they must be aware of the adulteration.

The Chairman said he had not studied the matter, and, therefore, could not give an opinion on the point. He had always considered, however, that the only way to repress adulteration was to make the seller—whether he had a guilty knowledge or not—liable to a penalty, leaving it to him to take proceedings against the person from whom he had purchased the article.

A paper was afterwards read by Mr. C. Symes, vice-president of the association, on "Pharmaceutical Progress," in which he referred to what had been done by the association for pharmacy.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, Nov. 21st, 1872; Dr. Frankland, F.R.S., president, in the chair.

When the preliminary business of the meeting had been transacted, a paper "On the Standardizing of Acids," by W. N. Hartley, F.C.S., was read by the Secretary. The author finds it convenient to prepare the solution for rapidly standardizing acids by dissolving a known weight of metallic sodium in alcohol, and diluting the solution with water; it is then ready for use. The second communication "On Anthraflavic Acid" was read by the author, Mr. W. H. Perkin, F.R.S., in which he gave the results of the continuation of his investigations on this acid, including an account of two new derivatives, *diacetyl-anthraflavic acid* and *dibenzoyl-anthraflavic acid.*

An animated discussion on some theoretical points indirectly connected with this memoir ensued, and the meeting finally adjourned until Thursday, December 5th, when there will be two papers by Professor C. Rammelsberg "On the reducing Power of Phosphorous and Hypophosphorous Acids and their Salts," and "On Hypophosphites;" also one by Professor A. H. Church, on "New Analyses of some Mineral Arsenites and Phosphates."

Parliamentary and Law Proceedings.

Conviction under the Adulteration Act.

On Tuesday, Nov. 19th, two cases were heard by Mr. Raffles at the Liverpool Borough Police-Court, in which proceedings were taken under the new Act for the prevention of adulteration of food, drugs, etc.

William Smith, cowkeeper, was charged with selling adulterated milk. An inspector in the service of the Health Committee said that on the 7th instant he bought a pennyworth of milk from the defendant, and subsequently gave it to Dr. Brown, public analyst.

Dr. Brown stated that he analysed the sample, and found it to contain less than half the quantity of cream found in the poorest cow's milk; it had been adulterated by adding 30 per cent. of water. Milk naturally contained from 85 to 88 per cent. of water, and to the milk he analysed other 30 per cent. of water had been added.

For the defence it was stated that, if the milk was adulterated, it was adulterated before it came into defendant's possession.

The magistrate said that, by an Act recently passed, any person selling adulterated food, whether aware or not that it was adulterated, was liable to a penalty not exceeding £20; and the person who caused it to be adulterated to a penalty not exceeding £50. This being the first case under the new Act, he was not inclined to inflict a heavy penalty, but future infringements of the law would be severely treated. He would in this case inflict a penalty of 40*s.* and costs.

Edward Elkin, cowkeeper, was summoned under similar circumstances.

Dr. Brown deposed that the sample sent to him of the milk sold by the defendant contained only half the average quantity of cream, and had been adulterated by adding 10 per cent. of water.

The defendant made a similar defence, and the magistrate inflicted a penalty of 20*s.* and costs.

Suspected Poisoning.

An inquest has been held before Dr. Lankester upon the body of Hannah Harwood, who was found dead in bed some time since, and a suspicion of murder existed against a man who lived with her, and who cut his throat at the time.

The Coroner said the woman's body had been examined, and although there was something strange in the man's behaviour, there was nothing on the woman's body to indicate that she had been injured or poisoned.

A juryman said since the adjournment a bottle containing laudanum had been found in the room. The bottle was then produced; it was a two-drachm bottle, labelled "Laudanum—poison."

A witness said she found the bottle on the Saturday following the day the inquest was opened, in the room where deceased lived. She believed neither the man nor the woman were in the habit of taking laudanum. It appeared to be new, as the label was perfectly clean when she found it.

To another witness who went to see the man at the hospital, he said that he took it himself; that he went to three shops and got one pennyworth at each, and took it the day he attempted to commit suicide.

Dr. Stone said the bottle could not contain sufficient laudanum to cause the death of a human being. He had found no traces of laudanum in the stomach of the deceased when making the *post-mortem* examination, and had no reason to believe she was injured or poisoned.

A verdict was recorded that the deceased died from heart disease, accelerated by habits of intemperance.—*Echo.*

Suicide of a Chemist.

An inquest has been held at Buxton on the body of Mr. John Acton, chemist and druggist. From the evidence adduced, it appeared that the deceased had been suffering for some time past from depression of mind, but nothing to cause any alarm to the family. He got up at his usual hour on Sunday morning and came downstairs, but when breakfast was ready he was not to be found. His wife went in search of him and found him partly on the bed and partly on the floor in his bedroom. She procured assistance, but examination showed he was quite dead. A bottle of prussic acid was afterwards found in the room and an empty tumbler glass, which had evidently contained the poison. The jury found "That the deceased had committed suicide by taking prussic acid whilst in an unsound state of mind."

Mr. Acton was seventy-three years of age, and had been in the trade for fifty-five years, first at Sheffield, but for the last sixteen years at Buxton. For some years he had been exceedingly eccentric, but not so as to cause any alarm to his friends.

Obituary.

Notice has been received of the death of the following:—

On the 6th of November, Mr. Richard Thomas Stipling Bray, chemist and druggist, of Pembroke Street, Devonport. Aged 33 years.

On the 17th of November, Mr. John Acton, chemist and druggist, of Buxton, Derbyshire. Aged 73 years.

On the 13th of November, Mr. Joseph Philpotts, chemist and druggist, of Newnham. Aged 70 years.

BOOKS RECEIVED.

A Manual of Elementary Chemistry, Theoretical and Practical. By George Fownes, F.R.S. Eleventh edition, revised and corrected by Henry Watts, B.A., F.R.S. London: J. and A. Churchill. 1873. From the publishers.

Introduction to Inorganic Chemistry. With 82 engravings on Wood. By Wm. George Valentin, F.C.S. London; J. and A. Churchill, 1872. From the publishers.

Correspondence.

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

Death by Misadventure.

Sir,—In your Journal of November 16th, your report of an inquest held at Paddington is calculated to mislead the public, as it does not contain the facts of the case. The following is a more correct account of the proceedings:—

On the 6th of November, Dr. Hardwicke, coroner, held an inquest at 13, Devonshire Terrace, Paddington, touching the death of a lady named Scott, aged 74. From the evidence it appeared that Mr. Dickenson, a chemist, of Queen's Gardens, Bayswater, prepared a prescription for the deceased without the help of an assistant, and being hurried, he used solution of morphia in mistake for water. The jury, after long deliberation, returned a verdict of death by misadventure.

One of the Jury.

Evasion of the Pharmacy Act.

Sir,—The following case has recently come under my notice:—A man who has proved his inability by "being plucked" carries on the business or profession of chemist, but sheltered from the law by transferring it to another who is on the Register, thus holding out to speculative chemists on the Register an opportunity of making an addition to their income by lending their names to incompetent persons, who could then carry on business in defiance of the Pharmacy Act. Surely we who are duly qualified ought to be protected against such piracies. Am I unreasonable in asking that as the law is so stringent, it should go one step further and prohibit the sale of all medicines for internal use by any but competent persons? We should then probably hear less of accidents from laudanum given for tincture of rhubarb, arsenic for magnesia, or from over-doses of Godfrey.

Many grocers, bakers, and small shopkeepers sell patents and drugs, driving a snug trade with the former, and without a licence, that I really begin to think the time and money spent in obtaining the qualification of pharmaceutical chemist has not been well laid out, and fail to see the advantage of belonging to a Society where such palpable evasions are tolerated either from want of power or unwillingness to arrest the evil. I venture to express a hope that other chemists will take up the subject, and do all in their power to promote the suggestion "that medicines for internal use should be sold by none but qualified persons."

W. Metcalfe.

November 18th, 1872.

[*** We think our correspondent has in his own hands the remedy for such cases as are within his own cognizance.—Ed. Ph. Journ.]

Errata.—"*Specific Gravities of the Liquids of the B.P.*"—Through a printer's error a correction in Mr. Umney's article on this subject in last week's Journal becomes necessary. Page 402, col. i. line 21, the sp. gr. of "No. 4" should be 1·053 and the "available chlorine" 2·600, instead of as it now stands. "*Sirius*," also, referring to his letter on p. 420, col. i, says that he intended to have written the last line of the fourth paragraph "exempt from the payment of *more than* 10*s*. or even 5*s*. per annum."

The report of the meeting of the Manchester Chemists' Assistants' Association on the 18th inst. has been received too late for insertion this week.

"*Occult Pseudo-Scientific Influence.*"—We have received what appears to be a proof-sheet of a work in the press, containing a vigorous attack upon the germ theory and the advocates for the use of carbolic acid and the carbolates.

F. J. Barrett.—The articles mentioned by you are preparations of a poison within the meaning of the Pharmacy Act, 1868, and therefore cannot be legally retailed or dispensed by any person not qualified according to the provisions of that Act. The Act, however, does not interfere with wholesale dealings in such articles.

"*Spes.*"—Apply to the Secretary for a copy of the Regulations of the Board of Examiners.

J. A.—*Pil. Taraxaci.*—The following formula is given by Cooley:—"Extract of dandelion, 1 dr.; powdered rhubarb, q. s.; divide into $3\frac{1}{2}$-grain pills."

"*A Lover of Fair Play.*"—All the information that was in our possession at the time was published, and on our application to the coroner for further particulars he declined to furnish them.

Messrs. Macdougall Brothers.—Your communication has been received and shall have early attention.

J. Goodfellow.—Your letter has not been overlooked, but it was not thought desirable to publish it, inasmuch as you appear to be under considerable misapprehension as to the facts of the case. For instance, it is not in the power of the Pharmaceutical Society to allow a man to pass on to the Major examination without first undergoing the Minor examination, since the latter has been prescribed by Act of Parliament as compulsory upon all who enter the business as chemists and druggists. Again, it is wrong to say that any person who has passed the Major is "excluded from the list of pharmaceutical chemists, simply from not paying fees to become so titled," since every person passing the Major examination becomes thereby entitled to call himself and be placed on the Register as a "pharmaceutical chemist," and this is not at all dependent upon the payment of any fees or joining the Pharmaceutical Society. Some of the incongruities you refer to are unavoidable, having been imposed by Parliament, but they will disappear with the lapse of time.

X. Y. Z.—The deposit referred to is not due to evaporation, but probably to a chemical change which takes place in this and other proof-spirit tinctures, especially under the influence of light.

A. Wright.—Tallow is commonly purified by melting it together with water, or water containing about two per cent. of sulphuric acid. Another plan is to blow steam for some time through the melted tallow. See vol. II. (1871) p. 322.

"*Leeds.*"—Much would depend upon the nature of the substance referred to in the word translated "salt," which could scarcely have been identical with what is popularly called by that name in this country. Possibly it was an earthy matter impregnated with chloride of sodium, which "lost its savour" as the salt crystallized out. We do not know to what Mr. Maundrell refers.

"*Unus ex Alumnis.*"—As the matter is under the consideration of a committee which has not yet made its report to the Council, we think it would be premature to discuss it, but we do not see that there would be any hardship involved in a person waiting until he is twenty-one years of age before going up for the Minor examination.

"*A Minor Minor.*"—The new regulations respecting the Bell Memorial Scholarships, adopted by the Council at its last meeting (printed, *ante*, p. 367) are now in force and apply to the next competition.

Mr. J. H. D. Jenkinson is thanked for his communication.

"*Chemist.*"—The prescription sent no doubt illustrates the frequent disregard of incompatibilities by prescribers, but we do not see how such a case can be dealt with otherwise than by bringing it under the notice of the medical man.

G. Masson.—*Vermin Killers.*—If you refer to the proceedings of the Council at its meeting in August and September (*ante*, pp. 112 and 188), you will see that amended regulations with regard to vermin killers have been prepared, which are ordered to be sent to all chemists and druggists on the Register.

L. V. O.—Phosphate of iron is reprecipitated. Make the phosphate yourself carefully, and keep it suspended in water, and we think that you will obtain satisfactory results. The author of the paper referred to informs us that he has not experienced the difficulties which you name.

R. B. B.—The green precipitate is protoxide of iron, and it is formed because magnesia precipitates oxide of iron from solutions of ferrous salts.

H. E.—No reaction takes place.

"*Pharmaceutical Chemist.*"—The subject of your letter has been already considered, as you will see by this week's Journal.

Communications, Letters, etc., have been received from Mr. G. Masson, Dr. Kernot, Mr. G. B. Clarke, Mr. D. L. Jones, Mr. Shaw, Dr. J. Léon Soubeiran, Dr. Stone, Mr. S. Wylde, Mr. Pearse, Mr. Macdowell, Aberdeen School of Pharmacy, "Chemist," Edinburgh Assistant," "Pharmaceutical Chemist," R. S., N. A. K., R. B.

THE EXTRACTS CONTAINING CHLOROPHYLL.*

BY J. B. BARNES.

In the last London Pharmacopœia it is directed that the extracts of aconite, belladonna, hemlock, henbane, and lettuce are to be prepared by evaporating the juice of the leaves unstrained to a proper consistence.

The British Pharmacopœia directs the juice to be heated to 130° F. "Separate the green colouring matter upon a calico filter; heat the strained liquor to 200° F. to coagulate the albumen, and again filter; evaporate the filtrate by means of a water-bath to the consistence of thin syrup; and then add to it the green colouring matter previously separated, and stirring the whole together assiduously, continue the evaporation at a temperature not exceeding 140° F., until the extract is of a proper consistence."

This is an improvement upon the old method, for the presence of the albumen not unfrequently set up fermentation, nitrous acid was evolved, and nitrites and nitrates formed in the extracts, probably at the expense of the active principles.

With the view of ascertaining if any further improvement can be effected in these preparations, I have made a series of weighings of the insoluble colouring matter contained in different samples of these extracts, obtained from some of the principal pharmaceutical establishments in London. The results are as follows:—

EXTRACT OF ACONITE.

Samples.	Quantity employed.	Amount of Chlorophyll obtained.
No. 1	100 grains	1·5 grains.
No. 2	100 grains	4· grains.
No. 3	100 grains	4· grains.

No. 1 was of the consistence of thick treacle, the filtration went on rapidly and satisfactorily, but Nos. 2 and 3 took some days to filter, and it was found that when warm water was employed in washing out the extract, the filtrate on cooling became turbid; consequently weighings were made of the insoluble matter which had been washed with cold distilled water; they were both firm enough to roll into pills.

EXTRACT OF BELLADONNA.

Samples.	Quantity employed.	Amount of Chlorophyll obtained.
No. 1	100 grains	14 grains.
No. 2	100 grains	17 grains.
No. 3	100 grains	18 grains.
No. 4	100 grains	15·5 grains.

All these were good firm extracts.

EXTRACT OF HEMLOCK.

Samples.	Quantity employed.	Amount of Chlorophyll obtained.
No. 1	100 grains	14 grains.
No. 2	100 grains	9 grains.
No. 3	100 grains	16 grains.
No. 4	100 grains	15 grains.
No. 5	100 grains	8 grains.

Nos. 1, 2, 3, and 4, were tolerably firm, but No. 5 was unusually soft.

EXTRACT OF HENBANE.

Samples.	Quantity employed.	Amount of Chlorophyll obtained.
No. 1	100 grains	16 grains.
No. 2	100 grains	11·5 grains.
No. 3	100 grains	18·5 grains.
No. 4	100 grains	14 grains.

The consistence of the samples was good.

EXTRACT OF WILD LETTUCE.

Samples.	Quantity employed.	Amount of Chlorophyll obtained.
No. 1	100 grains	13 grains.
No. 2	100 grains	1 grain.
No. 3	100 grains	1 grain.
No. 4	100 grains	9·5 grains.

Nos. 1 and 4 were tolerably firm, but Nos. 2 and 3 were of the consistence of thick treacle.

In these experiments, excepting Nos. 2 and 3 of extract of aconite, the colouring matter was separated by dissolving the extracts in hot distilled water; transferred to tared filters, they were washed with warm distilled water until the latter passed through colourless; the chlorophyll was then dried in an air bath at 100 C. until the weight became constant. The insoluble matter in some samples of extracts of aconite and lettuce was very small, amounting to only one and one and a half per cent., and in extract of lettuce was not green but brown; whether this change is due to age or not I am unable to say.

From these varying results it is clear that extracts containing the colouring matter are not of anything like uniform strength; so much so is it the case that I venture to bring the subject before the Society in the hope that discussion will elicit opinion as to the desirability or otherwise of eliminating this cause of varying strength in preparations, which it is so very desirable should be of constant and unvarying strength.

Dr. Harley* has shown how valueless the extract of hemlock of the Pharmacopœia is, and the value he attaches to the preserved juice. It is evident from his experiments that the prolonged application of heat employed to evaporate the juice to the consistence of an extract, dissipates so much of the active principle, conia, that very little of it remains in the extract. It is not improbable that some loss of alkaloid takes place in the preparation of extract of henbane; and it is most desirable that after coagulating and separating the albumen, the evaporation should be carried on at the lowest temperature possible. As far as my experience goes I think that a temperature not exceeding 120° F. should be used, and that the evaporation of the juice should be effected in shallow evaporating pans exposed to a current of dry air, until the proper consistence is obtained.

It is undoubtedly established that the action of aconitia, atropia, and conia are identical with the medicinal properties of the plants from which they are extracted; and it is not improbable that hyoscyamia will be found to possess the properties of henbane in the highest degree.

The objections which I anticipate will be offered to any alteration in the preparation of these substances, is the absence of the accustomed colour, the increased strength, and possibly the greater deliquescence.

My answer to the first objection is that in the case

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, December 4, 1872.

* "On the Preparation of Extract of Conium of the British Pharmacopœia, 1864 and 1867," (PHARM. JOURN., vol. VIII., 1866–67).

of these so-called green extracts, it is not so very easy to distinguish between one and another, as exemplified by the answers of the candidates who come up for examination in pharmacy. I venture to state that it will not be more difficult to distinguish these proposed *purified extracts* than it is with those already in use, for, although the colour will be different, their characteristic odours will be retained.

To the next objection, that of increased strength, any inconvenience which might arise from that source will be more than counterbalanced by the very important consideration of uniformity of strength of these preparations; and in order to facilitate the use of these *pure* extracts I might be allowed to suggest their employment in the form of *liquid extracts;* hemlock, however, should be excluded on account of the volatile nature of its alkaloid.

In order to prepare these fluid extracts, it will be necessary to continue the evaporation until reduced to dryness, before they are converted into the fluid state, and of course the addition of about a fourth part of rectified spirit will be required to preserve them. I have not made any of these solutions, therefore am not prepared to say of what strength they should be made.

They would be more definite in strength than their corresponding tinctures, they would cost less, and the ease with which they could be prepared would, I am sure, be a boon to the pharmacist as well as to the medical man.

The increased tendency of these extracts to deliquesce can be met by making them firmer than those in use at present, and by keeping them in pots better secured than those commonly used. For the dispensing counter, strong glass jars with ground-glass lids would be found to answer well; and when made into pills, the apt dispenser will not be at a loss to protect them from the action of the air.

[*The discussion upon this paper is printed at p.* 458.]

APPARATUS FOR MACERATING.*

BY RICHARD W. GILES.

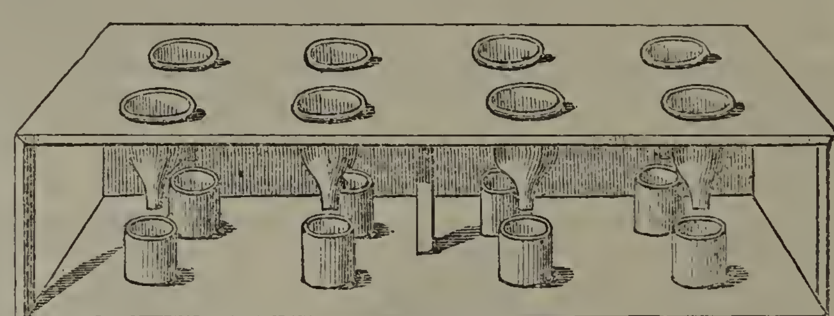
It has been suggested to me that it would be desirable to give some explanation of the model representing the simple arrangement which I have now presented to the museum of the Society, adopted for many years with increased satisfaction, for the exhaustion of drugs in the preparation of extracts, liquors, syrups, etc.; but as this has been already done when the same model was exhibited at Nottingham on the occasion of the Pharmaceutical Conference held there in 1866, I shall content myself with a very brief general description now, referring, for more detailed information, to former notices in the PHARMACEUTICAL JOURNAL,† and supplementing those communications by some unpublished notes on the preparation of extract of rhubarb, in which the present macerating process was employed.

The object of the apparatus is to obtain results similar to those which are effected by well-conducted percolation, viz., the exhaustion of the drug with the minimum volume of solvent by submitting it to successive contact with fresh portions of the menstruum. This is easily done when spirit is the solvent and the drug is in a state of moderately fine powder, but according to my experience it is not easily accomplished with *water*, which will neither penetrate ingredients in the powdered state nor exhaust them by passing through if they are not in a state of powder. A series of cones is, therefore, used, amongst which the total quantity of the substance operated upon is divided, and water is passed through the whole series, allowing sufficient time (determined by the character of the drug) for maceration upon each. When the model was previously exhibited, I thought that eight cones would prove sufficient for all substances; but I have since found it advantageous to employ at least sixteen cones when operating upon cinchona bark, and this number enables me to submit each portion of bark to sixteen macerations, and to effect a very complete exhaustion without using more water than would be required for a single maceration of the whole quantity. The completeness of the exhaustion is shown by the sp. gr. of the several infusions, of which it will only be necessary upon this occasion to quote the first and last taken from laboratory notes of two operations upon different samples of cinchona:—

Sample A.	sp. gr.
1st Liquor after passing through 16 cones	1034
16th „ „ „	1002
Sample B.	
1st Liquor after passing through 16 cones	1086
16th „ „ „	1002

I may mention that although sample B. proved so rich in extractive, the *quality* of the result was not considered satisfactory, and I agree with Mr. Umney, that cinchona barks suitable for fluid extract do not yield these large results.

The relatively small exposure to heat and oxidation during evaporation of the smaller quantity of liquid employed under these circumstances materially affects the quality of the product.



The sketch represents a stand of eight cones, and eight receivers placed beneath the cones to receive the infusions at each running off.

Each cone is about four gallons capacity, and is provided with a movable strainer fitting the delivery end, which is secured during maceration by a cork. When the cork is withdrawn, the liquor flows through the strainer. Cinchona bark is an extreme example of difficult exhaustion. In operating upon other substances I use fewer cones—sometimes ten, sometimes four, sometimes only two. In the preparation of the sample of extract rhubarb now submitted, 4 lb. *sliced* rhubarb were divided amongst four cones and treated in the following manner.

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* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, December 4, 1872.

† See particularly vol. viii. p. 220 (2nd Series).

20 oz. spirit of wine, mixed with 20 oz. of water, were passed through the cones in succession, being allowed to stand for six hours in each. About 26 oz. syrupy fluid were recovered and reserved. The spirituous maceration was followed by a succession of three aqueous macerations, which were recovered and evaporated separately to a syrupy consistence. In this way the rhubarb was efficiently exhausted with 7 pints of fluid (compared with 22 pints prescribed in the Pharmacopœia formula). The reduced aqueous macerates were mixed with the reserved spirituous liquor, and evaporated carefully in water-bath to suitable consistence, yielding as product 1 lb. 11 oz. (42·2 per cent.) of sapid and fragrant extract, which dissolves with facility in water, forming a solution which, in appearance and taste, might almost pass for fresh infusion of rhubarb. Its cost was 10*s*. 9*d*. per lb., including estimated allowance for working expenses. I have not investigated its medicinal activity; but unless it is greatly superior to that of average specimens, the practical result has been to waste 4 lb. rhubarb and a certain amount of time.

It will be seen that the above process, which differs materially from the process recommended by the Pharmacopœia, coincides with suggestions made by the President in recent papers upon the preparation of tinctures; that is to say, that it uses the spirituous solvent and the aqueous solvent consecutively (as in the Pharmacopœia process for extract jalap); and I may take the opportunity of saying that I have frequently availed myself of this mode of exhausting drugs, but I do not think it is applicable to the preparation of tinctures to the extent contemplated in the paper referred to. For example, it would not answer to macerate the ingredients for tincture of rhubarb first in rectified spirit, next in water, and then mix the resulting liquors, but a judicious application of the idea will often enable us to recover the *whole of the spirit* employed and to avoid loss of volume in the product, which, as Mr. Umney has shown in his useful table of the loss in the preparation of tinctures, is sometimes a matter of considerable importance.

[*The discussion upon this paper is printed at p.* 458.]

DISPENSING NOTE ON CHLORAL HYDRATE.*

BY J. G. PLUMER.

There have been many suggestions put forward respecting the dispensing and dose of chloral hydrate. It was first, I believe, introduced on the Continent, and has been given there in doses consisting of only five grains, principally combined with simple syrup and distilled water. But in England it is given in doses ranging from five to fifteen or twenty grains, either in the form of draught, syrup or mixture. It is generally prescribed in the form of a syrup; Tolu and other flavouring adjuncts being employed to disguise the taste. In my opinion the Syrupus Flor. Aurantii, P.B., is the best form of combination with which it can be used. It seems most effectually to avoid the sickly feeling created by the chloral hydrate; I venture to suggest the employment of a concentrated solution which may prove convenient. I find that one fluid drachm of a solution made with distilled water may contain so large a quantity as one drachm by weight of the chloral hydrate. I therefore use this formula:—

℞
Chloral Hydrat. . . . . ℥j.
Aquæ destillat. . . . . . . q. s. ad fl. ℥j.

About five drachms of aqua destillata are found necessary, and the result is satisfactory. Hence in a prescription ordering ʒij chloral hydrate, two drachms of the concentrated solution will be wanted. The convenient applications of this liquor will be obvious. Syrup of chloral hydrate in any combination may be instantaneously prepared. Thus:—

℞
Liq. Chloral Hydrat. . . . ♏ 80.
Syrup. Flor. Aurant. . . . . ʒiv.
Syrup. Simplicis . . . . . ʒiv.

The resulting syrup will contain ten grains of chloral hydrate to the drachm. Should a coloured syrup be desired, as is frequently the case, then the following formula may be substituted:—

℞
Syrup. Rhœados . . . . . ʒss.
Liq. Chloral Hydrat. . . . . ♏ 80.
Syrup. Flor. Aurant. . . . . ad ℥j.

Or,
Liq. Chloral Hydrat. . . . . ♏ 80.
Tinct. Cocci. . . . . ♏ ij.
Syrup. Flor. Aurant. . . . . ad ℥j.

An anodyne draught of any requisite strength may be expeditiously prepared; and the solution has this advantage, that although in so highly concentrated a state, it will keep without decomposition any reasonable amount of time.

[*The discussion upon this paper is printed at p.* 459]

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, December 4, 1872.

ANTIMONIUM SULPHURATUM; OFFICIAL AND COMMERCIAL.*

BY JOHN MOSS, F.C.S.,

Demonstrator in the Laboratory of the Pharmaceutical Society of Great Britain.

To prepare sulphurated antimony, the British Pharmacopœia directs that 10 oz. of black antimony shall be boiled with $4\frac{1}{2}$ pints of solution of soda for two hours with frequent stirring, and occasional addition of water to make up for that lost in boiling; then, that the liquor shall be strained off, and slightly acidulated with diluted sulphuric acid added gradually—the precipitate washed and dried.

The same authority describes the product of the above process as "an orange-red powder readily dissolved by caustic soda, also by hydrochloric acid with the evolution of sulphuretted hydrogen, and the separation of a little sulphur. Boiled in water with acid tartrate of potash, the resulting solution is precipitated orange-red with sulphuretted hydrogen. Sixty grains of this preparation, dissolved in hydrochloric acid and dropped into water, give a white precipitate, which, when washed and dried, weighs about 53 grains."

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, December 4, 1872.

The London Pharmacopœia (1851) orders 27 per cent. more of the alkali than the above, and the product is described as "golden-red." The Edinburgh Pharmacopœia also orders 27 per cent. more of alkali (in this case solution of potash) than the B.P. for the preparation of "golden sulphuret of antimony." The United States Pharmacopœia orders 35 per cent. more alkali (solution of potash); the product is called "sulphurated antimony," and is described as a "reddish-brown powder." In the French Pharmacopœia a totally different process is adopted. Sulphide of antimony, flowers of sulphur, dried carbonate of sodium, and vegetable charcoal are to be heated together in a crucible, and when effervescence has ceased, the cooled mass is to be exhausted with as little water as possible, the solution to be strained off, and precipitated with dilute sulphuric acid. The product is *Soufre Doré d'Antimoine.*

Experiments.—Having noticed that our laboratory students, when working the B.P. process, invariably obtained a product of a reddish-brown colour, I made a few experiments with a view of ascertaining the conditions necessary to the formation of the orange-red powder from the B.P. materials, viz., black antimony, solution of soda, dilute sulphuric acid and water.

The B.P. process was first tried in its integrity, and gave a product of a dark red-brown colour, almost maroon, little different in appearance from any that had been previously made by the students. In the next experiment, one lot of materials was boiled in an open dish, and another lot in a flask; otherwise the conditions under which the two experiments were conducted, were precisely similar. It was anticipated that, from the greater exposure of the materials in the dish, the product obtained from them would contain a relatively larger amount of oxide than the product of the flask experiment, and be correspondingly paler in hue. This was found to be the case as regards the colour; the proportion of oxide was not determined.

Several other experiments, 22 in all, were made, in which the B.P. process was modified in various ways, so as to include the proportions of materials ordered in the Pharmacopœias referred to above except the French, but I failed to obtain a product that had the colour mentioned in the Pharmacopœia. The one which most nearly approached the golden red of the Pharmacopœia was got by filtering the solution into diluted sulphuric acid.

In order to compare the dark red product of the B.P. process (which I shall call the B.P. product) with the sulphurated antimony of commerce, four specimens of the latter were procured from well-known establishments. The five samples were submitted to all the B.P. tests except the quantitative one.

B.P. product.—A red-brown powder, easily miscible with water, and rapidly subsiding from the supernatant liquid, which it leaves quite clear. Readily acted upon by solution of soda, but does not dissolve completely till the mixture is gently warmed, when a perfectly clear and colourless solution is obtained. From this solution brilliant crystals are deposited after boiling. Readily dissolves in hydrochloric acid with evolution of sulphuretted hydrogen; the solution is faintly opalescent from the separation of a very minute proportion of sulphur. After boiling with solution of cream of tartar, the filtered liquid gives a slight precipitate with sulphuretted hydrogen. Sixty grains treated as the Pharmacopœia directs gave a precipitate of oxychloride weighing 51½ grains. An examination of the filtrate showed that a little of the oxychloride had washed through.

No. 1.—(Labelled *Antimonium Sulphuratum*). An orange-red or orange-yellow powder, difficultly miscible with water, from which it never subsided entirely so as to leave the supernatant liquid quite clear. On mixing with solution of soda, a pale buff flocculent matter was left undissolved; on boiling, the flocks did not dissolve, but appeared to resolve themselves into a crystalline powder, and after standing for a few hours, brilliant crystals were formed on the side of the test tube; the supernatant liquid was bright yellow, evidently from excess of sulphur dissolved in the solution of sulphide of sodium formed in the decomposition. Partially dissolved by hydrochloric acid with evolution of sulphuretted hydrogen, and separation of much sulphur in flakes coloured bright red,—this colour probably due to undissolved sulphide of antimony. After boiling with solution of cream of tartar, the filtered liquid gave a considerable precipitate with sulphuretted hydrogen.

No. 1*a.*—(Labelled *Antimonium Sulphuratum*). Identical with the preceding in characters and reactions.

No. 2.—A dirty yellowish-brown powder, with pale yellow particles plainly discernible in it. Mixes with water more readily than No. 1, but not so readily as B.P. product. On mixing with solution of soda, very dark, almost black flocculent matter was left undissolved; on boiling, the flocks became paler, and afterwards the substance behaved like No. 1, which it also resembled in its behaviour with hydrochloric acid and with solution of cream of tartar and sulphuretted hydrogen.

No. 3.—Similar to No. 1 in appearance, and also in its deportment towards the reagents, except that the matter insoluble in caustic soda was of a distinct red colour, resembling calamine.

The difference, both in appearance and reactions, between the B.P. product and Nos. 1 and 1*a*, which may be taken as the representatives of the trade samples, was so marked that I made an attempt to ascertain the composition of each. After several experiments, the method finally adopted was as follows:—A weighed quantity of the sample was heated in the air-bath at 212° till it ceased to lose weight; this loss denoted hygroscopic moisture. The sample was then digested for an hour in a saturated solution of cream of tartar, thrown upon a tared filter, washed, dried and weighed; this loss was held to denote oxide of antimony. A weighed portion of the powder insoluble in solution of cream of tartar, was afterwards treated with a measured quantity of bisulphide of carbon, filtered, and the filtrate evaporated to dryness on the water-bath in a tared porcelain dish; the proportion of sulphur removed by bisulphide of carbon was thus ascertained. What remained after this treatment was presumed to be either the tersulphide of of antimony Sb_2S_3, or the pentasulphide Sb_2S_5. To determine which of the two, a weighed quantity of the original sample was dropped, a little at a time, into a long-necked flask containing fuming nitric acid, by which the antimony was oxidized to pentoxide, Sb_2O_5, and the sulphur to sulphuric acid. The contents of the flask were then washed into a porcelain dish, and excess of nitric acid expelled by evaporation nearly to dryness on the water-bath, water added, filtered, and the sulphuric acid in the filtrate determined by precipitation as sulphate of barium. Whether the amount of sulphate of barium obtained after the subtraction of that due to sulphur removed by bisulphide of carbon corresponded to ter- or penta-sulphide of antimony was then ascertained by calculation. Proceeding in this way, the following results were obtained:—

	B.P. Product.		No. 1.	No. 1*a*.	
	1st experiment.	2nd experiment.		1st experiment.	2nd experiment.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Water	2·97	2·97	1·372	1·272	1·272
Oxide of Antimony . .	3·584	3·258	35·938	38·515	37·013
Sulphur removed by Bisulphide of Carbon	·514	·532	23·975		25·725
	7·068	6·760	61·265		64·010
Ter- or Penta-sulphide of Antimony	92·932	93·240	38·735		35·990
Total	100·000	100·000	100·000		100·000

Sulphide of Antimony.—·812 gram of the B.P. product gave on oxidation with fuming nitric acid 1·538 gram of sulphate of barium, which is equivalent to ·2112 gram of sulphur. Deducting from this ·004 gram as the proportion of sulphur (ascertained by calculation from data given in the table) which would be removed by bisulphide of carbon, there is left a remainder of ·2072 gram. This is equivalent to ·7339 gram of tersulphide of antimony, or 92·189 per cent. of the hydrated salt; or to ·5118 gram of the pentasulphide, or 62·29 per cent. The antimony compound present was obviously the tersulphide.

With No. 1 and No. 1*a*, a different, and it is believed, a simpler plan was adopted. ·492 gram of the powder which remained after treating No. 1 with solution of cream of tartar and with bisulphide of carbon successively, was oxidized as previously described, and yielded 1·058 gram of sulphate of barium. Theory requires that ·492 gram of $Sb_2 S_3$ should give 1·011 gram of sulphate of barium and a similar quantity of $Sb_2 S_5$ should give 1·418 gram of the same salt. Proceeding in the same way with No. 1*a*, it was found that ·218 gram gave ·454 gram of sulphate of barium; theory requires that ·218 gram of $Sb_2 S_3$ should give ·448 gram, and that the same quantity of $Sb_2 S_5$ should give ·628 gram. These determinations show conclusively that what remains after treating the samples with solution of cream of tartar, and afterwards with bisulphide of carbon, is tersulphide of antimony. It does not follow, however, that No. 1 and No. 1*a* contain any tersulphide of antimony at all. On the contrary, I do not believe that they contain a particle of the latter salt, whilst the B.P. product contains above 90 per cent. of it. My reasons for this belief are as follows:—No. 1 and No. 1*a*, together with No. 3, are amorphous and uniform throughout, and must have been prepared by the well-known process which consists in the addition of excess of sulphur to the soda solution of black antimony whilst still boiling. Sulphantimon*ate* of sodium, a sulphide of sodium, ($Na_2 S_5$,) and hyposulphite of sodium, are formed. The first-mentioned salt on decomposition with sulphuric acid yields $Sb_2 S_5$, and sulphate of sodium, whilst H_2S escapes.

$$Sb_2S_3 + S_2 + 3\,Na_2S = \underset{\text{Sulphantimonate of Sodium.}}{2\,Na_3\,Sb\,S_4}$$

$$2\,Na_3\,SbS_4 + 3\,H_2\,SO_4 = Sb_2\,S_5 + 3\,Na_2\,SO_4 + 3\,H_2\,S$$

Sulphur is precipitated along with the pentasulphide of antimony, by the action of the acid on hyposulphite and the sulphide of sodium which are formed during the boiling.

$$2\,Na_2\,S_5 + Na_2\,S_2O_3 + 3\,H_2\,SO_4 = 3\,Na_2\,SO_4 + 3\,H_2\,O + 6\,S_2$$

It is thus that the excess of sulphur over that required to form pentasulphide of antimony finds its way into the product.

If any confirmation of the belief that antimony exists in these bodies as pentasulphide only, were required, it is found in the fact that the residue of the successive action of solution of cream of tartar, and of bisulphide of carbon, which has been shown to be tersulphide of antimony, gives no vapour of water when heated in a long narrow dry tube. For tersulphide of antimony obtained as such by precipitation from a solution, after drying at 212° F., still contains 2 per cent. of water (Fresenius). As would be expected, then, the residue of the B.P. product, treated as above, gives off water on heating.

The cream of tartar used in the above experiments was obtained by filtering a saturated solution of carbonate of potassium into solution of tartaric acid, and washing the precipitate two or three times with cold water.

Bisulphide of carbon, as met with in commerce, always leaves a slight residue on evaporation. A measured quantity of the same sample of bisulphide was used in all the estimations, and the amount of non-volatile matter due to this was deducted from the total residue.

The action of bisulphide of carbon on pentasulphide of antimony, in separating two atoms of sulphur from the rest of the compound, is very interesting, showing, as it does, that these two atoms are not so intimately combined with the antimony as are the remaining three. It also adds another to the many points of resemblance which already exist between the compounds of antimony and those of arsenicum.

From the appearance of No. 2, I believe it to be a mechanical, and not very complete, mixture of the B.P. product, with the commercial article as examined above. It does not give up so much sulphur to bisulphide of carbon as Nos. 1 and 1*a*.

The crystals which separate after boiling a solution of any of the above samples in solution of caustic soda are stated by Heffter (Watts's Dict. vol. i. p. 327,) to be antimonate of sodium $2\,NaSbO_3, 7H_2O$, and are described by him as regular octahedrons. They appear to me to be rather regular cubes or right prisms.

Conclusions.—The B.P. product is evidently the sulphurated antimony intended by the Pharmacopœia authorities to be used in dispensing prescriptions, "sulphide of antimony, Sb_2S_3, with a small amount of oxide of antimony, Sb_2O_3." There seems, however, to be a discrepancy between the product and the description of it, for few persons, I think, would distinguish it as an "orange-red powder." Further, the orange-red sulphurated antimony of trade is not, as a rule, the sulphurated antimony of the British Pharmacopœia, and therefore should not be used in making Plummer's pill, nor in dispensing, unless, of course, it were specially ordered. For these purposes the official article alone should be employed.

[*The discussion upon this paper is printed at p.* 459.]

ABERDEEN SCHOOL OF PHARMACY.

A course of lectures of an elementary character upon the practical study of materia medica, with the chemistry and botany of the Pharmacopœia, to be delivered by Dr. Beveridge, at Hospital Court, 56, Gallowgate, in connection with the Aberdeen Society of Chemists and Druggists, was commenced on Monday, Nov. 25th. The lectures will be continued on each Monday, Wednesday and Friday, at 9.30 A.M., until March 24th, 1873. A summer course of a more advanced character will be given at the same hour and on the same days, commencing on Wednesday, 2nd April, and terminating on Wednesday, the 30th July. Fee for either session 20*s*. Payable during the first week to the officer, Mr. William Adam, at the school. The library, which contains standard works on the above subjects, is open every Friday evening, from 8 to 10 o'clock.

CONVERSAZIONE OF THE NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

A large meeting of the members and friends of this society was held on Wednesday evening, November 25, in the rooms of the association, Exchange Buildings. A considerable number of objects of interest were exhibited, including some choice photographs and pictures lent by Messrs. Allen and Son, and Mr. A. Scott; the ethyl and methyl series of anæsthetics, presented to the museum of the society by Messrs. Hearon, Squire and Co.; several chemical novelties lent by Messrs. Hopkin and Williams; pharmaceutical apparatus, microscopes, and mountings of chemical and pharmaceutical substances, etc. The President exhibited a handsome collection of sponges, and Mr. Ransom, of Hitchin, contributed to the museum a fine specimen of scammony root, with the juice exuding. During the evening, the President, Mr. J. H. Atherton, F.C.S., distributed the prizes awarded to the students of last session classes in chemistry and botany, in connection with the School of Pharmacy. Previous to the distribution, the President congratulated the society on the very pleasant and successful evening they had spent, and hoped that another year they might have a conversazione on a larger scale. The present one was purely a family gathering of pharmaceutists of the town and neighbourhood. He thought that, although their family party had been so very successful, in his opinion they missed the presence of their elder brethren, the members of the medical profession. The science of medicine and the practice of pharmacy ought to go hand in hand together. The medical profession, he felt sure, would cordially respond to an invitation to meet their pharmaceutical brethren on such an interesting and social occasion as the present one. Another year he hoped to have a similar gathering, and invite all interested in pharmacy to be present. Such meetings would be productive of much good.

The prizes were distributed as follows:—

Botany.	Inorganic Chemistry.
Mr. Bothamley, 1st.	Mr. F. Lumley.
,, Isaac Grey, 2nd.	,, Ward.

Prizes from the Science and Art Department.

Mr. J. Stephenson	Queen's prizes.
,, Williamson Widdowson	
,, Reuben Widdowson	
,, Isaac Grey	
,, F. Lumley	Certificates.
,, W. P. Bothamley	
,, Ward	

The President announced that prizes would be given by the Council to the most proficient in Dr. Souter's class at the end of the session, and also that Mr. Williams had offered a prize for dispensing, which would be awarded to the candidate who excelled in neatness and correct manipulation.

THE HULL CHEMISTS' ASSOCIATION.

The annual dinner of the members of this society was held on Monday evening, December 2nd, at the Cross Key Hotel. The chair was occupied by Mr. Anthony Smith (president of the association). The usual prefatory toasts having been duly honoured,

Dr. J. H. Gibson proposed "Success to the Hull Chemists' Association." It was not many years since the chemists and druggists were looked upon as a rope of sand; having no conjoint action or thorough understanding amongst each other. But of late years they had been endeavouring to combine for most excellent objects,—first, that those who entered the trade should be better educated. And he believed the system now laid down by the chemists and druggists of Hull would become more perfect than any line of procedure they had hitherto pursued. Then they combined for self-protection in trade, which was an object he also much applauded.

The President, in responding to the toast, said no one felt more than he did the necessity for association; in this respect the Hull Chemists' Association had worked wonders by establishing a system of education for apprentices not surpassed by any in the kingdom, and he had every reason to believe it was highly appreciated by them. There was not the slightest doubt that it would ere long bear fruit, in sending up some medalist or first-class man who would reflect credit upon the town of Hull. They should, however, not study merely the education question, but study themselves, and cast off that coldness and those petty trade jealousies which had existed so long amongst them.

Mr. Oldham proposed "The Healths of the Vice-President, Mr. Earle; the Hon. Secretary and Treasurer, Mr. C. B. Bell, and the Committee." Mr. Niven proposed "The Medical Profession," associating with the toast the name of Dr. John Hare Gibson. The President proposed "The Healths of the Lecturers, Messrs. Niven and Parsons."

The health of the President was then proposed by Dr. J. H. Gibson, and acknowledged by Mr. Anthony Smith, who subsequently proposed "The Pharmaceutical Society of Great Britain."

The Pharmaceutical Journal.

SATURDAY, DECEMBER 7, 1872.

Communications for this Journal, and books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Elias Bremridge, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE AMENDED REGULATIONS OF THE BOARD OF EXAMINERS.

We are glad to put before our readers to day, in the report of the Council Meeting of the 4th inst., the altered form of regulations agreed on by the Council, whose duty it is, conjointly with the Board of Examiners, to frame or alter such regulations as may be required from time to time, to be observed in the examinations held under authority of the Pharmacy Acts.

We are the more pleased to be able to do this thus early, because much unnecessary alarm appears to have been raised in some quarters by the rumour that some alteration was about to be made. This was perhaps but natural, as everybody knew that in the early days of compulsory examination the greatest possible leniency had been exercised, on the understanding that as time wore on, the examinations would advance gradually to their proper standard. *It was hoped also that students would progress in a corresponding ratio.* Every change therefore in the examinations must necessarily be upward, and there is always a dread of change under such circumstances. But having looked through the new order, we confess that we see very little to alarm our young friends. The only addition to the "Preliminary" is, "*a thorough knowledge of the British and Metrical System of Weights and Measures.*"

Passing to the Minor, there is apparently more change; and at this we are not surprised, because that is of all examinations the most important, when considered in reference to the relationship in which the Council of the Pharmaceutical Society, as an educative body, stand towards the public. The Preliminary, though not referring to anything specially pharmaceutical, is of the utmost consequence, as securing an adequate foundation on which, and by the help of which, to build up a sound technical education. The Board of Examiners already accept the certificates of other examining bodies, and according to our thinking if all students were compelled to bring such certificates—provided always that the Council approved none but high-class examining bodies—it would be better for the great object of the Society in introducing lads of superior education to the trade. We hold any chemist culpable who signs indentures with an apprentice before he has passed the Preliminary examination. The "Major" is an honour to which every pharmacist who desires to take high rank among his fellows,—and as a fair inference to be more highly esteemed by the public,—must in future direct his course. But when a man has passed the "Minor," he goes to the world certified by the Board of Examiners that he is a fit and proper person to be entrusted with one of the most responsible duties which one man can perform for another. It is here that the Dispensing Chemist ceases to be a mere tradesman, buying and selling for gain only to himself; he has to exercise professional skill and knowledge on behalf of suffering humanity, and on his possession of competent skill and knowledge often hangs the life of his employer. To say then that such a person shall be able to detect *errors* and *unusual doses* and have *a general knowledge* of *Posology*, is saying no more than is absolutely necessary. The expression is a little enlarged from the old regulation verbally; but it really seems to us that when an examiner had the power to put a candidate to the proof as to "*unusual doses*," he must be virtually testing him in *usual* doses. The knowledge required under the head of "Pharmacy" seems an improvement; it is more important even that a man should know how simple substances are compounded, and *why* they are compounded in a certain manner to obtain a proper result, than that he should be able to run off the ingredients of a compound on his finger-ends from mere recollection of what he *read* in the Pharmacopœia. In the matter of Chemistry, it seems to have been deemed necessary to advance somewhat further than in the other subjects of examination, but not further than is desirable now that men may if so minded, stop short after this examination. We incline to the hope that the slight advance in chemical knowledge required at this stage may tempt men onward to further study, and consequently the higher examination, which, by the way, seems under the new system somewhat curtailed.

Taking the whole alterations, we think the framers of these regulations were impressed with the necessity of making the examinations more *practical* than they have hitherto been; and we are particularly led to this conclusion by the proposition to insist on the attainment of full age before coming up as candidates for the Minor examination, the attainment in fact of man's estate before assuming man's rights as a citizen. This we suppose must be a matter of Byelaw, and when to it is added the certificate of having passed three years in the practice of dispensing, a great safeguard for the public will have been secured. It is ordained that the new regulations shall not come into operation until October, 1874. Six years will then have elapsed since the passing of the Pharmacy Act of 1868; and while, on the one hand no apprentice or student who has commenced his career in Pharmacy during that time can say that he entered the business without knowledge that he must pass through a certain ordeal before commencing business on his own account; on the other, we think no assistant who entered previously, and has not yet availed himself of the earlier opportunity to pass, can complain of undue haste in the Council in endeavouring to fulfil their pledge to the public, *that in consideration of the privileges accorded to Chemists and Druggists, a duly qualified class of men should be provided to undertake their important duties.*

There will be an examination for scholarships at Sidney College, Cambridge, on Tuesday, April 1st, 1873. Among the scholarships are two of £40 per annum each, for Natural Science, the following books being recommended:—Heat and Electricity, —Ganot's Physics; Chemistry,—Roscoe and Galloway's Qualitative Analysis; Geology, —Lyell's Students' Elements; Zoology and Physiology,—Nicholson's Manual of Zoology, and Huxley's Lessons in Physiology; Botany,—Bentley's Manual.

The Secretary of the Pharmaceutical Society has received a letter from Mr. Simon, the Medical Officer of the Privy Council, intimating their Lordships' approval of the appointment of Mr. William Martindale, of London, Pharmaceutical Chemist, to be an Examiner in the room of Mr. Augustus Bird, resigned.

It is with pleasure we are enabled to state that the first of Dr. Tilden's pupils who has competed has gained a scholarship of the value of £80 a year for four years' in Natural Science.

At the sitting of the Académie de Médecine, on the 19th November, a commission reported upon a new manuscript work on the Chinese materia medica, by M. Dabry de Thiersant, consular agent of France in China, and M. Léon Soubeiran, Professor at the Paris School of Pharmacy. The work is said to contain not only much that is curious, but also valuable information respecting therapeutic agents in use by the Chinese, which are worthy of further investigation by Europeans. The commission complimented the authors upon having made a real advance upon all analogous works previously published, and recommended that the Academy should request the Minister of Public Instruction to have it printed at the public expense.

The Lord Mayor has appointed Friday next, December 13th, for holding a meeting in favour of the Anti-Income Tax Movement, at the Guildhall.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

December 4th, 1872.

MR. A. F. HASELDEN, F.L.S., PRESIDENT.

Present—Messrs. Atherton, Baynes, Bottle, Betty, Frazer, Greenish, Hampson, Hills, Owen, Radley, Sandford, Savage, Schacht, Shaw, Stoddart, Sutton, Urwick and Williams.

The minutes of the previous meeting were read and confirmed.

The Jacob Bell Memorial Scholarships.

Mr. Atherton asked when the new regulations respecting the Bell Scholarships would come into operation.

The President: In July next.

Mr. Atherton said in that case he feared many cases of hardship, if not injustice, would occur. He knew of one young man at Nottingham who, having communicated with the Secretary, and being informed that his position as a candidate for the Jacob Bell Scholarship would not be affected by his passing his Minor examination, came up for examination accordingly, and passed. Now it appeared that he would be excluded from the Scholarship. There might be other cases of the same kind; and he thought it would be better if the new regulations did not come into operation until 1874.

Mr. Williams thought if the matter were right to be done at all it should be done at once.

Mr. Urwick said he knew of cases in which young men had been preparing themselves to compete for the Senior Scholarship, and were now much disappointed; although, of course, the chief benefit of their studies would still remain to them.

Mr. Savage suggested that the rules should come into operation in July next, but that they should not have any retrospective effect on those who had been preparing for it.

Mr. Hampson said the character of the examination had been entirely altered, so that those who had passed the Minor examination would be almost sure to compete successfully with other candidates.

Mr. Atherton said the young man he referred to was, he believed, just twenty years of age. It was his intention to compete for the Bell Scholarship, and relying on the letter of the Secretary, he had passed his Minor examination.

The Secretary said he was quite under the impression when he wrote that the new regulations would not prejudice the case of the young man who applied to him.

Mr. Sandford suggested that Mr. Atherton should give notice of motion for next month that the regulations should not come into operation until 1874.

Mr. Atherton said he would do so.

Mr. Schacht said it must be understood that the entire change in the regulations should be suspended.

After some further conversation, it appeared that no date had really been fixed for the new regulations to come into operation.

Mr. Bottle thereupon moved:—

"That the alterations in granting the Bell Scholarships adopted by the Council on October 2nd, 1872, and the further alterations adopted on Nov. 2nd, 1872, do not take effect until after the award in 1873."

Mr. Greenish seconded the motion.

Mr. Baynes said he should oppose the motion unless it were understood that the Senior Scholarship was also retained in the next competition.

Mr. Schacht and Mr. Hampson supported the motion, which was then put to the vote with the following result:—

For—Messrs. Atherton, Baynes, Betty, Bottle, Frazer, Greenish, Hampson, Hills, Owen, Radley, Sandford, Savage, Schacht, Shaw, Stoddart and Urwick.

Against—Mr. Williams.

The President did not vote.

PROVINCIAL EDUCATION.

Mr. SCHACHT, in consequence of there having been no meeting of the Provincial Education Committee during the past month, proposed that two applications which had been received from Aberdeen and Leicester should be considered by the Council at once.

Mr. SANDFORD seconded the motion.

Mr. WILLIAMS moved an amendment, which was seconded and carried, for referring the matter to the Committee in the ordinary way, on the ground that it would occupy too much time to discuss these applications at the Council Board.

APPOINTMENT OF ANALYSTS UNDER THE ADULTERATION OF FOOD, DRUGS, ETC., ACT.

DEPUTATION TO MR. STANSFELD.

The PRESIDENT said no doubt the Council had seen a report in the newspapers of a deputation of medical gentlemen to Mr. Stansfeld, one of their resolutions being that chemists and druggists were not competent for the appointment of analyst under the new Adulteration Act. Mr. Stansfeld's reply was that an ordinary chemist and druggist was not competent, and that he did not imagine any such persons would be appointed, He (the President) thought this applied equally to ordinary medical men, that there were among chemists and druggists many quite qualified and eligible for the appointment, and that a deputation on the part of the chemists and druggists should wait on Mr. Stansfeld to urge their view of the matter. The Vice-President, he might say, was also of this opinion.

Mr. SAVAGE thereupon moved that a deputation be appointed to wait upon Mr. Stansfeld on the subject at the earliest possible opportunity.

Mr. HAMPSON seconded the motion, which was carried unanimously, and the President, Treasurer, Messrs. Sandford, Greenish and Betty, the Secretary, and the Society's Solicitor, with power to add to their number, were appointed the deputation.

AMENDED REGULATIONS OF THE BOARD OF EXAMINERS.

The amended regulations, as proposed by the Board of Examiners, were submitted.

Mr. SCHACHT said that as a member of the General Purposes Committee which had met a deputation from the Board of Examiners to consider this matter, he would propose the adoption substantially of the recommendations. All who were present at the large committee meeting would have heard the subject so fully explained by Mr. Carteighe, who perhaps had taken as much interest in the matter as any of the Board of Examiners, that it was not necessary to go into it again. Broadly speaking, however, there were two or three essential points for consideration. In the first place, there was a certain limit of age in the candidate for the Minor examinations, and the necessity of producing a certificate of having been engaged a certain time in the practice of pharmacy. That was one point of the utmost consequence. Then, again, there was a general shifting of the subjects in which the candidates were to be examined—some being taken altogether out of the Major, and thrown altogether into the Minor—and there was an apparent excess of matter urged upon the candidates for the Minor examination. The first topic seemed to be the one of by far the most importance, and to it he felt inclined most warmly to accede. The proposed change seemed a most wise one, and not only wise in itself, but in accordance with the spirit of the Act of Parliament which gave them power to examine at all. In fact, the opposite course seemed to be involved in absurdity; that that Society, in whose hands was vested the power of determining on behalf of the public who was or was not competent to carry on the business of a chemist and druggist, should be able to empower any young man, at the age of sixteen even, to do so was a simple absurdity; and it could not be other than in accordance with the intention of the Act of Parliament, that they should require such persons, who were to be stamped, as it were, with their certificate, to be of the mature age of twenty-one. The necessity, that candidates should pass a certain portion of the previous years in practical pharmacy, was what all recognized as positively necessary when themselves engaging assistants, and it was only fair to insist upon the same thing before allowing any one to practise his profession for the benefit of the public or otherwise. The alterations proposed in the Minor examination were not so great as might appear, and one or two points certainly seemed quite sensible, and only such as ought to be required by those in whose hands the public safety was placed. The small extra modicum of science could not be objected to by any one, and he thought the whole changes were in that direction which had been of late much clamoured for, namely, to prove whether a candidate had a practical knowledge of his business. He believed there was some little difference of opinion whether they had power to make these changes, and with that view he had framed his resolution, so as, if possible, to limit the expression of the opinion of the Council to the principles involved. And as there was also an idea in some minds that by carrying the regulations as they stood, they should be pledging themselves to the existing arrangement of fees, which was quite a different question; he also intended to exclude that subject. If those two elements of difficulty were eliminated from the question he could not but hope that the proposition would be unanimously carried in this form.

> "That the proposed amended regulations of the Board of Examiners with the omission of all words relating to fees, be adopted, and that the question as to the Council possessing the legal power to carry the proposed alterations into effect be referred to the Parliamentary Committee."

Mr. STODDART seconded the resolution with much pleasure. He knew two or three instances at the present moment of young men who had passed the Minor examination, which qualified them to keep open shops as chemists and druggists, who did not really know how to carry on the business at all. The fact was they had been apprenticed to masters who had rather taught them to come and pass the examination than how to carry on their business, so that they really were not qualified. That at any rate showed the necessity for requiring three years' experience before passing the examination, and his own opinion was that a young man ought to know his business first, and then come and pass the examinations afterwards. He had carefully looked over the amended regulations and could see nothing at all to make them too difficult unless it were the few words under the head of botany relating to the "arts and domestic economy." There was nothing there difficult in itself, but it might give the examiner the power of making the examination very difficult indeed.

Mr. FRAZER moved an amendment,

> "That the proposed alterations in the character of the present examination be not adopted."

He said he did not do so without serious consideration, and he was very sorry Mr. Mackay was not present, because he knew he took the same view. He would not go into the minutiæ of the matter, but he did not think any circumstances existed at present warranting a change. He was not aware that the present examinations had proved inefficient, though of course, isolated cases might occur, just in the same way as medical men occasionally proved inefficient to perform the responsible duties cast upon them, even although they might have passed a stringent examination. Generally speaking, however, he did not think the public safety had suffered from the inefficient conduct of their businesses by those who had passed the Minor examination, nor did he think the Privy Council would permit any increase in the stringency of the examination. At the time the Act of Parliament was passed, the Minor examination was intended for assistants, but the Privy Council stepped in and insisted that men who passed it should be allowed to conduct business on their own account, and he believed the same motives which actuated them then, would operate now to prevent what he maintained was a very considerable increase in the stringency of the examination. If changes were to be introduced, there was no doubt there would be a considerable diversity of opinion as to what the changes should be, as there had been with regard to the educational question. Some time ago this matter had been very much discussed in Manchester, and great difference prevailed as to what should be done. Even with the present examination, it was well known there was a great difficulty in getting apprentices. This was found to be the fact in Glasgow, and it was the same in Edinburgh, and he had the testimony of men all over the country to the same thing. Of course there might be exceptions as there were to every rule, and there was also a difficulty in getting young men at the termination of their apprenticeship on account of the stringency of the examinations and the expense of the fees. It had been stated that at the present time there was a much larger number in the trade than was either profitable or necessary, but there could be no doubt, if these changes were carried out, by-and-by it would be found that men could not be obtained to conduct the business, and they would have to take down their shutters themselves. The reason was very plain. The classes from whom they had hitherto derived their apprentices and assistants could not afford to give their sons the education necessary to fit them for these examinations, and the classes above them would not put their sons to such a business. He himself was giving his own son a university education, but he questioned if there were more than three or four young men in Scotland preparing for the business who enjoyed the same advantage. No doubt the business was rising in importance, but so were others in equal proportion. The present regulations had only been four years in existence, and he certainly thought it was too soon to make any change. In confirmation of what he had said with regard to the difficulty of getting assistants, he might add that he had recently heard from one of the large wholesale London houses that even they had now a difficulty in getting assistants, and had to look to the country for them, instead of having a list of applicants to select from, as had formerly been the case. He had no objection to any amount of science being introduced into the profession, and, for himself he regretted that the Senior Bell Scholarship was to be abolished; but still he did not want the compulsory examinations to be higher than the safety of the public demanded. Some persons might think there were too many in the trade, and that if there were less it would be better for those who remained, but still they were bound to act in accordance with the views of their constituents, and not to exclude young men who were not prepared for such stringent examinations, especially considering that even now the Senior Bell scholars were leaving the business and getting into better occupations. Very recently there had been a meeting in Edinburgh of some of the most highly qualified men in Scotland, when there was but one feeling, that the present examination should not be interfered with.

Mr. Hampson, in seconding the amendment, said he was one of the last men who objected to any real advance in pharmacy, or to do anything which would prevent its development in this country; but besides the advancement of pharmacy they must look at the matter from another point of view, not only as pharmacists but as traders; and he wished the Council to pause before sanctioning the great step proposed in the contemplated alterations. Only three or four years had elapsed since a very great change took place, viz., the passing of the Pharmacy Act, which of itself was a very important step as affecting the trade, and he thought it very unadvisable that another change should be made so soon. The examinations as at present conducted, he believed, were not inefficient to test the qualifications of men who had to conduct our business; and it must be borne in mind also that they were not legislating for Prussians or Frenchmen, where the whole influence of the State was exercised to support pharmacy, and to give it a proper status. In the majority of businesses throughout the country a very small amount of pharmacy proper was transacted in a chemist's shop; and until there was a larger amount of real scientific work to do, it was exceedingly premature to take such a step as this. No doubt these regulations had been proposed by the examiners with a good object, and were very suitable for the purpose they intended, but notwithstanding that he believed they were unnecessary and unadvisable. Then, again, the legal obstacle had been referred to, and had not yet been cleared up. It was intended to exclude all who had not passed a period of pupilage; but this, in his opinion, was a retrogressive step. Medical men were now doing away with the system of pupilage, considering it unimportant; and considering that about 99 per cent. of the candidates had passed through an apprenticeship, which was the natural inlet to the trade, he did not think it necessary for the sake of the hundredth to tie their hands in such a way. The London trade were well represented in the Council, and in consequence of the large amount of pharmacy which passed through their hands, they might be disposed to take a partial view of the question; but they must bear in mind the character of the trade throughout the country, and he believed if all country chemists were obliged to pass these examinations, the test would be altogether out of character with the condition of things. There was another important point to be remembered, the number even now leaving the trade. It will be said from a selfish and purely interested point of view, that it would be a good thing for those who remained; but the interests of the public must also be borne in mind. Rather than come to a decided vote on the matter that day, he should much prefer the question being postponed; for he did not think they were competent to settle it in a hasty manner, and most certainly he thought any such change was unadvisable for some years to come.

Mr. Savage said there was one point which presented an obstacle to his mind, namely, the age being fixed at twenty-one. If a boy were apprenticed at sixteen he seldom continued more than four years, which left him one year before he could pass his examination; and he was never so likely to succeed after that interregnum as he would be during his four years of apprenticeship. He thought if a boy were qualified after four years of apprenticeship to pass his examination, it was rather hard that he should be prevented doing so. In the main, however, he agreed with the amended regulations. With regard to the difficulty of getting apprentices, it was probable that under the new state of things there might be even less than there was at present, in consequence of the profession being more appreciated.

Mr. Baynes, as a country member, said while there was much that commended itself to his own mind in the new regulations, he did think they were attempting the alteration much too soon. They had already postponed the operation of the amended regulations with regard to the Bell Scholarships lest they should do injustice to individuals, and it was quite as likely there were many persons to whom this change would also prove a great injustice. The Pharmacy Act of 1868 took by surprise many young men who never expected to have to submit to an examination at all, and an increased stringency would not only be an injustice to these young men, but would arouse a feeling throughout the country that as alterations were being made so soon, others would be made later, and altogether young men would be deterred from turning their attention to the business at all. It must be remembered that in many country places the amount of pharmacy proper was very small indeed, not half a dozen prescriptions, perhaps, being seen in the course of a week, so that a great part of the work of the chemist's shop might as well be done by a porter. If these examinations were made too strict, the result would be the calling into existence of a class of men, not calling themselves chemists, who would retail drugs. Even at the present time, many grocers were selling drugs and chemicals, and the trade was being cut up not only by co-operative stores but by other traders. Making the qualifications too high would be only holding out a premium for irregular trading. He should be glad, therefore, if the question could be postponed *sine die*, especially as all those to whom he had privately mentioned the subject agreed that it was quite a mistake to attempt any further alteration at present.

Mr. Atherton, as another country member, did not think there would be any objection raised within the district he was acquainted with to these regulations being passed almost as they were. In fact, they were not increasing the rigidity of the examinations, but only making them more practical. He did not see that the passing of the Pharmacy Act was any injustice at all, but a very proper measure; and it really had the effect of lowering the examination, because the qualifications which now enabled a man to conduct a business were previously only intended for assistants, those who intended to carry on business themselves being expected to pass the Major examination.

Mr. Urwick did not think sufficient weight had been given to the opinion of those who had proposed the alterations, namely, the Board of Examiners, who were, perhaps, the best qualified to form a judgment on the matter. They seemed to think that the time was come when rather more should be required of those who presented themselves for examination, intending to carry on business, and he could not agree that men did not know they would have such an examination to pass. Most of those who had entered the trade ever since 1844 or 1845, should have looked forward to passing the Major examination; the Minor, which now qualified a man to commence business, was not so stringent as the Major. It was only proper that the public should be protected by a severer test being imposed, and he did not see that the complaint could be raised by those who were chemists and druggists and conducted country businesses, inasmuch as they had time given them to give notice of their intention to pass the modified examination. In his opinion, also, the examiners had the power of requiring almost as much (save the practical part) from the candidates under the present regulations if they thought fit; and the alterations appeared to be proposed more with the idea of making the change public, so that young men might see what would be required of them. At the same time, he agreed with Mr. Savage that the age might be reduced one year, for he thought any one might learn the business in three years if he had common sense and application.

Mr. Williams said that these new regulations really arose through the past action of the Council itself. About a year and a half ago the Council were forcibly impressed from what occurred out of doors, as well as what they heard in other ways, that the examinations were not anything like what they ought to be; Mr. Siebold, of Manchester, for instance, expressing an opinion that they were a sham. The consequence was that a deputation of the Council met the Board of Examiners, who were then of opinion apparently that no alteration was required; but the question being argued at some length, the Board of Examiners took a different view, and the result was that, after much consideration, these improved regulations had been proposed. The attempt had been, not to make the examinations more stringent, but to make them more consistent; and he believed this was their real effect. The present regulations required a man who went up for the Minor to be examined in prescriptions; but there was no power of examining him as to unusual or poisonous doses or in mistakes. Now, it was certainly very inconsistent to give a man the power to carry on business, when he had not completed his examination in such a necessary subject. The Council had impressed upon the Board of Examiners that they should make the Minor as purely practical as possible, so that a man who had passed some time behind the counter of a good house of business ought to be able to come and pass his examination without the necessity of cramming or resorting to other extraneous sources. At the same time, it was felt that the Major should be made if possible the test of scientific acquirements, whilst the Minor was the test of practical knowledge. In that way he believed they would be carrying out the intention of the Act of Parliament and doing their duty both to the public and to themselves, which, he believed, with the present examination they did not do. He would only add that he might take exception verbally to some of the regulations; but he would not do so considering that the whole matter had been carefully gone into by the Board, who were really the best judges of the matter.

Mr. Owen said, though he did not wish in any way to oppose the advancement of pharmacy, he could not forget what had been said by Mr. Baynes and Mr. Hampson, who had an extensive knowledge of country businesses. He could also speak as to the difficulty of getting assistants, particularly juniors, and thought any further restriction would be a great mistake, especially considering the short time since the Act was passed.

Mr. Radley, as a country member, said the new regulations recommended themselves very strongly to his judgment, and he did not anticipate any difficulties whatever being raised in the country, for he believed they would meet with general approval. The certificate given to a young man entitled him to commence business, and there was certainly nothing in the new regulations which was not necessary for him to be examined in, nor did he see anything to be objected to. He had spoken to some of his friends in the country on the matter, and they agreed that it was perfectly right that the examination should be improved.

Mr. Shaw said it always appeared to him that the Act of 1868 was defective in certain respects, especially in allowing a young man to be examined at any age, either fifteen, sixteen, or seventeen. It might, however, be a question whether twenty should not be substituted for twenty-one.

Mr. Williams said there were reasons why it could not be done.

Mr. Shaw said that requiring three years practical experience was a very good feature, for he had it on the authority of Professor Attfield that those who had had no practical experience in a shop were the very persons who endeavoured to get through their examinations by means of cramming. In his opinion it was desirable that the Minor examination should be made as stringent as possible, seeing that the passing of it entitled a person to undertake the dispensing of medicine. It was true at the time the Act was passed the Government did not wish that the Major examination should be a business qualification, but it did not necessarily follow that that should be understood to apply to all future time. Under the head of chemistry in the Minor examination there was the word "practical" in italics, which he should like to have some definition of, because, as it stood there, it appeared to him that it might be construed to mean that the candidate must have been practically engaged in a chemical manufactory.

The PRESIDENT said he did not suppose any such thing was intended, but it only meant that the candidate should possess a knowledge of how certain articles, such as quinine or bicarbonate of soda, were produced.

Mr. SHAW said he only wanted it made clear, so that there might be no mistake about it. With regard to the objections which had been made, he thought the change would improve the *status* of the profession, and induce young men to come into it, knowing that they would occupy a higher position than they had hitherto done. In that way he hoped they might in time arrive at a greater unanimity in charges for the greater benefit of the whole trade. If, on the contrary, they enabled young men to come in on very easy terms, they would only be perpetuating the evils which had been in existence for the last thirty years. He should therefore vote for the adoption of the new scheme, especially considering that the Board of Examiners so strongly recommended it.

Mr. SANDFORD said a great deal had been said about its being proposed to change the examination at the present time, but in October, 1873, when the new regulations would come into force, the Pharmacy Act of 1868 would have been in operation five years, and therefore they could scarcely expect any young man who was apprenticed at that time would be injured by them, and any who had entered the trade since had come in knowing that such examinations must be passed. Still, he should have no objection to the date being altered to 1874, if it were desired, which would give them six years. He should advocate the adoption of the resolution, especially considering that Dr. Greenhow, the Government visitor, had expressed himself in these terms in his Report: "In my first report on the Examinations of the Pharmaceutical Society I stated that the Minor examination was in my opinion as stringent as could with fairness and practical advantage be enforced at that time. Three years have, however, now elapsed since the provisions of the Pharmacy Act came into operation, and there could be no hardship provided due notice were given beforehand, if at the end of another year candidates for the Minor examination were to be examined practically as to their ability to determine by means of the proper tests, the presence of the acid and base in solutions of one or more of the salts commonly used in medicine, or to ascertain the purity and strength of some of those officinal articles most likely to be impure or to vary in strength. This addition to the present subjects of examination seems the more desirable when it is considered that candidates who have passed the Minor examination and been registered as chemists and druggists, are thereby qualified to keep shops for the retailing and dispensing of medicines." Now that was a very important point. The position was altered altogether. A young man was now sent out into the world as a safe dispenser to be trusted by the public, and that altered the question very much. It had been proposed that the age should be twenty, but their solicitor informed them that it was really a question whether a man before the age of twenty-one had any right to be examined at all. Until that age he was only an infant, and was not entitled to the privileges of a "person" as mentioned in the Act. He believed twenty-one would be a very good age, because it would almost ensure a certain period of practice in dispensing. It had occurred to him as a desirable regulation, that three years, or four, might be required between the passing of the Preliminary examination and the passing of the Minor, which would also have the effect of ensuring only properly educated youths coming into the business.

Mr. SUTTON asked if that would be legal.

Mr. SANDFORD said he did not know of any illegality in it. They already provided that a man could not come up for the Major until three months after passing the Minor, and it would be just as legal to say three years as three months. He merely threw out what seemed to him a good way of securing the Preliminary examination being passed at the commencement of the apprenticeship. With regard to the alterations themselves, he could not see very much difference between them and the regulations in the Calendar which he held in his hand, and he agreed with what had been said, that the examiners might have made the examinations just as stringent under the old as they could under the improved regulations. They had transposed a certain part of the old rule headed "Practical Dispensing" to "Reading Prescriptions," and had added 'to detect errors, discover unusual doses, and have a general knowledge of posology; also to render in good Latin prescriptions written in English." In the old form it was to translate prescriptions, and detect unusual doses, and to render literal as well as appropriate translations of the directions for use. Now here they had to render in good Latin prescriptions written in English. All that was perfectly necessary, for it was well known that errors did occasionally occur in prescriptions, and the detecting unusual doses was the same thing as detecting errors. That, therefore, was very little more than there was before. Then in the pharmacy clause, they had added and to give "the best excipients and methods of manipulation for forming emulsions, pills, etc.," and also "to give the proportions of the active ingredients, and possess a practical knowledge of the processes" for making certain preparations. Formerly they were asked to give all the ingredients in certain preparations, but it was of much more importance that the student should know as well as the principal ingredient in what way the preparation is made. For instance, to take confection of senna it was more important that the young man should know how to make it than that he should know the exact weight of figs to be used. The materia medica clause stood as before. In the botany clause Mr. Stoddart took exception to the words "domestic economy," and he believed any little matters like that the examiners would only be too glad to alter if necessary. The clause relating to chemistry did seem stiffer than many would like; it stood "to determine practically, by means of tests, the presence in solution of the chemicals in common use, and explain the reactions which occur in each case. To possess a general knowledge of the laws of chemical philosophy" (which seemed a rather wide expression), "and a practical knowledge of the means of determining specific gravities, densities and temperature, and of the instruments appertaining thereto, and the physical and chemical constitution of the atmosphere." He did not know how that could be modified in any way, it was at any rate not more than a man ought to know. He had certainly met with such lamentable errors in the examiners' room as perfectly startled him. He had heard from the President the other day that in a prescription put before the young men who came to be examined, the word *incipiens* occurred, and coming under one of the examiners there was only one man who translated it correctly.

The PRESIDENT: And that prescription has been before the candidates for the last ten years.

Mr. SANDFORD said in his own experience he had met with the most gross errors in translating directions for use, which showed very clearly that they wanted better educated youths in the first place, and that after a certain time they should pass a good examination before they were entrusted to dispense medicines for the public.

Mr. WILLIAMS said that at a late meeting of the Board of Examiners he understood one of the questions put was this, something was to be evaporated in a water bath, and the question being asked what was the temperature of the water, the young man said he did not know, he did not expect that question.

Mr. BETTY said he was sorry the regulations had not been taken clause by clause, so that whatever was open to objection might be pointed out and everything considered on its own merits, especially as it would be most invidious and distasteful to reject *en masse* the whole scheme. However, Mr. Sandford had gone through most of the details, and said exactly what he should have done if necessary, and therefore he would only add, that he hoped they would vote almost unanimously in favour of the new regulations, which he believed would thoroughly stand the test when they came to be applied.

Mr. Bottle said the time had now arrived when it was the duty of the Council to vary the examination in accordance with what was palpably the intention when the Act was obtained. The 6th section of the Act of 1868 stated that the examinations should be such as were provided for and contemplated by the Act—there were no assistants under that Act—"or as the same may be varied from time to time by any bye-law to be made in accordance with the Pharmacy Act as amended by this Act." So that clearly the Legislature intended at that time to adopt what was then held to be the qualification for assistants, in order that they might not take any one by surprise in being called upon to pass an examination, but that they should have reasonable time to prepare for something better. The preamble of the Act said, "Whereas it is expedient for the safety of the public, that persons keeping open shop for the retailing, dispensing, or compounding of poisons, and persons known as chemists and druggists, should possess a competent, practical knowledge of their business;" and further, that they should be duly examined as to that practical knowledge. He maintained that the alteration proposed was nothing more than asking men to show that they were practically acquainted with the business, and all this might fairly be expected of them. Mr. Sandford, however, had taken up the position which he was about to take in asking to defer, until 1874, the introduction of this new regulation. He thought that was only fair, and would give longer notice to those who were now preparing for examination. As to the observation that it was utterly impossible to expect the pupils of country chemists to pass the improved examination, he thought that if any pupils ought to pass such a one, they were the pupils of country chemists, for if their masters knew anything at all, they had more time to teach it than those engaged in business in London or large towns. Then it was said that twenty-one was objectionable, but he did not think so. He remembered the first apprentice he took was the son of a friend of his who had been broken down by over exertion, and at the earnest request of the boy's mother he took him when thirteen and a half years of age, being apprenticed until he should be twenty-one, and he stayed two years afterwards as an assistant. He maintained that the very fact of this arrangement as to twenty-one would be a great advantage to masters taking apprentices, inasmuch as it would enable them in many cases to retain them until twenty-one, and they would thus get over the difficulty which had been spoken of as to getting junior assistants. His best assistants he had always found had been his own apprentices whom he had himself trained. Therefore the very fact of a man knowing that he could not pass his examination till he was twenty-one, would lead in many cases to his binding himself for five years instead of four.

Mr. Hills asked the proposer and the seconder of the resolution if they would agree to alter the date to 1874 instead of 1873. By that means they would be acting perhaps more fairly towards those who came into the business.

Mr. Sutton said he had been talking to Dr. Odling and Professor Williamson in regard to the nature of the examinations which they conducted, and how they dealt with those questions which referred to the processes going on in large chemical manufactories—such as alkali works. They told him that they always incorporated these things in the examination; and he asked them how they provided for the case of a man who came up from some locality where he could know nothing at all about these things. They told him they did not make any strong point of such questions. If they happened to have a man from a locality where he had an opportunity of obtaining a knowledge of these processes they passed it to his credit, and if he did not, they passed it by altogether. That appeared to him the only way of doing it; for otherwise it simply resolved itself to this—a man must have lived in a certain place or he could not know anything about such matters.

Mr. Baynes said if the year 1874 was substituted for 1873, it would meet the views of many of the Council.

Mr. Schacht, in replying on the amendment, said he had not made the alteration just referred to for this reason, that he should be rather disposed to suggest after the discussion that had taken place, that still greater liberty should be taken with the resolution, namely, that the regulations should be referred to a committee for the purpose of discussing every line and word, and if needful of making here and there a verbal alteration. If it were thought by such modifications the principle would in any way stand in jeopardy, he should adhere to his original resolution. But still he should like to make the alterations to meet the views which had been suggested if possible; and in doing so he knew that they would not be acting contrary to the feeling of the Board of Examiners. For instance, if there was a strong objection to the introduction of the words "domestic economy," he knew the examiners would be willing to expunge them. Their intention, however, in introducing them was merely that the candidates' knowledge should not be absolutely limited to medical botany. If, however, it was supposed that the words referred to included an examination upon all subjects connected with the words "domestic economy," of course it would be better to expunge them altogether. He, however, wished it to be understood particularly, that the Board of Examiners considered the general arrangement of the paragraphs as essential to their scheme, and that to alter the balance of the subjects would spoil it altogether. To each of these subjects a certain number of marks were assigned, and they were carefully arranged so as to convey a general result to the minds of the examiners. Any material alteration, therefore, would be mischievous. For his own part he regretted the suggestion of postponement for a year, for he did not see why it should not come into operation at the end of the current session. At the end of that time he saw no injustice to anybody if the new regulations came into force. At the same time he felt quite sure that the Board of Examiners were the last body who would wish to insist on their own views, but would be willing to explain them if that were felt to be necessary. He would remind those who thought there was an extra stringency in the regulations, that the full number of marks which could be obtained by a candidate were not required in order to entitle him to a certificate. As to altering the age, he thought there would be equal difficulties in the way, and on the whole he should prefer the matter being referred to a committee who should confer with the Board of Examiners.

Mr. Stoddart, as the seconder, said he should be glad to consult with Mr. Schacht. He was only anxious that they should have the Minor made a good and practical examination. He had been rather misunderstood as to his objection to the words "domestic economy," his only object being that he might be able to advise young men who frequently came to him as to the course which their studies should take.

Mr. Greenish said that the words were simply inserted in order that the examiners might have an opportunity of ascertaining whether the young men knew anything of botany generally. In other words, to give the examiners more scope.

The President said he believed the Board of Examiners had no other view in framing these regulations than to carry out the wishes expressed by the Council some time ago, and also the wishes of the Government; and he believed they had also framed them with a view to the convenience of the candidates. They had taken from the Major such portions as seemed useless and unnecessary, having been already tested in the Minor. Thus, the determination of unusual doses, etc., being now provided for in the Minor, together with the reading and translating of prescriptions, these subjects were removed from the Major altogether, as it was evident that if a man could translate prescriptions and detect errors well enough to carry on a business, it was unnecessary to test him further. Again, with practical dispensing, as it was called, in the Major examination, the candidate was only required to give the strength of certain solutions, and the supposed best way of making pills, emulsions, etc., which was in reality theoretical dispensing; and this having been now provided for in the Minor, was removed from the Major. Looking at it as a whole, he did not think there was anything more difficult than the examiners might make the present examination if they saw fit. With regard to fees, they had been simply inserted as a piece of information for candidates, as the Board of Examiners had nothing whatever to do with regulating them. Nor did he think there would be any objection to removing the words "domestic economy," the reason for the introduction of which had already been explained. All the examiners were in favour of the age being fixed at twenty-one; and with regard to the supposed difficulties of their country friends, he could only say that all their best assistants came from the country. He must say he hoped the regulations would be passed at once, for if sent back to a committee, it would only cause delay. He should prefer the resolution terminating at the word "adopted," leaving the legal question for a separate resolution. With regard to the time, he was rather in favour of 1874, because it would take two or three months at the earliest before the necessary bye-laws could be legally passed and go to the Privy Council for approval, at the end of which time candidates would have only six months to prepare themselves. He should be glad if Mr. Frazer could see his way to withdraw his amendment.

Mr. FRAZER regretted that he could not do as the President suggested, but he had not proposed his amendment without serious consideration, and he had heard nothing in the course of the discussion to induce him to alter his mind. He must say, also, he regretted that a vote had not been taken on the scheme as it stood, without any alterations being suggested. It had been stated that the character of the examinations as a whole had not been altered, but his complaint was that so much of the Major had been imported into the Minor as to render it much more difficult. He could not for one moment agree with Mr. Savage, that by rendering the examinations more difficult would remove the difficulty of getting apprentices, for he was convinced the result would be quite the reverse. In conclusion, he desired to add that he yielded to no one in his respect for the Board of Examiners, who had no doubt prepared what in their judgment was an improved scheme, but he could not agree in the expediency of introducing it at the present time.

The amendment was then put to the vote with the following result:—

For—Messrs. Frazer, Hampson and Owen.

Against—Messrs. Atherton, Baynes, Betty, Bottle, Greenish, Haselden, Hills, Radley, Sandford, Savage, Schacht, Shaw, Stoddart, Sutton, Urwick and Williams.

The amendment was therefore lost.

Mr. SCHACHT again expressed his readiness to modify his resolution, so that the matter might be referred to a committee, who should confer with the Board of Examiners as to verbal alterations.

After some further discussion, however, it appeared to be the general feeling that any further delay was unadvisable, and the motion was put in this shape:—

"That the proposed amended regulations of the Board of Examiners, with the accompanying slight alterations, and the omission of all words relating to fees, be adopted."

The vote being taken, gave the following result:—

For—Messrs. Atherton, Baynes, Betty, Bottle, Greenish, Haselden, Hills, Radley, Sandford, Savage, Schacht, Shaw, Stoddart, Sutton, Urwick and Williams.

Against—Messrs. Frazer, Hampson and Owen.

The resolution was therefore carried.

The AMENDED REGULATIONS are as follows:—

"*Regulations of the Board of Examiners, for the Examination and Registration of Pharmaceutical Chemists, Chemists and Druggists, and Apprentices or Students, in accordance with the Pharmacy Acts,* 15 & 16 *Vict. cap.* 56; 31 & 32 *Vict. cap.* 121; *and* 32 & 33 *Vict. cap.* 117.

"The Board of Examiners in London meets for conducting the Minor and Major examinations every month, except in August and September. For the Modified examination, the Board meets as often as required. Candidates must give notice to the Registrar of their intention to present themselves and pay the fee, on or before the first of the month in which the examinations are held.

"The Board of Examiners in Edinburgh meets for the Major, Minor, and Modified examinations as often as required. Notice is given in the PHARMACEUTICAL JOURNAL when meetings take place.

"Secretary to the Board in Edinburgh, John Mackay, 119, George Street, Edinburgh."

"*The First or Preliminary Examination.**—(For Registration as Apprentices or Students.)—This examination is held throughout Great Britain on the first Mondays in January, April, July, and October in every year. Candidates for this examination must give not less than ten clear days' notice.

"The examination is a written one, and comprises

- Latin,—translation into English of a paragraph from the first book of Cæsar ('*De Bello Gallico*'), or a passage from each of the following works: Pereira's 'Selecta e Præscriptis,' and the last edition (Latin) of the London Pharmacopœia.
- Latin Grammar.
- English Grammar, Composition.
- The first four rules of Arithmetic, simple and compound, Vulgar Fractions, and Decimals, and a thorough knowledge of the British and Metrical systems of Weights and Measures.

"In the case of candidates residing in the country and unable to attend in London or Edinburgh, the Registrar shall send the questions, under seal, to the person appointed to superintend the writing of the answers,† with instructions that they be opened by him in the presence of the candidates, who shall write the answers forthwith in his presence in a given time.

"*Minor Examination.*—(For registration under the Pharmacy Act, 1868, as chemists and druggists.)

"Candidates for this examination must have passed the First or Preliminary examination, and must produce certificates of having attained the full age of twenty-one years, and also of having been employed for three years by a pharmaceutical chemist, or chemist and druggist, and in dispensing and compounding prescriptions.

"The following form the subjects of examination:—

"Prescriptions.—The candidate is required to read without abbreviation autograph prescriptions; translate

"* Certificates of having passed the Local Examinations of the Universities of Oxford, Cambridge, or Durham, the Examination of the College of Preceptors; or those of any legally constituted examining body previously approved by the Council, *provided Latin and Arithmetic be included in the subjects*, are accepted in lieu of this examination.

"† The Council have appointed the Local Secretaries to undertake this duty.

them into English; and render a literal as well as an appropriate translation of the directions for use. To detect errors, discover unusual doses, and have a general knowledge of posology; also to render in good Latin ordinary prescriptions written in English.

"Practical Dispensing.—To weigh, measure, and compound medicines; write the directions in concise language in a *neat and distinct* hand; to finish and properly direct each package.

"Pharmacy.—To recognize the preparations of the Pharmacopœia which are not of a definite chemical nature, and have well-marked physical characters, such as extracts, tinctures, powders, etc.; to give the proportions of the active ingredients, and possess a *practical* knowledge of the processes, and the principles of the processes by which they are made, and of the best excipients and methods of manipulation for forming emulsions, pills, etc.

"Materia Medica.—To recognize specimens of roots, barks, leaves, fruits, resins, gums, animal substances, etc., used in medicine; give the botanical and zoological names of the plants, etc., yielding them, and the natural families to which they belong; name the countries and sources from which they are obtained, the officinal preparations into which they enter, and judge the quality and freedom from adulteration or otherwise of the specimens.

"Botany.—To recognize the more important indigenous plants used in medicine. To possess a general knowledge of the elementary structure of plants, and the structure and distinctive characters of roots, stems, leaves, and their parts. To name and describe the various parts of the flower.

"Chemistry.—To recognize the ordinary chemicals used in medicine. To possess a *practical* knowledge of the processes by which they are produced, the composition of such as are compound, and explain the decompositions that occur in their production and admixture, by equations or diagrams. To determine practically, by means of tests, the presence in solution of the chemicals in common use, and explain the reactions which occur in each case. To possess a general knowledge of the laws of chemical philosophy, and a *practical* knowledge of the means of determining specific gravities, densities and temperature, and of the instruments appertaining thereto, and the physical and chemical constitution of the atmosphere.

"*Major Examination.*—(For registration as pharmaceutical chemists under the Pharmacy Act, 1852.)

"Candidates for this examination must have passed the 'Minor' examination at least three months previously.

"Materia Medica.—This comprises a *practical* knowledge of the methods of estimating the value of important drugs, of obtaining their active proximate constituents in a separate state; of identifying them and ascertaining their purity or impurity by tests.

"Botany.—This comprises an intimate acquaintance with the parts of the flower, fruit, and seed; the functions and mode of arrangement of the different organs of plants; a knowledge of the general principles of classification, and of the Linnæan and De Candolle's systems. The candidate must be able to distinguish practically between each of the following natural orders:—Ranunculaceæ, Papaveraceæ, Cruciferæ, Malvaceæ, Leguminosæ, Rosaceæ, Cucurbitaceæ, Umbelliferæ, Compositæ, Gentianaceæ, Convolvulaceæ, Solanaceæ, Atropaceæ, Labiatæ, Schrophulariaceæ, Polygonaceæ, Euphorbiaceæ, Orchidaceæ, Iridaceæ, Liliaceæ, Melanthaceæ, Graminaceæ; and refer to their respective Orders such specimens as may be shown to him.

"Chemistry.—This comprehends an intimate knowledge of the laws of chemical philosophy, a *practical* knowledge of the nature and properties of the elements and their compounds, both organic and inorganic, especially those used in medicine or the arts. The different combinations and decompositions must be explained by equations; also the *qualitative* analysis of the more important chemicals, *e.g.* nitrates, chlorides, carbonates, sulphates, phosphates, oxalates, tartrates, etc., and the detection of impurities in them, and the *volumetric* estimation of the strength of all pharmacopœia preparations in which standard solutions are ordered to be used.

"An elementary knowledge of the properties of light, heat, electricity, and magnetism is also required."

To come into force, October, 1874.

Examination Fees.

Mr. Williams also moved, and Mr. Urwick seconded a resolution—

> "That the consideration of the fees to be paid in future by candidates at examinations be remitted to the Parliamentary Committee."

This was also put and carried.

On the motion of Mr. Williams, the names of Messrs. Fraser, Greenish and Urwick were added to the Parliamentary Committee.

Proposed Alterations in the Bye-laws.

Mr. Hampson said, in the absence of Mr. Brown, he wished to propose a resolution to this effect:—

> "That no resolution by which the legal position of members of the Society, or the legal position of chemists and druggists, whether members of the Society or not, may be altered, shall be passed at any meeting of the Society unless fourteen days' previous notice shall have been given of the intention to propose such resolution."

Mr. Williams said he was going to propose a resolution which he thought would render that unnecessary, and he would bring it forward now:—

> "That the Parliamentary Committee be instructed to examine the bye-laws generally, and to prepare and report upon such alterations as may be deemed expedient, more especially as regards the conduct of the general meetings of the Society."

Mr. Urwick seconded this motion, which was carried unanimously.

Elections.

Pharmaceutical Chemists.

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

Butterfield, Edward ....London.
Clarke, George Ernest........Stowmarket.
Robertson, F. Freer Leslie....London.
Saunders, Thos. Bealby ......Cheltenham.

Associates.

The following, having passed the Minor examination, were elected Associates:—

Birrell, George ....Kensington.
Buswell, Arthur ....Winchester.
Butler, John Harsant ....High Wycombe.
Chesterton, Wm. Peter ......Walsall.
Crundall, Augustus Horton....Cirencester.
Faraker, John Joseph ....New Brighton.
Gatenby, Robert ....Beverley.
Griffiths, Evan ....Cardiff.
Johnson, Fletcher Atkinson ..Driffield.
Maitland, Pelham Christopher Launceston.
Parris, Thos. Watkin ....Taunton.
Urwin, Matthew ....South Shields.
Vigis, Joseph Lewis..........Shepton Mallet.

Finance.

The report of the Finance Committee was received.

"The Committee recommended the purchase of £1000 Stock New Three Per Cents. on the general fund, etc.

"*Collector for* 1873.—Mr. L. S. Hughes was recommended for re-appointment as collector of the subscriptions to the Society and to the Benevolent Fund for London and the suburbs.

"*Annual Subscriptions.*—The Committee also recommended that the accounts of the Local Secretaries and the London Collector's account with the Registrar for subscriptions received for the current year be closed at end of March.

"That all subscriptions remaining unpaid after that date be applied for by the Registrar direct.

"That a copy of these resolutions be sent to each Local Secretary and printed in the Society's Journal and Transactions.

"*The Register for* 1873.—Messrs. Butler and Tanner's estimate for printing the Register was recommended to the Council for acceptance.

"*The Calendar for* 1873.—Messrs. Taylor and Co.'s estimate for printing the Calendar was also recommended for acceptance."

The Report and recommendations of the Committee were adopted.

BENEVOLENT FUND.

The Report of the Committee was received and adopted. It stated that the Secretary had received a communication from the executors of Mrs. Jane Lyons, of Albert Terrace, Knightsbridge, stating that that lady had left a legacy of £500, free of duty, to the Benevolent Fund. It also recommended the grant of £10 to the widow of a late annuitant on the Benevolent Fund.

LADY STUDENTS.

Mr. HAMPSON moved in accordance with notice—

"That lady students attending the classes or lectures are eligible to compete for the Sessional Prizes and Certificates, and for all prizes and scholarships given for proficiency in this Institution."

He said that when he asked the Council to admit ladies as students, and received a unanimous assent, he did not dream of any doubt arising as to whether such students would be entitled to compete for class prizes. He thought there was no doubt that lady students might claim this as a matter of right; but it appeared there was some doubt existing, as evinced by a letter received from Mrs. Garrett-Anderson, and in order to remove it he had brought forward the resolution. He would not weary the Council by adducing self-evident reasons in support of the claim of the lady students, for he thought a moment's reflection would decide every one to vote unanimously in favour of it. The professors, as well as the present and prospective lady students, were waiting the decision of the Council of the Society, and to refuse them the same privileges as gentlemen, after so freely admitting them to the lectures, would be to deceive, disappoint, and use most unfairly those who were entitled to fair play, impartial treatment, and courtesy.

Mr. SCHACHT said he was very happy to second the resolution, but he thought the latter clause must be omitted, as it would include the Bell Scholarship, which, as it included laboratory instruction, was already decided against by the previous vote of the Council.

Mr. HAMPSON said he would confine the resolution to sessional prizes and certificates.

Mr. SANDFORD said the students could already claim certificates by law.

Mr. HILLS said he was at the Royal Academy on the previous night, when he found a large number of young ladies and young gentlemen studying together with no difficulty whatever being apparent. There were many large establishments in London where both sexes were thrown together without any disadvantage.

Mr. BETTY said this was a very important question, and he should like to ask the mover and seconder of the resolution if they had any ulterior object in view, or if they merely confined it to the resolution proposed. If so, he should have no objection to vote for it; but if it was meant as an encouragement to ladies to enter the business, he should contest it as a matter of principle and expediency.

Mr. SCHACHT said he would candidly state that he meant what was contained in the resolution and nothing more. The future would take care of itself.

Mr. BOTTLE called attention to the existing regulations as bearing on the matter. Mr. Hampson's resolution proposed to throw open the door to ladies to compete for everything which the Council had to give away. Now, however, it was proposed to withdraw the Bell Scholarships; and it would be found on referring to section 4 of the Rules and Regulations for Prizes that the "Prize of Books" and "the Pereira Medal" could only be given to associates or registered students of the Society. He took it that ladies who were permitted to attend the lectures on botany and chemistry were not associates, and consequently were not entitled to compete for these prizes. He had no objection to ladies attending the botanical classes and receiving the prize which entitled them to admission to the Royal Botanical Society's Gardens; but with regard to the other prizes, much as they might desire to be generous to the female sex, they must not forget to be just towards the male. Now it must be remembered that ladies who entered for the chemical or botanical lectures would probably be able to devote a great deal more time to them than young men who were at work in the laboratory as well, and it would be hardly fair to the latter to put them on the same footing with a young lady who had nothing whatever to do but study the particular subject in which she wished to gain a prize. He had, therefore, sketched out an amendment which he thought would meet the case, to the effect—

"That lady students attending the chemical or botanical lectures are entitled to receive certificates of such attendance, but are not eligible to compete for the prizes now offered by this Council, and that it be referred to the Library, Museum and Laboratory Committee to consider and report upon the expediency of offering special prizes to be competed for by lady students."

Mr. STODDART said he would second the amendment. One reason in favour of altering the bye-laws was, that in his opinion the Herbarium prize ought to be restricted to those actually engaged in the business. It was impossible for a young man in business to compete on fair terms with another who had the whole of his time at disposal.

Mr. HAMPSON said he had certainly counted on Mr. Bottle's support, knowing him to be both just as well as generous. With regard to lady students attending only one or two classes, and therefore being able to concentrate their energy on the particular subjects they studied, it must be remembered that the same argument applied to gentlemen students, but no alteration of the rule was made to meet their case. Of course lady students would be ineligible to compete for prizes which were restricted to associates, and that he did not propose to deal with. He believed, however, that one lady was already an associate, and no doubt one or two more would become so. Lady students did not want special prizes, but the opportunity to compete with male students under precisely similar circumstances. The law permitted ladies to become chemists and druggists, and therefore, in the interests of pharmacy and common sense, they ought to grant them the same privileges as male students.

Mr. SANDFORD thought it was a mistake to suppose that any lady was an associate.

Mr. HAMPSON said he referred to a lady who had passed the Preliminary examination.

Mr. SANDFORD said that was another matter.

The PRESIDENT said the sessional prizes and certificates were open to all students, and were not restricted to associates,

Mr. HILLS thought the subject required a good deal of consideration, and though he did not wish to be so ungallant as to vote against the ladies, he should like to give the matter more consideration before he could vote for the resolution. He therefore hoped that consideration would be deferred for another month or so.

Mr. SHAW said this question of female pharmacy was constantly coming forward, month after month, which he thought was a very great pity, and should much prefer they should come at once to some decision with regard to it. Referring to the Act of Parliament, there were several clauses in which the term "person or persons" occurred, and it must evidently be meant to include both sexes, and it had already been so determined with regard to the registration of females who were in business prior to 1868. According to the bye-laws, he considered that ladies were eligible to be elected as associates if they passed the proper examinations; and if that were so, they were not placed on a fair footing if the opportunities of studying were not placed at their disposal, and the same advantages given to them as to the other sex. There might be many circumstances in which it would be proper and desirable that females should study pharmacy.

Mr. URWICK saw no objection to Mr. Hampson's resolution, and thought the fact of ladies competing for the prizes would stimulate young men.

The PRESIDENT thought it would be very hard if a lady like Mrs. Garrett-Anderson were allowed to compete and take away the prizes from the other students.

Mr. HAMPSON said Mrs. Anderson did not propose to come there herself, but she applied on behalf of the lady students.

After some further discussion Mr. HAMPSON said in the interest of the ladies themselves, and also of the better reason of some of the members present, he would withdraw the resolution for a time.

LIBRARY, MUSEUM AND LABORATORY COMMITTEE.

The Report of this Committee was presented. It recommended the purchase of the following books for the Library:—

Bloxam's 'Chemistry, Inorganic and Organic,' second edition.
Bouchardat's 'Nouveau Formulaire Magistral,' seventeenth edition.
Dorvault's 'L'Officine,' eighth edition.
Fresenius's 'Qualitative Chemical Analysis,' eighth edition.
Hofmann's 'Modern Chemistry.'
Nicholson's 'Introductory Text-Book of Zoology'; 'Advanced Text-Book of Zoology'; and 'Manual of Zoology,' second edition.

It also stated that Professor Attfield had suggested the desirability of appointing an Assistant Demonstrator in the Laboratory in consequence of the great number of students at present engaged; but the Committee were not able to recommend such an appointment without further information.

The report and recommendations were received and adopted.

A letter from Professor Attfield was also read on the subject, and the President reported the result of a conversation he had had with him. After some conversation, it was resolved that a temporary engagement be entered into for three months only, and that Mr. Shenstone, one of the Junior Bell Scholars of last session, be offered an appointment for that period.

HOUSE.

The Report of this Committee was received and adopted. It contained nothing calling for report.

PARLIAMENTARY.

The Report of the Parliamentary Committee was read, advising, amongst other things, the taking of proceedings against several persons who, it was alleged, had infringed the provisions of the Pharmacy Act with regard to the sale of poisons, etc. It also contained correspondence with the solicitor, reporting the proceedings which had been already taken in cases previously under consideration. The Report was received and adopted.

GENERAL PURPOSES.

The Report of this Committee was received and adopted.

REPORT OF THE BOARD OF EXAMINERS.

November, 1872.

ENGLAND AND WALES.

Examination.	Candidates. Examined.	Passed.	Failed.
Major	5	4	1
Minor	65	39	26
	70	43	27

Certificates received in lieu of the Preliminary Examination:—

Society of Apothecaries	1
University of Cambridge	3
" " Oxford	1
College of Preceptors	2
	7

PHARMACEUTICAL MEETING.

Wednesday, December 4th, 1872.

MR. A. F. HASELDEN, F.L.S., PRESIDENT IN THE CHAIR.

The following donations to the Library and Museum were announced, and the thanks of the Society were voted to the donors:—

'The Lichens and Scalemosses of Devon and Cornwall,' by E. M. Holmes; 'The Mosses of Devon and Cornwall,' by E. M. Holmes and F. Brent, from the Curator; 'Medico-Chirurgical Transactions,' vol. LV., from the Royal Medical and Chirurgical Society of London; the 'American Dispensatory,' by J. King, M.D., eighth edition, from the author and publishers, per Professor Wayne, of Cincinnati, and Mr. Umney, of London; 'De la Respiration Végétale,' per A. Guillaumet, from Dr. Soubeiran; Specimens of Amyl Hydride, from Mr. J. Robbins; section of Baobab Tree, from Mr. T. Baynes.

Professor BENTLEY drew the attention of the meeting to a section of the baobab-tree, which had been forwarded to the Society by Mr. Baynes, who was formerly the artist of the Livingstone expedition. Mr. Baynes stated that the bark was used as a substitute for quinine. In most manuals treating of the properties and uses of plants, the bark of the baobab-tree was reputed to be used medicinally, and as an authentication of that, Mr. Baynes' contribution was of value.

Dr. PAUL asked the attention of the meeting to a table which had been forwarded by Mr. Ekin, of Bath, in which the nutritive values of various articles of food were represented on the basis of the respective percentage of carbon and nitrogen. This mode of valuation was somewhat hypothetical, but it afforded a fair ground of comparison between different articles of food within certain limitations. The table was constructed in such a way as to show these comparative values graphically. Though the use of graphic formulæ in chemistry were not to be recommended or regarded as very serviceable, he thought that in a case like the present, and within certain limits, a table of that kind with the graphic method of representing fact might be of use.

Professor REDWOOD called attention to an apparatus which had been placed in the room for the inspection of the members. It was a form of apparatus which was very generally used by pharmacists in Germany, and had at his suggestion been imported by Messrs. Zimmermann and Co., of the City. The apparatus provided in a small compass means for conducting the various pharmaceutical operations of boiling, distilling, infusing, digesting, etc.

Mr. COOPER exhibited a specimen of effervescing lozenges, which, he said, he had been some years endeavouring to produce. He was in hopes that by means of these lozenges certain medicines might be administered in a more pleasant way than by the present methods.

Professor REDWOOD remarked that Mr. Cooper seemed to have made an important step in the direction of elegant pharmacy.

Mr. COOPER added that if these lozenges had been produced twenty years ago, homœopathy would not have held its own.

Mr. WOOTTON described several specimens of French elegant pharmacy, which, he observed, were perhaps not very important, though interesting for the excellent manner in which they were made. Among these he referred especially to some sulphovinate of soda (prepared as described in the PHARMACEUTICAL JOURNAL of last June). There was also on the table a drop measure, which he said was the neatest thing he had ever seen, and was mathematically correct. The section of the tube was three milligrams in diameter. There was also a table showing the number of drops to the gram of various liquids, varying from water 20 drops, to ether 98 drops to the gram.

Mr. WILLIAMS said that within the last two months considerable demand had arisen for croton chloral hydrate, which, although not a new thing, having been introduced two years ago, had not hitherto been much used in medical practice in this country. It was stated to be of great value in nervous diseases affecting the face. It was made by passing dry chlorine into aldehyde, but the first experiments failed; it was found to be a very difficult body to manufacture, in consequence of the bad quality of the aldehyde. That prepared by the process usually given was a very impure body, and, in fact, quite unfit for the purpose of making croton chloral. He had, therefore, brought a specimen of what he believed to be nearly pure aldehyde, a thing he had never seen before, and of which he thought few in the room had any knowledge. It was a powerful body, and probably might be recommended for medicinal use. In the first place, it had great affinity for oxygen. If a stoppered bottle were half filled with it and left for a short time, the stopper would be held so tight that there would be a difficulty in removing it, for the whole of the oxygen left in that portion of the bottle was absorbed by the aldehyde. They knew very well that the spirits of nitre was a very favourite remedy. The Edinburgh Pharmacopœia a few years ago ordered spirits of nitre to be made with nitrite of ethyl. He believed he was right in saying that that preparation did not give satisfaction, and was not looked upon as a good medicinal article. An opinion had been held that aldehyde played an important part in the medicinal action of spirits of nitre. Medical men could now determine for themselves whether aldehyde had any important medicinal action or not, but if they breathed this specimen, he thought they would agree with him that it was likely to be a very potent one indeed. Speaking theoretically, he thought it ought to prove one of the most powerful anæsthetics known. The croton chloral hydrate smells of lemon. It is formed by two moduculcs of aldehyde, less one moducule of water, the three atoms of hydrogen being replaced by three atoms of chlorine; croton chloral was the result, the hydrate forming the beautiful crystalline body before them.

The PRESIDENT mentioned that Mr. Robbins had presented the Society with a specimen of amyl hydride, but Mr. Robins was not present to explain it.

Mr. CARTEIGHE read a paper by Mr. Giles on an "Apparatus for Macerating."

[The paper is printed at p. 442, and gave rise to the following discussion:—]

The PRESIDENT remarked that Mr. Giles had in some measure misunderstood what he stated at the time referred to. He stated that in certain tinctures, such as tincture of calumba, it was desirable to macerate the root first of all in a small quantity of water.

Mr. UMNEY felt very much indebted to Mr. Giles for bringing such an excellent arrangement of displacement apparatus before them. Some three or four years ago he had a conversation with Mr. Giles, from whom he took one or two hints, and since that period he had experimented upon cinchona bark, but with a modification of the form of apparatus before them. He had used cucumber glasses, which were cylinders having a diameter of 2 or 2½ inches, with a length of probably twenty inches or two feet. He had ten of these glasses, and had taken 100 ounces of cinchona bark, dividing the bark into ten portions, and percolating with successive pints of water, the percolate of the first being put upon the second, the second on to the third, and so on to the tenth. It was found that when 100 fluid ounces of percolate had been obtained, the bark was almost wholly exhausted. These evaporated, and one-third of its volume of spirit added, produced 20 per cent. of fluid extract, which was a good average quantity of completed liquor.

Mr. GERRARD suggested that it would be an improvement if each cone were divided by four, and only to have one receiver. There was by the present plan a considerable loss by spontaneous evaporation.

Mr. UMNEY said the last speaker seemed to forget that it was necessary to put the percolates on to each other successively, and therefore it was impossible to have one for four, or they would do away with the chief part of the process.

Mr. BLAND corroborated Mr. Umney's statement as to the advantage of the cucumber glasses, and said he had been in the habit of using them for the last eighteen or twenty years.

The PRESIDENT believed with Mr. Bland that there were no percolators much better than cucumber glasses, only sometimes they were not perfect, not being of the same diameter throughout. They, therefore, got an uneven pressure; but he had had one made upon the principle of a cucumber tube, and it was as perfect as a good glass syringe should be, being even all through.

A paper was read by Mr. J. B. BARNES "On the Extracts containing Chlorophyll."

[The paper is printed at p. 441, and gave rise to the following discussion:—]

The PRESIDENT said that this subject was one which ought to elicit considerable discussion. For his own part, he never could see the advantage of retaining the chlorophyll, because although a nice bright green when first made, the colour very soon became brown,—certainly before they could have a fresh supply in the following year. It was a question whether the extract deprived of the chlorophyll would be as manageable when put into a pill as when the chlorophyll was present. With regard to a making liquid extract from the extract reduced to dryness, he thought it was open to a good deal of question whether the extract would not suffer considerably during the process of drying, in order to be in a good condition afterwards,—whether it would not be possible without so much reduction to reduce the extract to a certain specific gravity, and then add the spirit that might be desirable to keep it. They had two or three instances of liquid extracts in the Pharmacopœia in the Succus Conii and the Succus Scoparii, which he thought were fair illustrations of what might be done in that way. Of course they were comparatively weak as compared with what might be made under Mr. Barnes's idea. The subject was well worthy their consideration, and Mr. Barnes had done a service to pharmacy in bringing it before the Society.

Mr. HANBURY thought the author had rather overlooked the fact that the raw materials employed in these preparations are not of uniform composition,—that henbane and belladonna not being definite chemical substances, it is unreasonable to expect they will afford preparations of unvarying composition. He also thought that the author had rather assumed than proved that the portion of the extracts insoluble in cold water consisted wholly of chlorophyll.

Professor Attfield said that Mr. Barnes had alluded to the evolution of nitrous fumes in certain cases during the preparation of extracts, and had suggested that some nitrous acid might be produced at the expense of the nitrogenous principles, notably, of course, the active principles of the plants. Considering how commonly nitrates were found in the juices of plants, it was not unlikely that the source of the nitrous fumes would be nitrates reduced by the organic matters present. He had found crystals of nitrate of potassium imbedded in a certain specimen of extract, but no nitre in a similar specimen from the same drug, which had undergone decomposition.

Mr. Umney could quite corroborate what Mr. Barnes had stated, upon the unmistakable odour of nitrous fumes in making the extract of henbane. Mr. Giles strongly advocated at the Pharmaceutical Conference at Brighton the omission of the chlorophyll in these green extracts. They had a great deal to learn from the Americans as regarded fluid extracts.

Professor Attfield asked Mr. Umney whether he had ever noticed these nitrous fumes from senna. He had observed them, and he should like to know whether anybody else had done so.

Mr. Umney replied that he had not.

Professor Attfield remarked that fresh henbane juice, pressed from a plant within half an hour of its being cut, was rich in nitre.

Mr. Fryer believed that a large proportion of the loss in these extracts could be avoided by applying less heat. He thought the process of the Pharmacopœia was quite needless in the separation of the chlorophyll. It was much better prepared without separating the chlorophyll, and by this means a good deal of waste could be avoided. Of course, it took a longer time; but he believed the result was more satisfactory.

Mr. Umney said that such an extract would be contaminated by the very body that they wished to get rid of—the albuminous matter. The authors of the Pharmacopœia had in view the raising of the juice to the boiling-point, in order that the nitrogenous principles should bo rejected, as they looked upon that as the most damaging ingredient in the extract.

"A Dispensing Note on Chloral Hydrate," by Mr. J. G. Plumer, was then read by Mr. J. Ince.

[This paper is printed at p. 443, and gave rise to the following discussion :—]

Mr. Barnes mentioned that he had recently had occasion to take chloral hydrate, and he found it exceedingly disagreeable, even with syrup of orange-peel. He found it greatly irritated the throat; but with the addition of a little mucilage of tragacanth, that was almost done away with.

A paper by Mr. J. Moss, F.C.S., on "Sulphurated Antimony, Official and Commercial," was then read.

[The paper is printed at p. 443, and gave rise to the following discussion :—]

The President remarked that this was an interesting paper, which might be the means of inducing them to test some of their preparations to ascertain whether they were B.P. preparations such as they ought to be; and he rather thought this was doubly necessary now after the passing of the Adulteration Act.

Professor Redwood said this subject was one which had come under his notice for a great many years. As long as he could recollect anything of laboratory experience in that Society, the preparation of sulphurated antimony had presented to those engaged in making it a great deal of difficulty. The process given in the present Pharmacopœia did not materially differ from the processes previously given. It was true that the quantity of alkaline solution directed to be used with a given quantity of black antimony was now smaller than it used to be, but that did not practically affect the result, for in none of the cases was the whole of the antimony taken up in solution. He could entirely confirm what had been stated by Mr. Moss, that, as a general result, proceeding as strictly as possible according to the instructions given in the Pharmacopœia, the product was rather a reddish-brown than a yellowish-red powder. Nevertheless, they knew that in commerce what had been sold as sulphurated antimony was either golden-yellow, as it had been sometimes called, or yellowish-red,—lighter and brighter in colour than that generally obtained by adopting the process given in the Pharmacopœia. He had felt a great deal of interest in the results which were represented as having been obtained by Mr. Moss. He regretted, however, that Mr. Moss had not been able to indicate a method of manipulation by which, without materially altering the composition of the product, they might be able to obtain a result nearly coinciding in appearance with that which pharmacists had been accustomed to use. He believed that if such a preparation as the one before them were sent out by wholesale houses, the trade generally would reject it; and he should be glad to see a method indicated by which they could obtain uniformly a product of a yellowish-red colour rather than a brown, and which, nevertheless, should have a composition such as the Pharmacopœia preparation was directed to have. He quite agreed with Mr. Moss, that it would be incorrect to use the golden sulphuret of antimony which was commonly met with in commerce, and which appeared to contain a large proportion—according to Mr. Moss's analysis, 37 or 38 per cent.—of oxide in the place of the $3\frac{1}{2}$ per cent. of oxide which Mr. Moss found in the preparation made by himself, strictly according to the Pharmacopœia. There could be no doubt whatever that the active constituent of this preparation was the oxide which was contained in it. If they now had to consider whether this preparation of antimony was the most satisfactory which could be proposed, he had no doubt they would come to the conclusion that it was not, and that they could replace it by some other which would be much more satisfactory, because more uniform in its composition and more to be relied upon. But suppose they were to omit this preparation from the Pharmacopœia, what would be the consequence? It would not be omitted from medical practice. They would go on using it without anything in the Pharmacopœia to indicate what its composition even approximately ought to be, and, therefore, they were bound to retain it because it was so firmly fixed in medical practice. Since Mr. Moss had kindly given him a copy of his paper a day or two ago, he (Professor Redwood) had repeated the Pharmacopœia process. Having made the solution by boiling the antimony with the alkali, he took one portion of it while it was still hot at nearly boiling temperature, strained it, and precipitated it with dilute sulphuric acid, and it came out as dark as the darkest specimen which Mr. Moss had placed before them. He took another portion when the cooling had taken place to a greater extent, and treated it in the same way, and it came out of a much lighter and brighter colour, nearly coinciding with the description in the Pharmacopœia.

Professor Attfield said that his colleague had almost exhausted the subject from a pharmacopœia point of view. It seemed that, as regarded the colours of the substance, if it was manufactured by the commercial process, it included penta-sulphide of antimony, and was more or less of an orange-red tint; if by the official process, it contained tersulphide of antimony, but had not the official colour—it was brownish, not "orange-red" at all. The question then arose as to the amount of oxide of antimony that should be present. Professor Redwood had suggested that, if an article could be obtained having the colour of the commercial article and the official proportion of oxide, that would be the best that could be employed. No doubt that Mr. Moss could, by continuing his researches, produce such an article. The Professor rose, however, rather to speak on the chemical aspect of the matter. It was well known to chemists that the so-called pentasulphide of antimony and the pentasulphide of arsenicum were by no means definite chemical substances. By adding an acid to a sulphantimonate, they necessarily obtained a precipitate containing proportions of sulphur and metal which corresponded with the true pentasulphide, but it by no means followed that it actually was a true pentasulphide. In the case of pentasulphide of antimony the mere application of a temperature such as would be sufficient to volatilize sulphur gave a sublimate of that element and a residue of a tersulphide. The action of hydrochloric acid also was to give not pentachloride of antimony, as might be expected, but terchloride. Then the pentasulphide of arsenicum gave up two-fifths of its sulphur to dilute solution of ammonia. Hence chemists would look with considerable interest to Mr. Moss's paper, with the object of ascertaining whether it threw light upon the constitution of the so-called pentasulphides of antimony and arsenicum. Well, they first came across the observation that bisulphide of carbon, which was an excellent solvent of sulphur, took away two-fifths of the sulphur from the pentasulphide of antimony and left the tersulphide. Here was a fact which seemed to indicate that the article was not a true pentasulphide. On the other hand, the tersulphide thus obtained contained no moisture, which certainly was a somewhat characteristic component of this substance when precipitated from a solution of the ter-compounds of antimony. Professor Redwood had remarked that there was room for more pharmaceutical research in connection with this subject; and he (Professor Attfield) would suggest there was also a good deal of room for more chemical work in the matter.

Mr. Martindale remarked that this article would be much better expunged from the Pharmacopœia, especially as it was used almost entirely for one preparation.

The President announced that the next meeting would be held on the 5th of February.

Parliamentary and Law Proceedings.

Poisoning by Chloral Hydrate.

On Wednesday evening, November 27th, Mr. C. J. Carttar, held an inquest at Greenwich, concerning the death of Mr. David Gower Silva, who was found dead in his bed on the previous Monday morning.

Mrs. Silva said the last time she saw him alive was at eight o'clock on Sunday evening. About six o'clock in the evening he went out to Mr. Part, a chemist, in Church Street. He had been in the habit of going there, but not during the last three months, for the purpose of obtaining sleeping draughts. At a quarter to twelve the same night she went upstairs to bed, and seeing deceased, as she thought soundly asleep, in order not to disturb him she slept in another room. The next morning she found him lying in the same position and quite dead.

In answer to questions, Mrs. Silva said the deceased had an empty phial in his right hand and another empty phial was found near him. On Saturday last the deceased sent his son to Mr. Part for a sleeping draught, but he came back and said that Mr. Part was then very busy and could not make it up, and that as his father (the deceased) had already had one draught he did not want another then. The deceased insisted upon the servant girl going for a draught. The deceased took this draught, and slept until eleven o'clock on Sunday morning.

Mr. Edward James Part, chemist, of Church Street, Greenwich, said about two years since the deceased came to him and wanted a sleeping draught, which he prepared of laudanum. He made a second draught of laudanum, but the deceased complained that they were not strong enough, and witness then prepared a draught containing 20 grains of hydrate of chloral, with a compound of cardamoms. This was witness's own prescribing. Witness afterwards found deceased was suffering from excessive drinking, and he had prepared him many draughts, increasing the strength at deceased's request, up to 100 grains of hydrate of chloral. On some occasions, when deceased sent for the draughts, he had sent him merely coloured water instead. On Friday last the servant of the deceased came for a draught, and witness prepared one containing 80 grains of the hydrate of chloral. The next morning the deceased came in as usual, and said it was no use sending him a draught under 100 grains. The draughts given on Saturday contained each 100 grains, and at that time and also about a year ago, he expressly cautioned deceased as to the taking of the draughts.

This being the whole of the evidence, the Coroner said that there was no doubt that death resulted from taking the poison named. The questions for the jury were, whether the same had been taken in mistake, or with any wilful intent. They would also probably consider the propriety of selling poison in such quantity. With regard to the serving of the deceased with two draughts on the Sunday evening, he (the Coroner) did not view that fact as some of the jury appeared to do, because a bottle specifying a "sleeping draught" would be supposed to be for one taking; but he did think that the bottles ought to have contained a label bearing the word "poison," because a bottle might have found its way into the hands of another person than whom it was intended for.

After a short consultation, the jury returned a verdict "That deceased died from the effects of an overdose of hydrate of chloral, taken in ignorance of its fatal effects."

The Coroner then called Mr. Part forward, and said it was the unanimous wish of the jury that he should caution him against selling poison in such a quantity, the danger of which he knew. Referring to the new Licensing Act, he observed that a publican was held responsible if he supplied a drunken person; and in the case of serving poison to a person suffering as deceased, greater caution should have been taken. He hoped the present inquiry would act as a caution in the future.

Mr. Part said there had never before been any mistake in conducting his business, and the draughts would not have been prepared but through the deceased urging him, and his promise that he would be careful in not taking both draughts served to him on Sunday evening.—*Kentish Mercury*.

[*** In reference to the comments upon this case which appear in the *Lancet* and *Medical Times and Gazette*, we must remark that the latter journal is so far in error that chloral hydrate is not included among the poisons enumerated in Schedule A of the Pharmacy Act, 1868.—Ed. Pharm. Journ.]

*** In consequence of the great length of the report of the Society's proceedings, we are compelled to defer the publication of several communications.

Communications, Letters, etc., have been received from Messrs. J. J. Nicholson, J. A. Clark, Brown, Pickup, Bland, Crundall, Fitzhugh, Bennett, Druce, Laird, Brown, Bascler, Burnett and Co., Lord, M'Master and Hodson, M'Neil, Symes, Jones, Watson, Crozier, Baildon, Young, Batting. An Associate, Justitia, A Chemist, Excelsior, Proctor Jones, Cecil, Datura, Persevero, Agitator, Z. V. Z., A. P. S.

PHARMACEUTICAL PROGRESS.*

BY CHARLES SYMES, PH.D.

The subject which I have hurriedly chosen is a wide one; my notes contain thoughts as hurriedly strung together, but I trust they will lose nothing of their genuineness on that account. It is one which looked at by different individuals, or even the same individual, under different conditions, will necessarily appear very different, therefore I can only be responsible for depicting it as it appears from my own point of view.

Were I so disposed, I have not the time to search out and bring before you all the minor circumstances connected with the dawn of pharmaceutical history, neither will I bore you with statistics and figures to prove simple facts of which you have a general idea already in your minds. We must necessarily have some starting-point, and probably cannot do better than take the foundation of the Pharmaceutical Society for our commencement; doing so, we will, if you please, divide our subject under these heads—the immediate past, the present, and the immediate future.

The Immediate Past.—There are some still living amongst us who first moved in constituting the Pharmaceutical Society, others who joined it in its early days, and consequently became also its founders. Those who are desirous of going into the details of its history from the commencement will find them fully set forth in the pages of the PHARMACEUTICAL JOURNAL. Suffice it to say that a number of earnest men, desirous of seeing a better state of things than there existed, with a large-heartedness well worthy our emulation, gave their time and their money to bring about the desired results. Some of these men have passed away in comparative obscurity, but their work remains, and let us, who are reaping the reward of their labours, honour their memory, rather than as has been occasionally done, make disparaging remarks as to their professional skill and knowledge; they did the work that came to their lot to do, let us do the same.

At first a considerable amount of energy was thrown into the matter; brilliant and rapid progress was anticipated. But it soon became evident that however correct and good the object in view, the immediate results were over-estimated; that there was no room for the continual display of this great energy. The same lesson has constantly to be learnt over and over again by individuals, communities and nations. Nature cannot be so easily pushed out of her course; matters of this kind will rarely proceed and become matured as rapidly as our wishes; in this particular the old maxim "festina lentè" prevailed, and it was over a quarter of a century before the hopes of the founders were realized.

It is true that in 1852 the Society got an Act of Parliament to confirm their charter of incorporation; but this only served to shut out from it many good and worthy men, who for reasons probably not known to themselves had not previously joined; the outsiders, as they were called, were in considerable majority, and jealousy gradually sprung up between these two bodies—a rival society being started. This society did some good of its kind; it gave this large outside majority a desire for organization, which the Pharmaceutical Society, from the very nature of its constitution at that time, could not do; and it finally treated with that Society for conditions on which, not only itself, but the whole trade should become one in certain common interests. We all remember how, amidst the strife of tongues, much written controversy, and after several failures, the Pharmacy Act was ultimately passed in 1868, and we were ushered into a new state of existence.

The Present.—Taking all things into consideration, the new Act is working as well as might be expected. It is true, we still have cases of poisoning as of yore; and both magistrates and coroners occasionally censure chemists quite undeservedly, by threatening to fine them for not registering the sale of such articles as laudanum, etc. This latter error will become less frequent in course of time, when the Act is better understood by these dignitaries. But the poisoning cases, when they will cease, who can tell? Education is a subject which at present is engaging much attention, not only amongst the pharmaceutical body, but throughout the civilized world; and it sometimes appears as though w had none of the great men of talent living amongst us now as in years gone by. But reflection tells us that things have changed; that in the past ignorance — dark, black ignorance prevailed; and wherever talent existed this darkness formed a background from which it shone resplendent. In the present, education more generally prevails; the background is not nearly so dark; there is more half tone, and, consequently, our educational picture is not so bold or striking. In nations and also in communities, we can usually judge of general progress by educational progress; and no one looking at pharmacy as it is in the present day, and as it was thirty years ago, can doubt for a moment that we have considerably advanced. The large number of excellent books which have been published during that period, in chemistry, pharmacy, botany, materia medica, etc.; the improvement in the purity of our drugs and chemicals; the better facilities for detecting adulteration are evidence of this. We have the pharmaceutical establishment in Bloomsbury Square, with its extensive museums, library and laboratories; also other schools of pharmacy, both metropolitan and provincial; we have the Pharmaceutical Conference holding its meetings in different parts of the country, for the purpose of interchange of thoughts, etc.; we have our provincial associations; and last, though not least, two excellent journals devoted to our interests.

In the past a five or seven years' apprenticeship was often spent in mere drudgery instead of intellectual culture, but there is a growing tendency to substitute mechanical for bodily labour. I grant you that some of those who were educated under difficulties turned out first-class men, but that goes for very little; might they not, with better facilities, have been still better men?

Then there are signs of decided improvement in shortening our hours of active labour in the business.

The Immediate Future.—I do not propose to enter the domain of prophecy, not even to suggest the possible position of pharmacy in the year 1900, but simply to make a few remarks as to certain progressive conditions and improvements which we might hope for and reasonably expect during the next few years.

Well, I have said there is a tendency to shorten the hours of active labour. Perhaps it might be

* Abstract of a discourse delivered at a meeting of the Liverpool Chemists' Association.

thought I attach too much importance to this; but, has it not been a curse to this business for many years, a bar to enlightenment and progress, the spoiler of social and home comforts, and a barrier which impedes the progress of associations such as this? When will men of pharmacy merge their petty jealousies, forego their inordinate desire for gain, and regulate their hours of employment more in accordance with Nature's laws rather than according to the arbitrary and absurd ones which they have prescribed for themselves? I believe there is in every individual a certain amount of energy,—different in different individuals of course, but in all there is this energy, partly mental, partly physical, partly active, partly passive,—and that a great portion, if not the whole of this active force, is transmutable. Just as a given quantity of motive power might be developed as heat, light or electricity, so this active energy is capable of being put forth either as mental or physical force. If you exhaust all this active force in physical development, or if you squander or trifle it away, where do you find power to cultivate the mental capacity? You might draw, it is true, on the latent energy; but this done too often, health is impaired. I should like to see our hours of business nearer to those of the merchant at his office, say from nine to six at the most, and during those hours should like to see business done as a merchant does it. None of that important time should be lost, the amount of work accomplished by any one individual would be little less than if extended over the larger number of hours, but the expenditure of energy decidedly so.

Well, gentlemen, when the day arrives that this is accomplished, what a large amount of time and energy we shall have at our disposal, and how much might be expected from us! Surely there will then be no grounds for Dr. Attfield charging our students with *superficial cram.* Cram you always will have if you choose to call it so, but if what is crammed is retained so as to be useful, cram as much as you like. The professor is doubtless correct when he says that the bulk of the students in the present day aim merely at passing the examinations, and do not study purely to gain knowledge. If we consider for a moment who they are that constitute the bulk of those presenting themselves for examination in the present day, we shall see that they entered the business never expecting to pass an examination at all. The present long hours of business only leave these young men very little time in which to prepare for the examinations. After they have done with these, we can still hope that some prosecute their studies for the love they bear towards them.

With all due deference to those who have been pushing forward educational schemes, it implies want of faith in the progressive condition of things which they have been instrumental in bringing about. There is a time to be active, and there is also a time to be *passive.* Two or three years hence things will have approached nearer their proper level; then, and not till then, shall we be able to fairly judge of what is necessary to be done for education. We are told that competent men get plucked,—that incompetent men pass the examinations; and the only reply seems to be "that the time is too short to examine in." Well, why not give more? It is surely unfair to send a man away half examined, when he pays well for it.

I anticipate, too, the day is not far distant when we shall all more fully value our time. I could say much on this point, but my friend Mr. Delf so thoroughly exhausted the subject in a paper which he read before you some time since, that to add thereto would be superfluous. In the future, too, we can hope that some of the provincial associations will give us some better evidence of their usefulness. Liverpool is considered to stand amongst the first of these—but does it? Is there the same difficulty amongst other associations, in getting papers for the evening meetings? We have a good library; but (with a librarian none too well paid) it costs about fourpence per volume per annum for each that is circulated. We have an excellent museum; but it is a rare thing to find any one in it. A school of pharmacy; but where are the pupils? Are these signs of a healthy condition? Can we not hope for something better?

We could wish, too, that the Pharmaceutical Conference would make some real progress; that its numerical strength were not the chief evidence we have of its progressive condition. It publishes a good Year-Book, and I should be pleased to see its proceedings form a more important feature in that volume. Some of the papers read at the annual meetings are good, some are trash. Just fancy a man reading a paper for the purpose of explaining that whenever tinct. ferri perchlor. is ordered he always uses the liquor!

Finally we reach Bloomsbury Square. There, as I have said, we have a grand institution, and good professors, and at the head of all the Pharmaceutical Council.

You remember the Executive Committee of the Chemists and Druggists' Society, and you also remember the old Pharmaceutical Council, embracing men whose names have become, if not household, certainly pharmacy words with us; men whose judgment we esteemed; men in whom we had confidence that, whilst they were at the helm, the ship would sail safely. Now, I speak with all due deference to the present Council, but I feel that I am speaking the truth when I say that it too much resembles the Executive of the Chemists and Druggists' Society—too little the old Pharmaceutical Council. Do not misunderstand me. There were some good men in the former body; but, as a whole, they were loosely strung together; uncertain in their action; they did not represent pharmacy of the first class; and this I maintain a governing body like the Pharmaceutical Council ought to do.

IODIZED ALBUMEN AND IODIZED ALBUMEN WITH FERRIC CITRATE.*

Professor Luigi Guerri, of Florence, has been studying the question whether it be possible to employ the white of egg to prevent the decomposition of ferrous iodide, and to obtain a combination which should contain one part of iodine to five parts of oxide of iron. In order to investigate the action of iodine upon albumen, Professor Guerri saturated it with dilute phosphoric acid, collected the liquid, evaporated the solution of albumen to 3° Beaumé, and afterwards added finely divided iodine, obtained by precipitating tincture of iodine with water. This

* From 'L'Union Pharmaceutique,' vol. xiii. p. 289.

caused the albumen to turn red, but after some time, when stirred, it regained its primitive colour. These changes of colour occurred repeatedly after additions of iodine until at length the red colour remained persistent and mucilage of starch was coloured blue. When this point was attained the liquid was agitated, and, after standing ten or twelve hours, it again regained its original colour; it then no longer gave the reaction with starch, except under the influence of chlorine water or nitric acid containing hyponitric acid. Even these were not sufficient to set free some portion of the iodine, it being necessary to incinerate with potash in order to obtain it in the state of iodide of potash. Professor Guerri found afterwards that even during the evaporation of the albumen to dryness the iodine remained in combination, and that during the process some white flakes appeared, which separated upon standing, and redissolved in a very small quantity of potash.

According to careful experiments of Professor Guerri, 100 parts of this iodized albumen, that had been dried at 60° C., contained 3·132 parts of iodine; and 474 parts of solution of albumen of 3° Beaumé density when so evaporated yielded 31·928 parts of iodized albumen, whilst 31·928 parts of iodized albumen contained 1 part of iodine. The iodized albumen forms yellow transparent scales, soluble in water, with the exception of a few flakes which are not dissolved by acetic acid or phosphoric acid, but are dissolved by alkalies. The solution is precipitated by alcohol; is neutral, and gives no iodine reaction.

In order to obtain a ferruginous preparation of the strength before mentioned, Professor Guerri dissolved 18 parts of ferric citrate,—corresponding to five parts of ferric oxide,—in 474 parts of solution of albumen, 3° Baumé density, previously iodized, and evaporated the solution at a temperature of 60° C. to dryness. This gave 50 parts of a compound containing one-third of ferric citrate and two-thirds of iodized albumen. The product so obtained has the appearance of ferric citrate, but is a little yellower. The solution comports itself similarly to the iodized albumen. The iron is not separated from it by alkalies, or by ferrocyanide of potassium, but is separated by the alkaline sulphides.

Each of these preparations is easily formed into a pill mass with simple syrup, as well as with extracts not containing much tannic acid. They can also be administered in powder.

THE CHEMICAL PROPERTIES OF EUCALYPTUS LEAVES.

BY M. RABUTEAU.

In a note presented at a recent session of the French Academy,* M. Rabuteau describes the result of an attempt to ascertain whether the leaves of the *Eucalyptus globulus*, now frequently employed in cases of intermittent fever, contained any basic principle analogous to the alkaloids of quinine.

Brunel, in a memoir upon the effects of eucalyptus, speaks of an undefined substance obtained from it which he calls eucalyptine; and in Corsica the medical men have administered, with success, a saline residue, obtained by treating an alcoholic extract of eucalyptus bark with sulphuric acid. If, however, the eucalyptus had contained a febrifuge alkaloid, M. Rabuteau thinks it would scarcely have escaped M. Cloez in his researches on eucalyptus leaves and eucalyptol; and a direct search for such an alkaloid by M. Rabuteau has led him to the conclusion that one does not exist in the leaves.

Having evaporated some alcoholic tincture of the leaves to half its original volume, the addition of water caused a plentiful precipitation of yellowish resin, which blackened upon exposure to the air. A few drops of hydrochloric acid considerably favoured the separation of this resin, which was soluble in alkalies, and formed with them resinates. The slight alkalinity of the saliva was sufficient to dissolve it, with extreme slowness, but in appreciable quantity. A preparation might therefore be made from it analogous to certain medicinal tars, soluble upon the addition of an alkali.

The liquor, separated from the resin and filtered, contained tannin, which imparted astringency to it, and was removed by a salt of iron. It was then treated with a solution of iodine in iodide of potassium, to precipitate an alkaloid if present; also with phosphomolybdic acid, but without success, although the latter reagent is said to be such a delicate test for an alkaloid that it gives a plentiful yellow precipitate when caffeine is present in a solution in the proportion of 1 part to 20,000, and a yellow turbidity with 1 part in 80,000.

A decoction of powdered leaves of *Eucalyptus globulus*, in water acidulated to separate all the resin, treated with the same reagents, yielded no trace of an alkaloid.

* 'Comptes Rendus,' lxxv. 1032.

CERTAIN UNDESCRIBED PROPERTIES OF THE CONCENTRATED SOLAR RAYS.*

BY GEORGE ROBINSON, M.D.,

Fellow of the Royal College of Physicians of London.

Some thirty years since, I accidentally noticed that the sun's rays, concentrated by an ordinary lens and directed upon the hand immersed in water, produced immediate pain with burning heat and vesication. This experiment, varied and repeated at intervals on different living animal tissues and under different circumstances, always led to the same result. But if the concentrated rays were fixed for an instant upon the head of a small aquatic animal, death immediately resulted before vesication occurred. On dead animal matters similarly treated, no perceptible effect was produced.

The physiological action was, as I have stated, always instantaneous, but when a thermometer having a bulb of black glass was immersed in water, and the rays concentrated on the bulb for some time, the instrument at the end of ten minutes only indicated a rise of temperature from 60° to 80°. A few years since I happened to mention these observations to my venerated friend, the late Dr. John Davy, and at his request I prepared a short account of them, which he communicated to the British Association for the Advancement of Science, at its meeting in 1867.

The rationale of the results witnessed in this simple experiment always seemed to me obscure, and to indicate the possible existence in the sun's rays of some property or force that had not hitherto been investigated. Under this impression, and being myself engaged in practice, I took advantage of an opportunity to draw the attention of the illustrious Faraday to this subject some fifteen years since, in the hope that he would apply his powerful mind to its elucidation. But in a kind letter

* From the 'Scientific American.'

he told me that he was then overwhelmed with work and could not undertake the inquiry.

Happening to be in New York during the recent hot summer, I have performed a few additional experiments; and so far as they go, they certainly tend to confirm my belief in the existence of a hitherto unrecognized property or force in the solar rays.

In attempting to ascertain the precise nature of this force, I could not rely on ordinary thermometers, for they are actuated gradually and slowly while the pain and sensation of heat are instantly felt. Neither would the usual thermo-electric apparatus meet the difficulty, as my observations must be made in water as well as air. I finally concluded to rely on Nature's own instrument, the nerves of sensation as they exist in exquisite perfection in the integuments of the finger. In the propriety of this course, I was confirmed by a remark of Professor Tyndall that the optic nerve is more sensitive to the heat rays present in light than any thermometer.

In experimenting, I generally placed on the end of the forefinger of my left hand the substance under observation, steadying it with the thumb, and dipping the hand when necessary into water so as to have a layer of that liquid at least an inch thick above the skin. The lens employed was of seven inches focal distance; and in using it, I always threw the focus behind the object examined so that the rays should traverse it instead of being concentrated upon it.

Whenever in experiments in air there was the slightest appearance of singeing or other action of heat on the substance examined, the observation was rejected. Care was taken not to press the finger firmly against the substance, but merely to maintain the slightest possible contact. Under these conditions, a burning painful sensation was felt when the concentrated solar rays were transmitted through the following substances both in water and air, namely, two layers of blue glass, black leather (glazed and unglazed), green leaves, thick white cardboard, the same covered with blue or red paper, six layers of pink paper, earthenware, oilcloth and common brown glue a quarter of an inch thick.

Now taking only these substances into consideration, it is not easy to explain on the views now current how rays could pass through an opaque non-conducting substance like oil-cloth, so as to pain the finger placed beneath it even when both were immersed in water. But my observations came still more into collision with received opinions. Thus it is generally stated in scientific works that a crystal of alum is athermanous, that while allowing the rays of light to freely traverse it, those of heat are arrested. But on directing the concentrated rays through a crystal of perfectly transparent alum, I found that it produced a burning sensation in the skin, both in air and water. It is evident, therefore, that Melloni's conclusions with reference to athermanous bodies do not apply to the concentrated solar rays, if the pain were produced by heat. Another still more curious and unexpected result was obtained. It is generally believed that metallic surfaces reflect heat rays of all degrees of refrangibility, and are consequently impenetrable to them and absolutely athermanous. But I found that a burning heat was felt in the finger when the concentrated rays were transmitted through double tin-foil and thin sheet-iron. The following experiment illustrates this point very clearly: I took a mirror formed of plate-glass a quarter of an inch thick, silvered in the usual way with tin amalgam, on the back of which was a thick layer of red paint, well dried. I let the painted back part of the mirror rest upon my finger both in air and water; and on concentrating the rays upon the glass, throwing the focus as usual behind the mirror, the burning pain in the finger was instantly felt by myself and others. The mirror itself was in no way affected by the experiment.

Here the light rays were of course excluded, and those of radiant heat were, according to the generally accepted laws of physics, prevented from penetrating to the finger by the intervening metallic coating of the mirror, to say nothing of the layer of red paint; and yet rays capable of producing pain and inflammation in the integuments of the finger undoubtedly passed through, 1, the water; 2, the thick plate-glass; 3, the layer of tin amalgam; and, 4, the coat of red paint.

Now what were these rays?

They were very refrangible, they possessed great penetrating power, they acted instantaneously, and energetically upon the tissues of the living animal body. These are obvious and palpable conclusions, but without additional facts we cannot go much further in reasoning on the subject.

That the concentration or mere convergence of the sun's rays does really increase their penetrating power is, I think, highly probable, and this may partly explain some of the facts observed. But I still cling to the belief that the conditions present, for instance, in the last-mentioned experiment, rather point to the presence in the sun's rays of a force acting specially and as a powerful stimulant or irritant on living matter. It may be that the more refrangible heat rays thus exercise on vital structures a special influence analogous to the actinic or chemical power of the more refrangible rays of light. I append other experiments, which also tend to render it probable that the irritation and pain in the living tissues, observed under these circumstances, are not induced by common heat. Ordinary albumen being coagulated at a temperature of about 150° F. might, I thought, serve as a test of the presence of common or thermometric heat in the sun's rays, and so assist in determining the question whether the burning pain was really due to heat or to some other force.

Some perfectly transparent egg albumen, placed on glass or on white earthenware, was not at all changed by the concentrated sun's rays; on any dark surface, however, it was instantly coagulated, and this effect occurred both in air and water. Thus when poured on dark purple paper and the rays concentrated upon it in the slightest degree, the albumen presented at once an opaque clot.

I took some of this purple thick glazed paper, and wrapped it round my finger. On the purple surface I placed some albumen, and on the latter a second layer of the purple paper. I then carefully concentrated the sun's rays so as to avoid burning or injuring in any way the paper, throwing the rays through it and the albumen; I instantly felt the burning pain in the finger, and then withdrew the lens and examined the albumen placed between the two layers of purple paper. *It was not at all coagulated.* Here the irritating rays passed through two layers of purple paper and a film of albumen without producing any effect on those substances, but instantly caused pain in the skin beneath. A little of the same albumen placed upon the same paper was at once coagulated by the same condensation of the sun's rays, so that, if any rays of heat had passed through the first layer of paper, they ought to have produced coagulation in the albumen resting upon the second layer of purple paper. As they did not do so, the probability is that the pain was not occasioned by ordinary heat.

In another experiment the mirror above-mentioned was placed upon the finger, a layer of egg albumen intervening between the skin and the back painted surface of the mirror. The rays were then gradually concentrated upon the upper glass front of the mirror until a burning pain was felt in the finger beneath the latter. The albumen, being then examined, was *not* coagulated.

In leaving this subject for the present, I shall merely remark that the phenomena of "sun stroke" are probably due to the peculiar rays producing the pain and other physiological and pathological effects noticed in my experiments. This inquiry may therefore not be without some practical interest to the members of the medical profession.

In the hands of more skilful investigators, aided by the refined scientific appliances of the present day, there is every reason to hope that the obscurity still surrounding this subject will be dispelled, and that we shall hereafter be enabled to recognize more fully the nature of the intimate and beneficent connection undoubtedly existing between the solar and vital forces.

INDIAN RESINS AND GUMS.*

BY P. L. SIMMONDS.

The progress of our manufactures and chemical industries leads to increased demand for gums and resins, which are only received in any quantity from two quarters, India and Africa, where they are abundant and labour is cheap. In soluble gums, Arabic, etc., there has been a small increase in the imports in the last few years; but, notwithstanding the large employ of dextrine and gum substitutes, the natural gums, at moderate prices, are still much wanted; of the various lac products, for which we are solely dependent on India, the supply is decreasing; and of the resins for varnish, copal and kowrie are the only ones of which steady supplies are maintained; animi has fallen off considerably. In view of the growing deficiency in the supply of gums and resins for commerce, the Government of India has set on foot, through its officials, inquiries as to the yearly amount that could be obtained of the more easily procurable kind of gums and resins, and the price per ton at which they could be put down at the provincial commercial centre most convenient for export to Europe, or for transmission to a suitable port. The exportation of these products, and especially of gums proper, has only to a very small extent engaged the attention of traders. They are now generally gathered for local consumption merely. A large foreign demand would develope the trade in each kind to an immense extent, as gum-producing trees are abundant all over the provinces. We have not all the replies before us, but from the report of the Commissioners of the Central Provinces, some useful facts may be gleaned.

About 180 tons of dammar or *ral*, at from 160 to 190 rupees per ton, could be put down yearly at Nagpur or Jabalpur. This would come from the district of Mandla, Balaghat, Raipur, and Bilaspur. Formerly, a good deal of ral was procurable. It is easy to get. The hillman selects the finest trees, hacks a circle on the bark round each, and removes the ral when formed. This process, though, kills the tree, and entire forests have been destroyed by it. Of late years a stop has been put to the practice in the Government jungles, and but little ral now finds its way into the market, and that is procured from the Malguzari jungles. In addition to the above, a large quantity could be exported yearly from Sambulpur, and put down at the port of False Point, at 135 rupees a ton. The vast extent of sal forests (*Shorea robusta*), Government and zemindari, in these eastern districts, would admit of enormous quantities of ral being produced, were there a call for it, at a fairly remunerative price. The hill tribes would readily carry on the industry, and, could they be induced to tap the trees judiciously, the timber would not suffer. These provinces, at a rough guess, could readily supply 25,000 tons of stick lac. The price at which it could be put down on the railway, and a part of it at False Point, is from 280 to 500 rupees per ton. All districts produce lac, but it is particularly abundant in the eastern ones. Large quantities of it are consumed in the different towns in the making of bracelets, etc.; but most districts also export it, to a greater or lesser extent.

In Jabalpur there is a European lac factory that consumes most of the lac produced in the district. It comes, too, to Jabalpur and Mirzapore in large quantities from Raipur, Bilaspur, Sagar, and Mandla. In the last-named district, the Jabalpur lac firm has bought the right, for the next three years, of collecting lac in the Government jungles, for 950 rupees a year. In the Sambulpur district, a European firm, from Mirzapore, has for a long time held practically the monopoly of the lac collection. Burhampur and Bombay receive supplies, though of less quantity, from the Narbada and Nagpur divisions. The whole exports of the Central Provinces for the year 1868–69 amounted to 1492 tons, and for 1869–70 to 1348. Of this amount in the two years respectively, 1417 tons, valued at 386 rupees a ton, and 1290 tons, at 269 rupees a ton, were exported to Mirzapore and Central India; 66 tons, at 540 rupees, and 53 tons, at 350 rupees, were exported towards Bombay; and nine tons, at 205 rupees, and five tons, at 252 rupees a ton, were sent down to the eastern coast.

Stick-lac is procurable in immense quantities all over the provinces. In years of excessive heat the out-turn is said to be less. The low price at present paid for it hardly repays, it is said, the cost of collection, and in consequence much that is in existence is not gathered. A large demand at a good price—and this it is confidently expected will not be long in coming—would call all this at once into the market. Moreover, by inducing better methods of cultivation, collection and cleansing, it would vastly increase the supply, which would be limited only by the extent of the demand and the size of the forests. The valuable industry, too, that it would establish would tend to develope the resources of the most backward parts of the Central Provinces. The increase of the supply by artificial propagation thus becomes a subject of much interest. Major Lucie Smith reports that lac is found abundantly in the zemindaries to the east of the district of Chanda. The incrusted twigs are broken off and sold by the Gonds to the dealers in lac. The people believe that the lac insects are born of the morning mist, and no efforts are made to propagate them artificially. But were there a large demand, the rearing of the insect would be systematically carried on, and result in a very great increase of the product. Mr. Grant, the Commissioner of the Jabalpur division, states that in two places only is the production of lac assisted by human agency in propagating the insect from tree to tree. The great bulk of the lac is produced without any artificial assistance, and left entirely to the unaided exertions of the insect, and its migration from tree to tree. The question whether it would pay the Government to undertake the establishment of lac-producing tracts of forests is one which naturally suggests itself in any discussion of an increased supply of resins. On the practicability of a scheme of this nature, the Deputy-Commissioner quotes a passage from a letter received by him from Mr. Michia, a French gentleman of some scientific attainments, who possesses a very intimate knowledge of the forests of the Jabalpur and Mandla districts, and who is himself the proprietor of a large tract of productive forest land in the latter district. Mr. Michia says the production of stick-lac might be indefinitely increased in the Central Provinces, if more attention were paid to the rearing of the cocoons. If, instead of trusting to chance for the annual propagation of this valuable insect, and relying altogether on the agency of birds in transfering young broods from tree to tree, without which lac would altogether disappear from our forests, we were to establish in the wilds of Balaghat and Mandla lac plantations for rearing the cocoons, the supply would be enormously increased. Palas (*Butea frondosa*) and cusam (*Schleichera trijuga*), the only necessary trees, are found in great abundance all along the whole of that line of country. The plan suggested by Mr. Michia appears feasible, and worthy of a trial.

The Beejasal (*Butea frondosa*) and dhak (*Pterocarpus marsupium*) that yield kino are fairly plentiful in these provinces. At present there is no demand for kino, except to a small extent for medicine. Large quantities could, if required, be supplied for export. The Deputy-

* From the 'Journal of the Society of Arts.'

Commissioner of Chanda considers that 100 tons could easily be raised in his district, and put down at the Wurdha railway stations for 120 rupees a ton. But the valuable timber of the Beejasal would suffer by the process of tapping that is necessary for the production of the resin. The Salai tree (*Boswellia thurifera*), from which *gunda fereza* is produced, is as abundant as any tree in the Central Provinces. At present but little of the gum is brought into market, and that for local use, but very large quantities could be readily supplied. The tree yields the gum abundantly. The value of its timber is very little, nor is it injuriously affected by tapping. From the Chanda district, it is estimated that 10,000 tons could be put down yearly at the Wurdha railway station for 100 rupees a ton. In the Narbada valley, it could be brought to the railway for 160 rupees (£16). Of the Dikamali resin (obtained from the *Gardenia lucida*) it is conjectured that 200 to 300 tons could be brought to the railway from the Chanda and Bhandara districts for about 100 rupees a ton.

Some 4500 tons of the better kinds of gums could readily be supplied on the Great Indian Peninsula Railway at from 100 to 200 rupees per ton. The dhouma (*Shorea robusta*) and babul (*Acacia arabica*) are said to yield the best gum. Good gum is also procured from the char, ber, palas (*Butea frondosa*), saj, ain (*Dipterocarpus* sp.), tendoo, khair (*Acacia Catechu*), etc. There are numberless other gum-yielding trees, the gum of most of which is not of any market value. All these gums are readily procurable in most districts in large quantities. But the different kinds are brought to market so mixed up together that it is impossible to distinguish between them, or to make a guess at the amounts of the different sorts that could be suppled. Gums are generally collected for mere local consumption. Small quantities are, however, exported into the Berars, from Sagar to the north, and from the Narbada division towards Bombay. During the last year or so, two Bombay European firms have sent agents into the interior of the Nimar district, to make arrangements for a permanent supply. They have not as yet been very successful. In some parts the Gonds gain a livelihood by gathering gum, but the price is so low that in most districts men find the cutting of grass and sticks much more profitable. As a rule, women and children are employed on the work. In Nimar, their wages are the weight of the gum collected in wheat, or double its weight in *jowari* (sorghum). A large demand at higher prices than those now offered would not only greatly increase the outturn, but bring into the market a far superior article. At present, as has been stated, all kinds are gathered promiscuously, and offered for sale as gum, not as the product of any particular tree, except, indeed, occasionally, when the gatherers are under contract to supply the dhouma or some other gum for medicine. But these pure gums are procurable in very small quantities. Not only this, but the gum offered for sale always contains a quantity of sand, leaves, and bark. No attempt is made to keep it clean. It is gathered carelessly before it is sufficiently dry to come away of itself, and in consequence pieces of bark are torn off with it. But it may well be questioned whether this industry would ever become a remunerative one in these provinces, so far removed from the sea. Gum-bearing trees grow as extensively on the sea-board, where facilities for export are much greater.

A NEW FILTER.

BY R. ROTHER.

For most pharmaceutical purposes the ordinary plaited filter meets all requirements. But for analytical operations the plaited filter cannot be successfully applied. The numerous folds, while favouring the rapid transmission of liquids, expose too much surface for the convenient collection of precipitates, and at the same time greatly and seriously interfere with their washing. The plain filter is the only practical form for analytical uses, but as it exposes only half as much surface as the plaited filter, the passage of the liquid will naturally be slower; but a very fatal objection to the plain filter is the superfluous fold which in two thicknesses lies under one-half the extended surface of the filter. The interposition of these two extra layers compels the liquid to pass through three thicknesses of paper on the half side of the extended filter, whilst the other half side presents only a single thickness. It is evident that the two hidden layers are a very appreciable impediment to the current, aside from the more important fact that the liquid will traverse this side less rapidly than the other, and thus occasion an imperfect washing of the precipitate, or at least prolong the operation beyond reasonable limits. The writer, recognizing the force of this objectionable feature, resorted to a very simple modification of the plain filter, which, whilst saving 50 per cent. of the paper, removed all the deleterious defects of the old form. This new filter practically presents but a single thickness of paper to penetrate, at the same time preserving an even surface, equal in all other advantages to the plain filter. The strength and general security of the new filter has been thoroughly tested, and has not failed in a single instance. The filtrations are more rapid than with the usual form, and the absence of the superfluous half sheet admits of a more rapid drying, which is an additional gain of the new filter. The most gelatinous, as well as the most compact and heavy precipitates were collected with it from strongly corrosive liquids with the greatest ease. Its particular advantages for analytical operations are unsurpassed.

To make the new filter, cut the circular disc of filtering paper in two through the line of its diameter, take either half disc and fold it across the line of the radius, then turn down the double edge of the cut side and fold it over several times—finally, run a hard, smooth surface along the seam thus produced, to compress it, and spread the finished filter into an appropriate funnel, first moistening it with water before the liquid to be filtered is poured in.—*Chicago Pharmacist.*

SUNDERLAND CHEMISTS' ASSOCIATION.

The annual dinner of the Sunderland Chemists' Association was held on Wednesday, December 4th, in the Palatine Hotel; Alderman Thompson, the President of the Association, occupied the chair. The usual loyal and complimentary toasts were drunk, that of the "House of Commons" being coupled with the name of Mr. Candlish, M.P., who was present and replied.

Mr. Nicholson (hon. sec.), in responding to the toast of "The Sunderland Chemists' Association," said the members of the society had but one object in view, and that was to advance the position of the chemists, which was best done by the formation of local associations.

In reply to the toast of "The Medical Profession," proposed by the Vice-president, Dr. Yeld said he thought that the medical profession should not infringe upon the rights of chemists, and he hoped that few years would elapse before medical men gave up the practice of dispensing. When they did that, however, he hoped the chemists would then give up the practice of prescribing. He hoped that a Sunderland chemist would be appointed to the office of analyst. He had been charged with having stated that there was not a chemist in Sunderland qualified for the position, but he denied that he ever said anything of the kind, as he knew there were gentlemen well able to do the work.

The Chairman, in reply to "The President and Officers of the Association," said it was degrading to medical men that they should have to compound drugs when there was a branch of the medical profession in waiting night and day to do the work. In conclusion, he recommended the members of the trade to unite together for the protection of their interests.

THE ADULTERATION OF FOOD ACT.—DEPUTATION TO MR. STANSFELD.

On Thursday afternoon, December 12, a deputation from the Pharmaceutical Society, consisting of the President, Treasurer, Messrs. Betty, Bottle, Greenish, and Williams, with the Secretary and Mr. Flux (the Solicitor) attended by appointment at the office of the Local Government Board to bring before Mr. Stansfeld their views with regard to the appointment of analysts under the Adulteration of Food, Drink and Drugs Act. They were received by Mr. Lambert and Mr. Lumley, who stated that Mr. Stansfeld regretted very much that he was unable to meet the deputation, having been summoned to a Cabinet Council at such short notice as not to enable him to communicate with the deputation beforehand.

The President stated that the deputation attended in consequence of what had taken place at a deputation of medical gentlemen a short time ago, an account of which appeared in the *Times* of November 22nd last, from which it was feared the inference would be drawn that Pharmaceutical chemists or chemists and druggists would be excluded from competing for the appointment of analyst under the Act referred to. Now, as there were among their body many men quite qualified for the appointment, they were desirous that it should be publicly stated that such persons being so qualified were eligible. He would read three resolutions which had been passed by the deputation that morning:—

"That whilst it is obvious that sanction to the appointment of a dispensing chemist, simply because he happens to be called a chemist, cannot properly be asked, it is equally obvious that sanction to the appointment of a medical practitioner simply because he happens to be called a medical practitioner cannot properly be asked.

"That there are upon the Register of Pharmaceutical Chemists and Chemists and Druggists, persons possessing competent *medical, chemical and microscopical* knowledge for the office of analyst within the meaning of the Act of Parliament, and that it is not expedient for such persons to be excluded from the appointment.

"That competency is a question of fact, to be considered in each case, and that the examinations of the Pharmaceutical Society in a knowledge of chemistry and materia medica are, as a test of competency, at least equal to those necessary for admission to the Medical Register."

Mr. Lumley inquired if there were any examination to as microscopical knowledge by the Pharmaceutical Society, or how that qualification was to be tested?

The President said they did not examine in microscopical knowledge, nor was he aware that medical examinations included that subject.

Mr. Lumley asked if any of their examinations led to the belief that the persons examined had really given any study to the subject of microscopical investigation.

The President said the examinations themselves did not; but it was known as a fact, that there were many gentlemen in the business who were well qualified in that respect, and it would be, therefore, unfair to them that they should be excluded simply because they happened to be called chemists and druggists. Their view simply was, that chemists and druggists who were properly qualified should not be excluded from competing for the appointments.

Mr. Lumley asked how it could be ascertained that a person had acquired the requisite knowledge. With regard to a medical practitioner, the study of anatomy or some other branch of his profession would necessarily or naturally lead to microscopical investigations.

Mr. Greenish (member of the Microscopical Society) said the microscope was very much used at the present time in connection with materia medica, and although it did not form any part of the Society's examinations, yet it was very rare to meet with a pharmacist who was not a tolerably good, if not an accomplished, microscopist. In fact, the use of the microscope was necessary to the proper study of materia medica; especially in connection with starches and similar substances which would constantly have to be examined to detect adulterations.

Mr. Lambert said, as he understood, the resolutions simply went to the effect that a dispensing chemist should not be excluded from the appointment referred to, provided he was properly qualified.

The President said that was their object.

Mr. Flux said he considered it went to this length, that there was a greater inference to be drawn from a gentleman being on the Register of the Pharmaceutical Society that he was properly qualified for this appointment than if he were on any medical register. In lately preparing a case which he had laid before the Attorney-General and Solicitor-General in connection with this matter, he had made many inquiries, but he could not discover that there existed any test as to microscopical knowledge; but it appeared that the test applied by the Pharmaceutical Society as to the knowledge of materia medica went further in this direction than any other he could discover. It appeared that medical men were examined more especially in the application of medicines than in the knowledge of their ingredients, while the examinations of the Pharmaceutical Society were directed more to the composition of the medicine in its original state and its various compounds. What led to the present deputation was the fact that it appeared from several medical publications that a special claim was set up on behalf of the medical body to these appointments by reason of the use of the word "medical" in the statute. Now, in consequence of that, he had laid a case before the Attorney-General and Solicitor-General, and obtained opinion from those gentlemen, and he would ask leave to hand in both the case and the opinion.

Mr. Lumley, after looking at the opinion, said no doubt that when the Legislature wished to point to a legally qualified medical practitioner, they used those words which were not to be found in the present Act.

Mr. Flux said that was as far as the deputation desired to go. They only wished an authoritative utterance to the effect that these appointments were not limited to medical practitioners on the medical Register, and that really the electing bodies had to select the most competent persons within their knowledge and submit the election for confirmation to that office without a foregone conclusion that if the person appointed were not a medical man his election would not be confirmed.

Mr. Lambert said it was quite clear from the opinion of the Law Officers of the Crown that the appointment was not to be confined to medical practitioners, but it appeared that the persons must have some medical knowledge.

Mr. Flux said he admitted that, but contended that that medical knowledge did not necessarily import the practice of medicine.

Mr. Lumley said the difficulty was to see how a gentleman's medical knowledge could be ascertained unless he possessed a medical diploma.

Mr. Flux said there were many gentleman possessing the degree of Doctor of Science from the London University who were examined in all the sciences, including medicine, but they might not possess a medical diploma, and would not be on any medical register. Their contention was that the question of medical knowledge, like any other, was one of fact to be ascertained by the electing bodies without reference to any register, that the knowledge of medicines themselves was as much medical knowledge as the knowledge of their administration, and all pharmaceutical and other chemists did possess a knowledge of medicines, although they were not examined as to their application.

Mr. Lumley said in that case, would not the word "chemical" have been sufficient?

Mr. FLUX said hardly so, because medicines were distinct from chemicals.

Mr. LUMLEY said one consideration was that the articles to be analysed would be drugs supplied by chemists, and thus a gentleman would be analysing articles furnished by persons in his own trade. Was it contemplated that he should give up his business?

Mr. FLUX said that consideration would apply equally to a medical man. They did not contend that only gentlemen on their own Register should be eligible, for there were many men of eminence as practical analytical chemists who were not on the Register. He would also submit that there was no reason to imagine that a practising chemist and druggist would not duly discharge his duty equally as well as a practising medical man; because they might be called upon to analyse medicines. Their contention really came to this—there was no objection applicable to the one body which did not apply to the other, and that in fact a chemist should in respect of these appointments stand on a level with a medical man. A medical man might be presumed to have a kind of medical knowledge which the other did not possess, whilst on the other hand, the chemist might have a kind of knowledge which the medical man did not possess. Again, there was nothing to show that the medical men as a body were examined in chemistry.

Mr. LAMBERT said it appeared to him that before a medical man's election could be approved, some proof would have to be given of his competent knowledge of chemistry. And in like manner, if a chemist was appointed some proof would be required that he had competent medical knowledge.

Mr. FLUX said his contention was that the whole matter was a question of fact. The person to be appointed must have three qualifications, and if he possessed any two without the third, he was not competent; this was to be ascertained, not by reference to any register, but by such evidence as the electing bodies could obtain.

Mr. LUMLEY said he could understand that a gentlemen's medical knowledge could be ascertained by a reference to the Medical Register, and in the same way that his chemical knowledge might be ascertained by a reference to the Register of the Pharmaceutical Society. Could not microscopical knowledge be proved in the same way by reference to the register of some microscopical society?

Mr. FLUX said as far as he could understand, admission to the Microscopical Society was not subject to any test. It was merely a matter of voluntary subscription. The same was, to a certain extent, the case with the Chemical Society.

The PRESIDENT said that in any election which would take place, the persons competing, would bring forward what certificates they could in proof of their qualifications, and the electing body would decide probably from those certificates and any other knowledge they might be able to obtain. With regard to the word "medical," he thought it might almost be left out of the question, because he believed it referred not to a knowledge of medicine in the therapeutical point of view, but to a knowledge of the nature of medicines either to be used as adulterants or as being themselves adulterated; and also a knowledge of the action of these medicines upon the human frame. He contended that chemists and druggists, when properly educated, did possess that knowledge, and probably in a greater degree than ordinary medical men, and he thought this view was borne out by the opinions of the Attorney-General, Solicitor-General and Mr. Langley.

Mr. LAMBERT said he did not quite gather that from the opinion itself.

The PRESIDENT said he thought it would appear so from the opinion when read in connection with the case upon which it was given. He had nothing to say against their medical friends; on the other hand, he did not wish them to be unduly favoured, but that all should be put on the same footing.

Mr. LUMLEY said it must be remembered that the analyst had not only to report as to whether drugs were adulterated, or used to adulterate other matters, but also whether adulterations of other articles were injurious to health. One adulteration might be very slight, and yet very injurious to health, another might be very gross, and yet harmless. Some articles were poisonous in certain quantities, but not in others.

Mr. FLUX said his contention was that the knowledge of materia medica possessed by a chemist and druggist would enable him to deal with such matters. Every chemist had upon his shelves works stating what were the proper doses to be employed of strychnine or any other poisonous compound when used for medicinal purposes, and it not unfrequently happened that chemists were called upon to correct by their own knowledge errors made in prescriptions.

Mr. LUMLEY said he could quite understand that; they had, however, to deal not only with drugs and medicines but with articles of food of all kinds.

Mr. GREENISH remarked that if a medical man studied microscopy, he generally did so in connection with the minute structure of the human body; whereas a chemist used the microscope habitually to detect adulteration in the practice of his business.

Mr. WILLIAMS said there was one point which had not been touched upon, viz., that the main function of the person to be elected was that of analysing. Now analysis was a thing which required great experience, long study and much special knowledge. Medical men were rarely conversant with this branch of science, whilst many chemists were. He held in his hand a cutting from a London newspaper containing the remarks of a medical officer of health declining the office of analyst for his own district, for which he had been proposed, on the ground that he was not qualified. In so saying he was not to be understood as stating that he was not perfectly qualified as a medical officer, but candour compelled him to say that he had never made an analysis in his life, and he even went so far as to add that in his opinion there were only two medical officers in London—Dr. Letheby and Dr. Stephenson—who were really qualified for the office of analyst. This was an honest admission of the truth which the deputation contended for.

After a few remarks from Mr. HILLS,

Mr. LUMLEY asked what were the qualifications of any of the gentlemen appointed under the former Act?

Mr. WILLIAMS said he believed there were only two appointments made in London, one of Dr. Letheby, a medical practitioner, and one of Dr. Muter, who held no medical qualification.

Mr. FLUX said as far as he could gather no inference could be drawn from the appointments made under the former Act.

Mr. LAMBERT said he thought the subject had been very fully discussed, and he and Mr. LUMLEY would submit to Mr. Stansfeld the resolutions which had been drawn up, together with the case submitted to the Law Officers and their opinion, and also lay before him as fully as they could the views of the deputation. He would add that he believed as yet there had been very few appointments, none having been submitted for the approval of the department. The whole question was at the present time under consideration, so that a more opportune moment could not have been chosen for the deputation.

The PRESIDENT suggested in conclusion that the objection to a chemist being appointed because he might have to analyse articles sold by his fellow-tradesmen applied equally to medical men as officers of health, since they might be required to inspect and report upon property in which some of their best patients were interested.

Having thanked Messrs. Lambert and Lumley for their courteous reception, the deputation then withdrew.

The Pharmaceutical Journal.

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UNIVERSAL PHARMACOPŒIA.

THE discussion, recently reported in this Journal, relating to the proposed Universal Pharmacopœia, has left undetermined several questions that were then raised, or that naturally suggest themselves on reflection. The principal object contemplated in the proposition made at the International Pharmaceutical Congress was the assimilation in strength and composition of all important medicines used in different countries. This is a result that can only be obtained by slow degrees, after the collection of much varied information, and finally through the intervention of those officially connected with the governing bodies having control over the issuing of authorized pharmacopœias. The first thing to be aimed at is the attainment of the requisite information. It is necessary to direct the attention of medical men and pharmacists to existing differences, often important, in medicines having the same or similar names. Arising from this cause much difficulty and even danger sometimes attends the dispensing of medicines for travellers in foreign countries. If all medicines having similar names were similarly composed, this difficulty would be removed. But how is such an assimilation to be effected? It is not the mere publication of the formulæ of different pharmacopœias, nor the placing of such formulæ in juxtaposition, that would accomplish what is required. The habits and prejudices prevailing in different localities must be overcome, and this, not by the exercise of authority, but by an appeal to facts and arguments. When several forms are adopted in different places for the administration of the same medicine, questions will arise as to the necessity for these differences; and if such necessity, or some sufficient advantage to justify an exception, cannot be shown to exist, then which of the several formulæ should be adopted to the exclusion of the others? These questions can only be settled after opinions have been freely expressed by all parties interested. The book proposed to be issued by the Société de Pharmacie of Paris, and referred to at the Vienna meeting, had for its object the eliciting of this kind of information, and was perfectly distinct and different in its design from the work described by Dr. THUDICHUM as that projected by Dr. PHOEBUS and other eminent medical and pharmaceutical authorities, including himself.

Then again, the book referred to at Vienna, itself emanating from a pharmaceutical corporation, was to be sent to other associations of a similar description, to be used by them at their discretion for furthering the object in view, but not with a view to its sale for profit, or its use for the ordinary purposes of a pharmacopœia.

The question of pharmaceutical nomenclature is one of considerable importance in connection with the attainment of the desired object. If it is proposed to assimilate the composition of medicines used in different countries, the names applied to them should be assimilated also; and then comes the question, in what language should these names be expressed, and further, in what language should the work as a whole be composed. In most countries Latin is the language of prescriptions, if not wholly, at least as far as relates to the names of medicines, and prescribers and dispensers in every country are supposed to have a knowledge of Latin. This is obviously, therefore, the language most suitable for a universal pharmacopœia.

There is also the question of weights and measures, or other means of representing the relative quantities of the ingredients entering into compound medicines, which will have to be determined before the Pharmacopœia is finally prepared.

Some of these questions were asked with reference to the work described by Dr. THUDICHUM; but the doctor's remarks, although conveying much valuable information, did not refer to these points. What we learn from his statement is, that a society consisting at first of eight members, with Dr. PHOEBUS at its head, and called the "Pharmaconomical Society," has undertaken the production of a Universal Pharmacopœia, which is to comprise a description of European medicines, good, bad, and indifferent, and that these are to e classified according to their merits by the size haracter of the type used in describing them, important medicines being in large type, then medicines of less importance in smaller type, and lastly, worthless medicines, which, in the opinion of the authors ought to be discarded, in the smallest type.

With the exception of the proposed classification by means of different types, we presume this work would not materially differ from HAGER'S "*Pharmacopœæ Recentiores Anglica, Gallica, Germaniæ, Helvetica, Russiæ, inter se collatæ.*" It might, no doubt, be a valuable addition to pharmaceutical literature; but from the description given, we fail to discover in it the essential features of such a work as the International Congress evidently contemplated.

AWARD OF PRIZES BY THE FRENCH ACADEMY.

On the 25th November the Académie des Sciences held its annual public meeting, on which occasion the prizes for the last two years were awarded. M. Faye, the Vice-President for 1871, delivered an address in which he alluded to the disasters from which France had suffered, and said that, nevertheless, the sittings of the Academy had been uninterrupted, except on one occasion, when one of the perpetual secretaries having left his home for the Academy was obliged to return in consequence of the erection of barricades and the imminent danger of his house being destroyed by fire. M. Faye also congratulated his hearers upon the fact of the French metre having been recognized in Great Britain and the United States, and adopted in Germany. Amongst the prizes awarded, numbering 34 in the two years, were—(1870) the Jecker Prize, 1700 francs each, to Messrs. Clermont, Gal and Grimaux, for researches in organic chemistry; the Barbier Prize (in the absence of a botanical competitor) to M. Personne, for his researches on chloral; (1871) the Jecker Prize of 5000 francs to M. Schützenberger for his labours in organic chemistry; the Barbier Prize, to M. Duquesnel, pharmacien and author of a work entitled 'De l'Aconitine Cristallisée;'* the Montyon Prize, in experimental physiology, to M. Raulin, for a treatise entitled 'Études Chimiques sur Végétation.'

The system of giving prizes for original research, which is such an important feature in connection with the French Academy, is one that is undoubtedly successful, not only in promoting scientific investigation, but in influencing generale ducation. Many suggestions have recently been made as to the most profitable disposal of the presumed surplus funds of the Pharmaceutical Society, and it would, perhaps, be worthy of consideration whether a portion might not advantageously be applied in a similar manner to assist in the development of pharmaceutical research in this country.

THE ADULTERATION ACT.

At a recent meeting of the Association of the Medical Officers of Health, Dr. Letheby brought forward the subject of the payment of analysts appointed under the above Act, with the object of obtaining the sense of the Association upon the question. He estimated that an average of 250 analyses would be required from each analyist appointed, and he suggested that if paid wholly by salary, each analyst should receive £175 per annum; if partly by salary and partly by fees, then at the rate of £1. 1*s.* each for the first 100 analyses, and 10*s.* 6*d.* each for the remainder; if paid wholly by fees, then the scale should range from 2*s.* 6*d.* to 10*s.* 6*d.* per analysis, that being the scale of fees required by the Act to be paid by any purchaser of articles of food, etc., desirous of having such articles analysed. The suggestion was approved by the Association.

* See Pharm. Journ. [3] vol. ii. p. 602.

Dr. Whitmore has been appointed public analyst for the parish of Marylebone, and Dr. Bernays, of St. Thomas's Hospital, for the parish of Camberwell. So far as we have been able to ascertain, the tendency of the bodies in whom is vested the appointment of analysts under this Act, has, hitherto, been to appoint medical officers of health of their districts, and there is little doubt but that this tendency is encouraged by the Local Government authorities.

DISINFECTANTS AND DISINFECTING.

In our correspondence columns we have inserted a letter from Messrs. M'Dougall Brothers, in refere nce to our remarks upon this subject recently The preparations referred to by Messrs. M'Dougall are known to us, but we have no positive evidence as to their practical utility as compared with carbolic acid. As bearing upon this question, it may be mentioned that the authorities of the Smithfield Club Cattle Show have this year resorted to the use of Sir William Burnett's Disinfecting Fluid.

A society has been formed under the title of the National Health Society, which is to have for its object to help every man and woman, rich and poor, to know for himself, and to carry out practically around him, the best conditions of healthy living. The steps at present proposed are the holding of monthly meetings for the reading of papers; the establishing of classes for instruction in various branches of sanitary science; the delivery of free popular lectures; and the formation of a reference library and an information office.

On Monday last, Mr. J. K. Lord, the naturalist and superintendent of the Brighton Aquarium, died after a short illness. Two days previously the first public illumination of the Aquarium took place with great success.

A meeting of the representatives of the Italian Pharmaceutical College has been recently held in Rome, having for its object an examination of the status of the body, which was found to be satisfactory. Messrs. Rolli, Peretti, Cicconi, Marignani, and De Cesarisi, of Rome; Colleoni, of Venice; Garofoletti, of Milan; De Vecchi, of Umbria; Kernot, of Naples; and Monteforte, of Palermo, were nominated as a committee to inquire into the progress of pharmacy in the west of Europe, and apply the same to Italy; also to draw up a pharmaceutical code of laws and a single tariff.

Provincial Transactions.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The first meeting of the session of this society was held in the new rooms of the association, Exchange Buildings, on Friday evening, the 18th October; Mr. J. H. Atherton, F.C.S., the President, in the chair.

Several members were elected, and donations to the library and museum announced.

The President said that arrangements had been made for a course of lectures on "The Chemistry and Botany of the Pharmacopœia," by Dr. Souter, to be held in the rooms of the society every Tuesday afternoon, and he hoped that all the associates would avail themselves of this opportunity of acquiring the sound and practical knowledge which Dr. Souter was so well calculated to afford. He explained that the time for the classes had been altered from nine o'clock P.M. to the afternoon for several reasons, chiefly because it afforded an opportunity for young men in the neighbouring towns and villages to avail themselves of the lectures and other advantages of the association, many applications from such places having been made; and another reason was, that by holding lectures in the afternoon they had a better attendance of the pupils, and their minds were more capable of receiving instruction in the afternoon than when wearied with the exertions and toil of a day's business.

The President also congratulated the society on having obtained such very convenient and commodious rooms at a more moderate rental. They must now devote their energies to the enlargement of the museum, so as to give every possible facility to the associates for acquiring a practical knowledge of the articles used as medicine.

The President then delivered the "inaugural address" of the session, referring at some length to the question of provincial education, and stating that he still adhered to his original opinion, that the establishment of large centres of education would not at all meet the wants of the country. That provincial societies could not afford, and ought not to be called upon, to defray entirely out of their own pockets all the preliminary expenses of forming museums, libraries, etc. That the question of aid from the Pharmaceutical Society ought to be considered as only of a temporary nature. That the elaborate schemes introduced by various gentlemen during the past year did not at all help the Council in their decision on the subject; that, in fact, their work was retarded in his (the President's) opinion. The matter being only temporary, the more simple the arrangement the better. If pecuniary aid was needed at all, it was needed at once; and he thought the Council should give grants where local societies were doing good work; where the necessity was felt for education, arrangements would be made in other parts of the country either for establishing classes for themselves, or arranging with the nearest provincial association. If the necessity was not felt, there was nothing to be done; even if the masters did not care to face the difficulties of forming an association in populous places, the assistants could form one for themselves, and receive aid where necessary. He thought that pecuniary grants should be given according to the number of young men in the district, and ostensibly for aiding local societies in forming museums, libraries, and the means of carrying on the educational work. He (the President) quite believed that in a few years if there existed a proper means of having good and well-illustrated lectures, a useful museum and a good library, the lectures could be made self-supporting, and in that case the local funds would be adequate for all ordinary expenses; there would then cease to be any necessity for using the funds of the Pharmaceutical Society.

The President then alluded to the method by which the utility of the Society could be spread over an area of thirty miles, at very little more expense to those living in towns a short distance from Nottingham.

Other matters were alluded to, such as the Adulteration Act, the Juries Bill, Co-operative Stores, the Pharmaceutical Conference, the Examinations, and Mr. Atherton concluded by dwelling on the uses and advantages of associations of a like nature, and making a strong appeal to the members to support the society not only by their subscriptions, but to do so by their presence, as an encouragement both to the young men, and to the officers of the society.

After some discussion, a cordial vote of thanks was passed to the President for his comprehensive address.

SUNDERLAND CHEMISTS' ASSOCIATION.

On Wednesday evening, Nov. 13, Dr. Donkin, late Professor of Medical Jurisprudence at the University of Durham, delivered a lecture to the Sunderland Chemists' Association, in the long room of the Athenæum, the subject being "Arsenical Poisoning," with reference to the "Cotton Cases," which have raised much interest on the subject in the country. Alderman Thompson presided. The following is an abstract of the lecture:—

The ancient Greek and Roman physicians were familiarly acquainted with two compounds of arsenic and their poisonous properties; these were the red and the yellow sulphurets of arsenic. To the red they gave the name of sandaracha or realgar, while the yellow was named arsenicum or auripigmentum, now contracted into orpiment. Dioscorides, the father of the materia medica, who wrote towards the end of the first century, as well as his successors Ætius, Actuarius, Galen, and later still, the Arabian physicians, especially Avicenna, have given an account of the symptoms and treatment of arsenical poisoning; and they used the same remedies which are now considered most effectual against this poison, namely, emetics, demulcents, such as milk, and barley water in large draughts, linseed tea and laxatives. Pliny the naturalist also describes the sulphurets of arsenic, and applies the term arsenicum to the yellow variety. Both the red and the yellow sulphurets of arsenic owe their poisonous properties to the large quantity of free arsenious acid they contain, amounting sometimes to 30 per cent. of their weight. Owing to the brilliant colours of these compounds, they are much used at the present day in dyeing, paper staining, and painting, and, what is still worse, in colouring toys and sweetmeats for children. When solid arsenic is found in the exhumed body which has been long buried, it is generally in the form of orpiment, or yellow sulphuret, produced by the chemical action on the arsenic originally administered of the sulphuretted hydrogen generated by the process of decomposition. Arsenious acid, commonly called arsenic, was first produced in the eighth century by Geber, an Arabian chemist, to whom we are also indebted for the discovery of corrosive sublimate, nitrate of silver, and other valuable compounds. To arsenious acid he gave the name of "sublimed arsenic," and Avicenna, an Arabian physician, afterwards named it white arsenic, its common modern appellative; he knew it to be a most virulent poison, and says of it '*interficit homines.*' The native physicians of India administered it internally as a valuable remedy for diseases of the skin, and for intermittent fever, long before its introduction into European medical practice as a therapeutic agent. Arsenic is thus a poison and a medicine of great antiquity, and as such has been long known in China, where the prohibition of the sale of arsenical compounds is somewhat similar to that now in force in this country. But the penalty for infringing the law is somewhat different; inasmuch as both the seller and buyer suffer decapitation if the effect of the poison is fatal; but if not fatal they are obliged to undergo the pleasant alternative of being strangled! Metallic arsenic, like all other pure metals, is innocuous, but most of its compounds are energetic poisons; of these arsenious acid, or common white arsenic, may be studied as the prototype, whether in a free state or in combination with alkalis or other substances. Arsenic occurs in two conditions, either in white enamel looking masses with a shining fracture, or in the state of a white powder. It is perfectly tasteless and inodorous, and this is one reason it is so often employed by murderers, as it can be administered without exciting suspicion. It is very sparingly soluble in water; cold water dissolves it in the proportion of from half a grain to a grain to the ounce; water at the boiling point only a grain and a quarter to the ounce; but if the arsenic is boiled for an hour in water, it is dissolved to the extent of 11 grains to the ounce; and as three grains constitute a fatally poisonous dose, an ounce of this latter liquor might kill three adult persons. An Act of Parliament prohibits the sale of solid arsenic in quantities less than 10lb., unless it is mixed with one-sixteenth of its weight of soot or one thirty-second part of it weight of indigo. If blue or black arsenic, therefore, should be administered to a victim, the matters vomited will be blue or black. This prohibition, however, does not produce an increased security against arsenical poisoning, because by boiling and filtering a strong poisonous colourless solution can be obtained. Arsenic combines readily with potash and soda, and the arsenite thus produced is quite soluble and quite as poisonous as pure arsenic. Arsenic is also readily suspended in a mechanical condition, in mucilaginous and viscid fluids, such as gruel, arrow root, sago, cocoa, or even porter. Arsenic may justly be described as the very Proteus of poisons, so to speak, being capable of producing almost every species of poisonous action, except pure corrosion, and of attacking almost every important organ of the body. Thus, on some occasions, it excites violent inflammation of the stomach and bowels, and so destroys life by this purely local action; on other occasions it leaves the stomach and bowels altogether uninjured, and produces fatal sinking of the heart's action, or death by syncope; while in other instances, again, the patient, without evincing either pain or uneasiness, gradually sinks into a deep sleep, and dies comatose, leading to the belief that he has been poisoned with opium, or has died from apoplexy. Now, in the two latter class of cases, there are no symptoms or indications whereby the most highly-trained and experienced physician can, during life, detect, or even suspect arsenical poisoning. The poisonous energy of arsenic is equally fatal to vegetable and animal life. Plants watered by an arsenical solution fade, wither and die, and thus the vegetation in the vicinity of furnaces employed for the smelting of arsenical ores displays a sickly, wan and withered appearance. When animalcules are watched under the microscope, they are observed to die in the course of from ten to thirty minutes after the addition of a solution of arsenic to the water containing them. The poison is equally fatal to worms, insects, crustaceans, fish, reptiles, birds and mammals. In short, no animal, great or small, is capable of resisting its fatal energy as a poison.

In arsenical poisoning cases occur which are acute and cases which are chronic; the difference arising entirely from the mode of administration. The acute cases are produced by a single large dose of the poison, the object being to kill the victim outright in the course of a few hours, or in a day or two at the outside. Most frequently the poison begins to act in from half an hour to an hour, locally, by producing violent inflammation of the stomach and bowels, attended with very characteristic symptoms, which do not resemble, when studied conjointly, the phenomena produced by any disease. The symptoms are those of what are termed irritant poisoning. The victim is suddenly seized with faintness, depression, nausea and sickness, accompanied with intense burning pain at the pit of the stomach, greatly aggravated by pressure; the pain then extends to the whole of the abdomen, and violent vomiting and purging ensue, the vomited matter being brown or turbid, and sometimes streaked with blood, but black or blue at first if arsenic mixed with soot or indigo has been administered. In some cases a white vomit has been observed when a large quantity of white arsenic has been administered. In cases of suspected poisoning the vomit should be carefully preserved for examination. The vomiting in arsenical poisoning is very violent and persistent and is rendered more intense by swallowing the smallest quantity of any substance or fluid, and, moreover, it is not followed by the slightest relief. The purging, too, is equally persistent and painful, and there is often a discharge of blood. The mouth is parched and there is intense thirst with a sensation of burning and constriction in the throat. The pulse is exceedingly feeble, frequent and irregular, often quite imperceptible, owing to the depressing power exercised by arsenic on the action of the heart; so that the condition of collapse is generally, but not always, induced; the skin becoming cold, clammy, and livid. A case of arsenical poison may, therefore, at first sight, bear a strong resemblance to cholera, for which, however, it cannot be mistaken on a careful examination, even although the calves of the legs may be cramped. There is much jactitation and restlessness, and the countenance is generally collapsed from an early period and expressive of intense torture, anxiety or even despair, and the eyes are injected, red and sparkling. When this congeries of symptoms has lasted for a few hours the brain and spinal cord often become affected, so that convulsive movements of the trunk and extremities begin to be manifested, and then delirium, followed by fatal stupor. But the intellectual faculties often remain clear to the last; death taking place calmly, though it may be preceded by an attack of convulsions. In this category of cases in which a very large dose of the poison has generally been swallowed, death frequently occurs at the end of twenty-four hours, and generally before the end of the third day, although some cases may linger a few days longer, and become subacute. Now these cases are examples of violent and fatal inflammation of the lining membrane of the stomach and intestines, of which all the traces, including ulceration, are detected by dissection, after death. When arsenic kills by its action on the heart, brain, and spinal chord, after being absorbed or taken up into the blood by the minute blood vessels forming a dense net work on the lining membrane of the stomach, the local effect of inflammation on the stomach and bowels, just described, is either entirely absent or very feebly developed. In fact, life is extinguished so rapidly (within five or six hours) that inflammation has not time to become developed. When the poison acts on the brain, after absorption, it produces complete narcotism, with the symptoms of death by opium or apoplexy, namely, a deep sleep, with loss of consciousness and volition. Dr. Moreland, of Bombay, describes a fatal case of this description, in which the victim, a man, was suspected of having taken a large dose of opium. When the poison kills by its action on the heart, producing death by syncope, attended with all the symptoms of collapse and sinking, namely, a faint and almost perceptible pulse, a cold clammy skin and laborious breathing, the intellect may remain clear, or, there may be some degree of stupor, and there may or may not be convulsions. When arsenic kills by its action on the brain and spinal cord, or on the heart, death takes place rapidly; generally at some period between two and eight hours after the poison has been swallowed. In these cases, as I have already stated, there is generally a complete freedom from local inflammation of the stomach and bowels, and its attendant characteristic symptoms. The symptoms of chronic arsenical poisoning may be divided into primary and secondary. The primary are those developed by the local contact of the poison with the lining membrane of the stomach and intestines, and indicate the inflammation excited and kept up by the continuous administration of the poison. They are as follows: constant pain in the stomach, nausea and vomiting, especially after taking food or drink, griping pains, tenderness and distension over the abdomen, and obstinate protracted purging. The tongue is red and dry, and there is urgent thirst. The pulse is frequent, small and feeble. When these symptoms have continued some few days, those of the secondary class become developed and are produced by the absorption of the poison into the blood and the constant saturation of the tissues of the body with it. These are: redness and suffusion of the eyes and intolerance of light, salivation and ulceration of the gums, a discharge from the nostrils, cough and expectoration sometimes bloody, strangury, a peculiar eczematous eruption on the skin, emaciation and great muscular prostration; convulsions, numbness and tingling in the fingers and toes, ending often in paralysis, especially of the lower extremities. As the case progresses, convulsions, numbness, stiffness, tingling and paralysis of the lower extremities (sometimes the upper), and of the lower half of the body, generally permanent, and ending in death. Orfila was the first to prove experimentally on dogs that when a solution of arsenic is injected into the empty stomach, it is absorbed into the blood and diffused or deposited in every part of the body in the short space of an hour and a half. From the rapidity with which the poison destroys life by its action on the brain and heart, there can be no doubt that the absorption and diffusion of arsenic throughout the body is equally as rapid in the human subject as in the dog or other animals, the laws of osmosis being alike in each. Arsenic is not a natural constituent of the human body, and does not enter into the formation of any of the tissues, and no sooner is it deposited in any of them than its removal from the body, or elimination, as it is termed, begins to take place. This is effected by the organs of excretion, more especially by the kidneys, and is no doubt due to the fact that arsenic does not form an insoluble compound by combining with the tissues; but being a crystalloid it is subject to the laws of osmosis and cast out of the body dissolved in water. Orfila first detected by experiment on dogs that the urine becomes impregnated with arsenic in from three and a half to five hours after the poison had been injected into the stomach. Further experiments and actual observation on the human subject have clearly demonstrated that arsenic is gradually and completely removed from the body, after having been deposited in the tissues, in the course of from twelve to fifteen or twenty days after its administration has ceased, consequently it will not be detected in the tissues after death, by chemical analysis, if the victim survives the operation of even a large fatal dose, for a period exceeding fifteen or twenty days, assuming the kidneys to be healthy as well as the other organs of excretion. It follows from the facts just stated that in a case of suspected poisoning by arsenic, and more especially in chronic and subacute cases, when suspicions of foul play have been roused, portions of the urine should at once be secured for chemical analysis, taking precautions, of course, to secure the identity of the specimens procured. This procedure is indispensable in forming a correct diagnosis, and one which should never be omitted by the medical attendant, because, should the case be one of arsenical poisoning, the instrument of destruction will not, with ordinary care, escape detection. A lecture on arsenic would be incomplete if the subject of poisoning by the arsenite of copper —Scheele's green—were to be omitted. This substance enters into the composition, more or less largely, of various pigments, namely: emerald green, mineral green, Vienna green, Brunswick green, etc. It is, therefore, found in the oil paint cakes of water colours, in wafers, adhesive envelopes, and as a green paint for toys. But it has been used most abundantly of all in green decorative paper hangings, especially those called "green flocks," by which so much mischief has been done. So great was the demand for these papers a few years ago that Dr. Taylor stated in the last edition of his work on poisons (1859) that a manufacturer told him that his average consumption of arsenic in making them was two tons weekly. The publicity given by the press since then to the serious injury to health, and even death, caused by these papers, seems to have rendered them much less fashionable in this country. The Prussian Government, after a thorough investigation, prohibited their manufacture altogether.

MANCHESTER CHEMISTS' ASSISTANTS' ASSOCIATION.

The third meeting of the session was held at the new Lecture-room, 37, Blackfriars Street, on Monday evening, November 18th; the President, Mr. Lane, in the chair.

A lecture was given by Mr. Siebold on "Volumetric Analysis." He explained the different modes of quantitative analysis, both by the ponderal and volumetrical methods, and showed the great advantage of the latter both in the saving of time and the increased accuracy of the result.

The lecturer practically tested the strength of acid. hydrocyan. dil., acid sulphurosum, etc., by the volumetric method, and the frequent applause of a large audience testified its thorough appreciation of the explanation and complete success of the numerous experiments.

At the close of the lecture a hearty vote of thanks was given to Mr. Siebold.

The fourth ordinary fortnightly meeting was occupied with the reading of a paper on "Opium," by Mr. R. de Burton. After describing the mode of obtaining it, "its varieties" and "constituents," the reader briefly referred to the large doses of morphia and other active ingredients sometimes met with, which greatly exceeded those of the Pharmacopœia, thereby causing a doubt to exist in the mind of the dispenser as to whether it was intentional or an oversight.

It was thought by the meeting that in all such cases where the dose of morphia and other active ingredients exceeded that of the Pharmacopœia, a mark of some kind attached by the prescriber, confirming his intention, would greatly assist the despatch of the medicine, and relieve the dispenser from much anxiety.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The second general meeting of the association was held in Anderson's University, on Wednesday evening, 27th November, at nine o'clock.

In the unavoidable absence of the President and Vice-President, Mr. Kinninmont was elected chairman.

After the minutes of last meeting had been read and approved of, Mr. Wm. McKenzie was elected as treasurer.

It was stated that the arrangements for Mr. John Curne's class were almost completed, so that the class would start in a few days.

Several members were then elected, after which the Chairman introduced Dr. John Clark, Lecturer on Chemistry, Glasgow, who delivered a very instructive and interesting lecture on the "Oxides of Hydrogen."

At the close of last session a motion was passed instructing the Council to take some active steps to raise the prices by retail of many of the drugs and chemicals that had advanced very much in price, and, if possible, to adopt a complete retail price-list, both for dispensing and general drugs. It was thought advisable, however, to consult the trade generally in regard to such a matter, and, if possible, carry the numerous doctors who keep open shop with the druggists in the movement.

Accordingly in September last a trade meeting was held which was well attended, and a large, influential committee appointed to draw up a complete list. The committee set to work at once, and the list having been completed, and the various districts of the City and neighbourhood canvassed by the members, on Friday evening last the final meeting of the trade was held in Anderson's University, Mr. John Currie, chairman of the committee, in the chair, for the purpose of receiving the report of the committee and giving a formal adoption to the list. The attendance was large, several medical men being present. The report showed that upwards of 130 chemists and surgeons had signed the petition in favour of the list, and with a very few exceptions, they were willing to adopt it. A committee was appointed to wait upon these persons to impress upon them the necessity of acting with the majority in this matter, and that the list gave no latitude for supplying inferior goods at lower prices. After some further discussion regarding the discretionary power to be used by the chemist in reducing prices occasionally to poor people, and it being understood that in such cases the letter "E" should be marked on the left-hand corner of the prescription, denoting *exceptional*, Mr. J. M. Fairlie brought forward the following resolution, viz., "That this meeting of the Glasgow drug trade cordially adopts the 'retail price-list' submitted by the committee; thanks the members for their arduous labours connected with its compilation and canvassing of the trade, and appoints them a standing committee to meet as occasion requires for the purpose of revising the prices of fluctuating articles, and adding to or deleting from the list any articles they think necessary." This having been seconded by Mr. James M'Donald (Glasgow Apothecaries' Company) and supported by Dr. George Smith, was unanimously agreed to.

A cordial vote of thanks brought the proceedings, which were very harmonious throughout, to a close. The list is being sold by the association at 1*s*. per copy.

HALIFAX AND DISTRICT CHEMISTS AND DRUGGISTS' ASSOCIATION.

The fourth annual meeting of this association was held on Thursday, December 5th, 1872. After supper the election of officers took place, with the following result, viz.—President, Mr. Jessop; Vice-Presidents, Mr. Stott and Mr. Hebden. Committee, Mr. Wm. Dyer, Mr. Jas. Farr, Mr. Pollard, Mr. Shaw, Mr. Wood. Treasurer, Mr. J. B. Brierley. Hon. Sec., Mr. Robert Brook.

The President thanked the meeting for the honour it had conferred upon him. He looked with pleasure and satisfaction upon the Pharmaceutical Society, and his connection with it, and was glad to see the Council doing their utmost by educational and other efforts to raise the trade into something more approaching a profession, and thought it was their duty as a local body to assist so desirable an object. He rejoiced to witness a more fraternal feeling of brotherhood apparent amongst them, and believed the result would be rather less of rivalry and competition and more of a desire to benefit one another.

The Honorary Secretary read the annual report, which alluded to the efforts made with respect to early closing, the recommendation of the executive to the members to register vermin killers, the Food and Drug Adulteration Act, the education controversy, the injury to trade from the civil service stores, competition and other trade matters, and which was unanimously adopted. Mr. Stott proposed "The Pharmaceutical Society." Mr. Wm. Dyer, in responding to the toast, said he had always had a profound respect for the Society, and they were now beginning to see and appreciate its value and importance. "Success to the Association," proposed by Mr. Blyton, was responded to by Mr. Hebden. Mr. Robert Brook proposed "The Mayor and Corporation," which was acknowledged by Mr. Councillor Pollard. Votes of thanks to the ex-president, honorary secretary and president brought an interesting meeting to its close.

BRIGHTON ASSOCIATION OF PHARMACY.

The monthly meeting of this association was held at the Hanover Lecture Hall, Church Street, on Friday evening, December 6th; the President, Mr. W. D. Savage, in the chair. There was a fair attendance of members. A paper "On Percolation" was read by Mr. Julius Schweitzer.

[The paper will be published *in extenso* in the next number of this Journal.]

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, December 5th, 1872; Dr. Frankland, F.R.S., President, etc., in the Chair.

Amongst the new members who were balloted for and elected at this meeting, after the minutes had been read, was a Japanese gentleman, Mr. K. H. Yoshida.

The first two papers read were "On Hypophosphites" and "On the Reducing Power of Phosphorous and Hypophosphorous Acid and their Salts," by Professor C. Rammelsberg.

A communication by Professor A. H. Church, entitled "New Analyses of Certain Mineral Arseniates and Phosphates," then followed, giving the result of his examination of the minerals fluor-apatite, arseniosiderite, childrenite, ethlite, tyrolite and wavellite. The last paper was "On the Condition of the Hydrogen Occluded by Palladium, as indicated by the Specific Heat of the Charged Metal," by W. C. Roberts and C. R. A. Wright, D.Sc., being an account of their recent experiments on the specific heat of palladium charged with hydrogen. This interesting compound, which was discovered by the late Professor Graham, Master of the Royal Mint, and supposed by him to be an alloy of palladium and hydrogen, is obtained on making metallic palladium, the negative pole in the electrolysis of water acidulated with sulphuric acid. The authors find, however, that the charged metal cannot be regarded as a true alloy of the two elements.

Parliamentary and Law Proceedings.

Important to Chemists.

Howlett v. *Jones*.

At the Whitechapel County Court on Wednesday, November 27th, the plaintiff, a shopfitter, sued the defendant, a chemist, for £3. 13*s*., for a plan and estimate for fitting up a new chemist's shop, and for polishing up the side of a counter to prepare for the work. Mr. Abbott, solicitor, appeared for the defendant, and informed His Honour that the counter in question did not belong to the defendant. He knew nothing about it.

The plaintiff stated that he had supplied the defendant with a plan and estimate, that the defendant had given him the contract, but, afterwards, had written to say that he had given it to another person.

Cross-examined by Mr. Abbott: He had given the defendant a price verbally, exclusive of extras, but he had not supplied him with a written estimate or specification. He charged three guineas for the pencil drawing. Taking into consideration the time spent upon it, and in attending upon the defendant while visiting other shops, it ought to have been five guineas, and that would be the price usually charged under such circumstances. He always charged for plans and estimates.

The defendant having been called, stated that he simply asked the plaintiff for a price and received a pencil drawing, which he never ordered. He was positive that he never ordered a plan, nor did he give him the contract. His last words to the plaintiff were, "That he would consider the matter over, and let him know in a day or two," which statement was corroborated by the defendant's assistant, who was present and heard it. The plaintiff having asserted that it was impossible for him to give the price required without making a drawing, His Honour allowed him two guineas and 10*s.* costs.

Conviction under the Petroleum Act.

At Sheffield, Henry Rose, oil dealer, was charged by the inspector of petroleum, with having exposed for sale some petroleum, in pint bottles, five of which had no labels upon them as required by the Act. The complainant stated that he met Rose's boys in the street with trucks or handcarts containing petroleum oil and benzoline, and that he seized five bottles holding about a pint each, which were not labelled, though three of them bore some indications of having at some time had labels upon them. The defendant relied upon a proviso to one of the sections in the Petroleum Act, exempting persons keeping petroleum in small quantities and under certain conditions from the necessity of obtaining licences, but the stipendiary ruled that the exemption applied to keeping petroleum only, and not to selling, conveying, or exposing for sale, and fined the defendant (who had been previously convicted for a similar offence) 20*s.* and costs.—*Sheffield Independent.*

Alleged Poisoning by Godfrey's Cordial.

An inquest was held in Hull on Friday, Nov. 29th, touching the death of a child four weeks old. The mother deposed that the day before the child died she thought it had a stomach-ache, and gave it nearly two tea-spoonfuls of Godfrey's Cordial, which she bought at a chemist's in Mytongate, without the admixture of water. The next morning, as it seemed ill, she took it to the doctor and told him what she had done, and he ordered her to give it some castor oil. The child died in the afternoon.

W. L. Loten, chemist and druggist, 31, Mytongate, said he recognized the mother, but did not remember selling her the cordial. Always waited on all the customers himself. Sold about half a gallon of Godfrey's cordial per week, and the greater portion went out in cups, which he did not label. Sold one ounce for a penny. Made the cordial himself of 4 lb. treacle, 40 drops oil of sassafras, 2 oz. sweet nitre, and 2 lb. boiling water. That was not the true Godfrey's cordial, which was a patent medicine. Every druggist had a formula of his own for what he called Godfrey's cordial. His cordial never contained any opiate or any poison whatever. The cordial produced by the police had not been purchased at his shop.

The medical evidence went to show that the child died of pericarditis, and a verdict was returned accordingly. —*Hull and North Lincolnshire Times.*

Alleged Acceleration of Death by a Cough Mixture.

An inquest was held at Sheffield on Wednesday, December 4th, on the body of Mrs. Lowe. It appeared from the evidence that for some time past deceased had been suffering from bronchitis, and for a few days before her death she had been very much worse. On Saturday her daughter went to Mr. Lockwood, druggist, South Street, Moor, for some cough mixture. That night she gave her mother half a tea-spoonful; and in the course of the night her mother herself took a similar quantity. She took some more on the following day. On Monday she was not able to get up, and her daughter in the course of the day and night gave her three doses of the mixture. When the daughter went to bed at night her mother was very ill, and groaned a good deal. On the following morning she found her mother was lying dead by her side.

Mr. Willington, surgeon, who was called to the deceased after death, gave it as his opinion that death had been accelerated by a narcotic. She had been, he said, a woman addicted to intemperate habits, and those habits would accelerate the effects of a narcotic. The mixture obtained from Mr. Lockwood was a narcotic. It was labelled "Essence of Linseed." The label was calculated to mislead, as there was no linseed whatever in it. It was composed of morphia, chlorodyne, treacle, and some other sweet substances.

The jury were of opinion that it was most improper for manufacturers and druggists to put a wrong label upon a medicine so frequently taken as a cough mixture. They returned a verdict to the effect that the deceased died suddenly from debility, accelerated by the administration of a narcotic inadvertently given; and they appended to their verdict that "the sale of narcotics under the name of essence of linseed is dangerous, and should be discontinued, and that the manufacturers of the said narcotic ought to have notice of this case and the opinion of the jury." The coroner promised that he would communicate their opinion to the manufacturers.

[*** In reference to the foregoing report, which is taken from the *Sheffield Independent* Messrs. Kay Brothers, of Stockport, request to be allowed to state that, although the surgeon's statement may be true with regard to the essence of linseed prepared by Mr. Lockwood, they deny its accuracy if applied to their preparation. They state that the amount of narcotic contained in their "essence of linseed" is less than in an ordinary cough lozenge, and that it is really what it is labelled.—Ed. Pharm. Journ.]

Alleged Attempt to Poison by Arsenic.

On Monday last a boy named Hoy, aged twelve, was charged at the Clerkenwell police-court with attempting to poison his step-mother by administering to her a quantity of arsenic. It appeared from the evidence that on the previous Wednesday morning the prisoner, according to his usual custom, took his father and step-mother each a cup of tea which they drank while in bed. Two hours afterwards the woman was seized with vomiting and purging, and a burning sensation in the throat. On Saturday the boy again brought the woman a cup of tea, which, however, she not drinking, afterwards threw away, when she noticed a sediment at the bottom. This roused her suspicions, and the cup was taken to a medical man who pronounced it to be arsenic. The father said he kept arsenic in his shop to poison rats, but he was not aware that anybody but himself knew of it. He saw the arsenic safe in a drawer about two months ago. Since then more than half of it had been removed, as well as the outside wrapper. The wrapper that was left had on it a poison label. The medical man stated that the sediment in the cup was arsenic mixed with a dark powder, probably charcoal. There was sufficient arsenic in the cup to poison more than a dozen persons. It corresponded with the arsenic in the drawer.

The prisoner was remanded.

Adulteration of Milk.—What is an Adulteration?

Several milk-dealers have been summoned before Mr. Raffles at the Liverpool borough police-court for adulterating the milk sold by them. In two cases Dr. Brown deposed that specimens of milk purchased had been adulterated by the addition of 20 and 10 per cent. of water respectively. A penalty of 20*s.* and costs was imposed in each case.

In another case it was alleged that the adulteration consisted in mixing 200 parts of skim milk with 100 parts of new milk. For the defence it was urged that this was not an adulteration within the meaning of the Act; that to prove an adulteration it was necessary to show that some foreign ingredient had been introduced. Mr. Raffles said that he saw the difficulty, but that reading the section as a lawyer he could not say that the milk had been mixed with any other substance. It was not an honest transaction, but he felt he could not convict. He would, however, grant a case if it were applied for. The summons was accordingly dismissed.

Explosion of Gunpowder in a Chemist's Shop.

On Saturday afternoon last a rather serious accident occurred to Mr. Williams, chemist and druggist, at his shop, 124, St. Philip's Road, Sheffield. Towards dusk he struck a match, in order to look for some article, and unfortunately one of the sparks fell upon a small barrel containing about two pounds of gunpowder, a portion of which exploded in his face, burning his hair very severely. A cry of "Fire" was raised, and a neighbour rushed into the shop and threw the contents of a water bucket upon Mr. Williams, whose clothes had been ignited by the explosion.—*Standard.*

Obituary.

MRS. SOMERVILLE.

The following obituary notice of the late Mrs. Somerville is reprinted from the *Times*:—

Mary Somerville died on Friday in the neighbourhood of Naples, where she had of late years taken up her residence. Had she lived to the 26th of the present month she would have attained her 83rd year. Mary Somerville, or, to give her maiden name, Mary Fairfax, was a lady of good Scottish ancestry, being the daughter of the late Vice-Admiral Sir William George Fairfax, who was a cadet of the noble Scottish house of Lord Fairfax, and who commanded His Majesty's ship Venerable at the Battle of Camperdown. She was born on the 26th of December, 1789; her mother was Margaret, daughter of Mr. Samuel Charters, Solicitor of Customs for Scotland. All that is known of her early life is that she was a great reader, even from childhood, and that she was brought up at a school at Musselburgh, in the vicinity of Edinburgh.

Before many of the most distinguished cultivators of physical science were born, Mrs. Somerville had already taken her place among the original investigators of nature. In the year 1826 she presented to the Royal Society a paper on "The magnetizing Power of the more refrangible Solar Rays," in which she detailed her repetitions of the experiments made by Morichini of Rome, and Bérard of Montpelier. The paper had for its object to prove whether solar light is a source of magnetic power. By means of a prism the component rays of a sunbeam were separated, and those which are now known as the chemical or actinic rays were allowed to fall upon delicately poised needles of various sizes which had been previously proved to be devoid of magnetism. In every instance the steel exhibited the true magnetic character after an exposure of several hours to the violet light. Experiments were then made by covering unmagnetic needles with blue glass shades and placing them in the sun, and in all cases they became magnetic. From these experiences Mrs. Somerville concluded that the more refrangible rays of the solar spectrum, even in our latitude, have a strong magnetic influence. This communication was printed in the 'Philosophical Transactions' at the time; it led to much discussion on a very difficult point of experimental inquiry, which was only set at rest some years later by the researches of two German electricians, Riess and Moser, who showed that the action upon the magnetic needle was not caused by the violet rays.

In 1831 or 1832 Mrs. Somerville published her 'Mechanism of the Heavens.' This book, her only strictly astronomical work, which is largely derived from Laplace's celebrated treatise, 'La Mécanique Céleste,' and is understood to have been originally suggested by Lord Brougham, was originally proposed by its author as one of the publications of the Society for the Diffusion of Useful Knowledge; but, being moulded on too large a scale for their series, it was given to the world in an independent shape. A few years later her name became more widely known by her 'Connexion of the Physical Sciences,' which obtained the praise of the 'Quarterly Review' as "original in plan and perfect in execution," and, indeed, "a true 'Kosmos' in the nature of its design and in the multitude of materials collected and condensed into the history which it affords of the physical phenomena of the universe." This she followed up with her 'Physical Geography,' which, as its name imports, comprises the history of the earth in its whole material organization. These two works, in addition to their popularity in this country, as testified by the many editions through which they have passed, have been translated into several foreign languages; and their author's services to geographical science were recognized in 1869 by the award of the Victoria medal of the Royal Geographical Society. In the same year she gave to the world her 'Molecular and Microscopic Science,' a work which, to use the expression of a writer in the 'Edinburgh Review,' "contains a complete conspectus of some of the most recent and most abstruse researches of modern science, and describes admirably not only the discoveries of our day in the field of physics and chemistry, but more especially the revelations of the microscope in the vegetable and animal worlds."

The publication of such a work as that last mentioned by a lady in, we believe, her eightieth year is without a parallel in the annals of science. In it that which most forcibly strikes the reader is the extraordinary power of mental assimilation of scientific facts and theories which is displayed by its author. In it Mrs. Somerville first gives us a clear account of the most recent discoveries in organic chemistry, in the elementary condition of matter, and tells us of the latest researches into the synthesis of organic carbon compounds. She next leads us on to the relations of polarization of light in crystalline form, and, quitting the subject of molecular physics with an account of the phenomena of spectrum analysis as applied to the stars and nebulæ, she begins with the consideration of the microscopic structure of the vegetable world; then passing in review the whole of the organisms from algæ to exogenous plants, she lands us in her second volume among the functions of the animal frame in its lowest organizations, and describes the morphology of the various groups of animals from the protozoa to the mollusc. In thus traversing this immense field of modern scientific inquiry, Mrs. Somerville does not attempt to generalize to any great extent, much less to bring forward any original observations of theories of her own; but, as she modestly hints in her preface, she has simply given in plain and clear language a *résumé* of some of the most interesting results of the recent investigations of men of science.

For some few years before her death Mrs. Somerville was in the receipt of a literary pension, bestowed upon her in recognition of her services to science. This was the nation's tribute to her worth. But among men of science a far higher value than pecuniary grants can have is set upon those rewards which can be bestowed only by such as can appreciate the labours and aims of a toiler in the scientific field. And these Mrs. Somerville received: the Geographical Society, as we have said, awarded her its medal; the Royal Astronomical Society elected her, in 1834, one of its honorary Fellows, the same honour being at the same time bestowed upon Miss Caroline Herschel—the only two ladies on whom such a distinction was ever conferred. The Fellows of the Royal Society also signified their appreciation of her works and their personal regard for their author by subscribing for a bust of Mrs. Somerville, which Chantrey executed, and which the Duke of Sussex publicly presented to the Society in 1842, in his own name and in that of the subscribers. This monument adorns the Library of the Royal Society.

Mrs. Somerville was twice married. Early in life she became the wife of Mr. Samuel Greig, who is described in 'Burke's Peerage' as "a Captain and Commissioner in the Russian Navy." Her union with him became the means of developing her latent scientific powers, as he took great pleasure in mathematical inquiry, and carefully initiated her in both the theory of mathematics and their practical application. Her second husband was Dr. William Somerville, a member of a good old family of Scottish extraction.

Notice has been received of the death of the following:—

On the 23rd of November, Mr. John Whitfield, pharmaceutical chemist, of the firm of Whitfield and Son, Worcester, aged 45. Deceased was one of the earliest examined members of the Pharmaceutical Society, which he entered in 1847.

On the 14th of September, at Perth, West Australia, of consumption, Mr. John Thomas Glass, late of Cheltenham and Bournemouth.

On the 22nd of November, Mr. Richard Constantine Hay, chemist and druggist, of Bond Street, Leeds, aged 79.

Reviews.

SANITARY SCIENCE: as Applied to the Healthy Construction of Houses in Town and Country. By R. SCOTT BURN. Glasgow, etc: Collins, Sons and Co.

This is a work which can be read with considerable interest; but the interest will centre in the value of the subject rather than in the literary performance. It would hardly be possible for an author to write a treatise on sanitary matters which should be altogether free from quotations, because the subject is of the widest; but to borrow too largely of the Egyptians, even if one acknowledges the loan, is doubtful wisdom, in more senses than one. No person in our day can arrogate to himself even a simple branch of one single science; but he can add to the cairn some stone which he has himself dug up and polished, and he only. We are far from saying that Mr. Burn has not heretofore contributed some heavy pebbles to our sanitary landmarks; but we say that he has not done himself justice on the present occasion. A book such as this, moreover, should have given the quoted matter in smaller type than the original matter. This is a healthy rule, and one Dr. Corfield, for example, followed out with great advantage to his readers in his 'Digest of Facts Relating to Sewage.' To bestow upon a work like that before us a title such as 'Sanitary Science,' is surely also a little indiscreet. 'Sanitary Jottings Concerning House Construction' would have been more appropriate to its bulk and general treatment. Perhaps the fault lies with the publishers, who may have urged Mr. Burn to write the work with somewhat of haste. Our author is universally known as a gentleman of good professional practice and extensive research, and we trust that he will be spared to polarize more of his own experiences for us in a future volume.

Mr. Burn has described and illustrated a very useful method of preventing the accumulation of dust in rooms, a matter almost altogether ignored in the construction of houses in the metropolis. This "dust draught" is of the simplest make, and would be a great saving of time to the housemaid, and a great source of benefit to the family if its use were universal. And yet it is nothing more than a tube which leads from the back-hearth into the chimney-flue some distance above the register of the grate. Dampness as a very prevalent source of evil finds also a proper recognition, and several cures for it are mentioned which experience has confirmed as being valuable. The chapter upon cottage accommodation will be especially welcome to the sanitary student, for it is a subject too often neglected by our domestic architectural writers. For the most part these treat of mansions and villas only, and leave the cottage carefully out in the cold. Even when some agricultural society or some philanthropic individual offers a prize for an essay upon the best form of labourers' dwellings, the chief points attended to by the competitors are less those of health and comfort than of cheapness and neatness of elevation.

Mr. Burn considers that a floor superficies of 144 feet is the minimum which should be allowed for a living room, and a 100 feet for a bed-chamber, no room being less than nine feet from floor to ceiling, and attics to be earnestly eschewed. We agree with him in each particular.

We confess our disappointment at the curt manner in which the smoke nuisance is treated, for this is the most crying evil of the day. The eye is weary of pictures of earth-closets and patent filters, and would twinkle with joy at any feasible device for ridding itself of the pungent smoke. That this pest is extinguishable is not to be doubted; but it does not seem to be a branch of Hygiene which "pays," and therefore it has few professors. This is a sober statement—smoke prevention as a business is unremunerative, hence we sit in "smuts" and perambulate in flakes of "blacks." Just notice what follows when the fiat has gone forth that such and such a contrivance is absolutely necessary. Burglary, for instance, is on the increase, and straightway the papers herald in a host of patent sash-fasteners, and the chief of the police placards the metropolis with his idea of the *ne plus ultra*. We have a better example occurring before our eyes at the present moment. The "constant water supply" is imminent with us, and already the lists of "water waste preventers" seeking recognition at the hands of the water companies, are mounting into a score. Let some one devise a means of ensuring a proper combustion which shall benefit the units who practise it, and a combined action in the same direction will soon be made imperative upon us. Our present schemes for the reduction of smoke are too tentative in character, and, in point of invention, too poverty-stricken. It is nigh twenty years since Mr. Spencer Wells pointed out the evils resulting from a constant grimy atmosphere, and cast the foreshadow of a cure. How can we be so dilatory in what concerns our longevity so nearly? And yet after all, it is not long since we separated our postage stamps with a pair of scissors.

We consider Mr. Burn's dissertation upon ventilation to be the most useful part of his book; and in the threescore pages which he has dedicated to this subject he gives the most ample information as to what is usually done in this matter, and why it is done. The chapter on water is practicable, and may be termed an epitome of all that is needed to be remembered by any one outside of the medical profession. We have only one fault to find here, and it is embodied in this sentence—"No overflow pipe should be connected with the drains if it can be at all avoided." Now it always can be avoided, and always should be avoided, for the disease germs often make a highway of such a pipe to reach the cistern, with results such as we all know. The book concludes with some excellent examples of ash-closet and other drainage systems and a short discussion on sewage utilization. Despite our friendly criticisms, we recommend the book as worthy of a place in a library, and wish it a good circulation.

Round the Table. Notes on Cookery and Plain Recipes, with a Selection of Bills of Fare for Every Month. By "The G. C." London: Horace Cox. 1872.

How to Cook. The Principles and Practice of Scientific, Economic, Hygienic and Æsthetic Gastronomy, with Model Recipes in Every Department of Cookery, Original and Selected. By T. L. Nichols, M.D. London: Longmans. 1872.

The sufferings of Sancho Panza, when the importance of his health to the community of the island of Barataria caused his dietary to be placed under the dictation of a doctor of physic, have often been food for laughter. But the reading of a well-written book on cookery enables one to sympathize with the hungry squire when he saw one dish whisked away because it was too watery, another because it was too highly spiced, or heard his plea for a plate of roasted partridges cruelly met with the Hippocratian aphorism, "Omnis saturatio mala, perdicis autem pessima." And since, in a recent pharmaceutical oration, it was strongly insinuated that competent pharmacists were much more numerous than pharmacists with a competency, some apology may be thought necessary for the introduction of a subject in the study of which it is so very difficult to obtain assistance in the shape of "object lessons." For under such circumstances Chispa's problem is very apt to crop up—

"I've heard my grandmother say, that Heaven gives almonds
To those who have no teeth. That's nuts to crack.
I've teeth to spare, but where shall I find almonds?"

But there has always been somewhat of a special connection between the apothecary and the cook, even beyond the evident one that a too free patronage of the latter frequently necessitates the services of the former. Much that is akin to practical pharmacy is found in the art of cookery as practised by a real *chef de cuisine*, and the special qualities required by an expert in both callings are mainly identical. Though at the present day, cookery is too often a preliminary to requiring the aid of the physician, it was in ancient times looked upon as a branch of the healing art; and a revival of this opinion is noticeable in the increased attention that has lately been paid by medical and scientific men to questions of diet. Besides this, medical men have not thought it beneath them to write upon cookery, and Sir Theodore Mayerne in the seventeenth century, Hunter and Hill in the eighteenth, and Kitchener in the nineteenth, have given to the world cookery books that rank among the best of their respective eras.

'Round the Table' is the production of a writer who not only knows his subject, but evidently loves it. One can easily believe the statement in his preface that the recipes are derived from experience. Although lacking the wit that renders Brillat Savarin's 'Physiologie du Goût' so enjoyable, "The G. C." makes the reader feel himself in good company. Starting with a proper horror of "people who on four days out of the seven dine off a joint and potatoes," he gives pleasant glimpses of that Utopia where the price of meat, milk and eggs has no power to interfere with the gastronomic enjoyments of its inhabitants. Indeed, in such company, one is surprised to meet with a "Potage au Pauvre Homme;" and it is quite a relief to discover, from the position of the adjective in the title considered in connection with the nature of the ingredients in the potage, that probably poverty of the pocket is not alluded to. But although there may be many dishes referred to in this book which would only be likely to make their appearance in an expensive establishment where professional cooks are employed, there is also a great deal of sound advice respecting those little points which are so essential to the comfort of the dining-room. Hints as to the number, selection and arrangement of the guests, the ordering of the servants, the decoration of the table and the disposition of the dishes thereon, the temperature of the room, the management of lamps, and a hundred other subjects—all of them marked by good taste, and generally as applicable to a small as a large establishment—meet the reader on almost every page.

It is curious to note how old customs are sometimes confirmed by modern opinion. The Romans said that the number of guests at a table should not be less than the Graces or more than the Muses. "Ten is the very largest number of friends that should assemble at dinner," writes "The G.C." "Good wine," said Sir Theodore Mayerne, at eighty-two years of age, "is slow poison: I have drunk it all my lifetime, and it has not killed me yet; but bad wine is sudden death." "In the matter of wine," echoes our author, "no mediocrity is tolerable; small beer or water is infinitely preferable to bad wine." According to Milton, the first hostess—Eve—was intent

"What choice to choose for delicacy best,
What order, so contrived as not to mix
Tastes, not well joined, inelegant, but bring
Taste after taste upheld with kindliest change,—"

although she was harassed by "no fear lest dinner cool." And the following description of a cook, written when Athens was more than a name, is just as true after the lapse of two millenniums:—

"To roast some beef, to carve a joint with neatness,
To boil up sauces, and to blow the fire,
Is anybody's task; he who does this
Is but a seasoner and broth-maker;
A cook is quite another thing. His mind
Must comprehend all facts and circumstances:
Where is the place and what the time of supper;
Who are the guests and who the entertainer;
What fish he ought to buy and where to buy it."

In this work the importance of using absolutely clean vessels is strongly enforced, and it is truly remarked that in a majority of the kitchens of the middle classes of this country the cooks would pronounce vessels "clean" which no amount of sand, soda and soap could make fit for use.

'Round the Table' supplies many recipes that might be usefully extracted if space allowed, but we must content ourselves with two which have the double advantage of answering a question sometimes put to the pharmacist, and giving a fair specimen of the style of the book.

"*Restorative Broth.*—Slice three onions, and dispose them in a saucepan so as to completely cover the bottom of it; over them place a layer of fat bacon in slices a quarter of an inch thick; over that put three carrots, also cut in slices, so as to form another layer; on this again put the following condiments judiciously proportioned—viz., salt, whole pepper, cloves, parsley, marjoram and thyme. Upon this pile up two calves' feet, chopped in small pieces, and one pound of beefsteak, free from all fat and finely minced. Cover the saucepan and put it on the fire, there to remain for one hour. There should be no fire at the side, it should be fairly under the saucepan. The next step consists in filling up the saucepan with boiling water so as just to cover the contents; and then it is put by the side of the fire to simmer for one hour; after that the liquor should be poured off without disturbing the other contents of the saucepan. The steam, which arises during this operation gives out a most appetizing perfume, which will fill the hearts of those present with gladness. The liquor should now be strained through a napkin; the little fat which will float on it should be removed with the help of some clean blotting-paper; and the broth can be administered to the patient. A teaspoonful of sherry and a small quantity of sugar may be advantageously added to each cupful. This restorative when cold will be a firm jelly, and it can then be administered in a solid form."

"*Beef Tea.*—Take 2 lb. of beef, free from all fat; mince it as fine as you can, and put it into a jar, with one pint of cold water, to stand inside the fender for a couple of hours; now strain off the water, and put it by, replacing it by another pint of tepid water. Put the jar nearer the fire, or on the kitchener, so as to keep the water hot without boiling. After the lapse of another couple of hours strain this off, and mix it with the first pint you strained off. Transfer the minced meat into a saucepan: add one pint of boiling water to it, and let it boil for one hour; strain and mix with the first two pints. Let the whole give one boil; add salt, and the beef tea is ready for use."

"The *théorique* of the above process is this. Meat contains various substances, all of them nourishing; but some, as albumen, are only soluble in cold water, others tepid water alone will dissolve, and others again can be brought out by the action of boiling water alone. By treating the meat with cold, tepid and boiling water separately, all that is to be got out of it is obtained; and the result is, as it must be, the best beef tea that can be made."

As might have been expected, the preserved Australian meat is referred to, and although it was not likely to be quite suited to the taste of "The G.C.," who complains of its being over-cooked, he describes several very appetizing dishes which can be made from it.

An interesting chapter on salads calls attention to a subject very much neglected in this country. Boldly rejecting that great favourite of the British greengrocer, mustard and cress, the author mentions several comparatively unused salad plants, especially the dandelion, and states generally that any vegetable which is not positively unwholesome when uncooked may form the foundation of a salad. Those who wish for further information upon this subject may consult an article, reprinted from *Nature*, in the present series of this Journal, vol. I. p. 167.

One point—too often neglected—that adds to the reader's comfort and confidence in the writer of this book is, that the orthography and accentuation of the French names are generally correct. In one line, however, there is the double trip of "celeri" and "crême."

The second book upon the list is addressed to a different class of readers. Written by an author who has recently been attempting to demonstrate "How to live on sixpence a day,"—a proceeding that might be supposed to do away with the necessity for cooking,—it is not surprising that the recipes as a rule are more suited for persons of straitened means than those in the manual first-mentioned. It would perhaps characteristically illustrate both books, though in somewhat an exaggerated manner, to quote a flavouring from each. In 'Round the Table' the addition of a bottle of sherry to the water a ham is boiled in is recommended; in 'How to Cook,' the final touch to a Poor Man's Potato Pie is a boned bloater cut up with the fat as a nice change of flavour. There is, however, in the introductory chapter of 'How to Cook' a great deal of much-wanted information on the food question, and, considering the low price at which it is published, the book is certainly a good one.

The following journals have been received:—The 'British Medical Journal,' December 7; the 'Medical Times and Gazette,' December 7; the 'Lancet,' December 7; the 'Medical Press and Circular,' December 7; 'Nature,' December 7; the 'Chemical News,' December 7; 'English Mechanic,' December 7; 'Gardeners' Chronicle,' December 7; the 'Grocer,' December 7; the 'Journal of the Society of Arts,' December 7; 'Grocery News,' December 7; 'Bulletin de l'Académie de Médecine for November 19; Evans, Lescher and Evans' 'Monthly Price List,' 'Western Lancet' for October; 'Journal of Applied Science' for December; 'Scientific American,' November 30; 'Neues Repertorium für Pharmacie; 'Milk Journal' for December; 'Moniteur Scientifique for December; 'British Journal of Dental Science' for December; 'Practitioner' for December; 'Food, Water, and Air' for December; 'Michigan University Medical Journal' for November; the 'Hull Packet and East Riding Times,' from a correspondent.

Correspondence.

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

Pharmacy in Germany.

Sir,—Many of your readers are probably aware of the monopoly that exists at the present time throughout Germany, in the acquirement and possession of pharmacies. This is naturally esteemed by many as an injustice to the bulk of the profession. At a meeting on Tuesday, Dec. 3, of the Berlin branch of the German Chemists' Asssistants' Association, the subject was brought forward in the shape of a petition, proposed to be presented next session to the 'Bundesrath,' requesting its early attention to the state of pharmacy in the empire, especially in relation to the principle of free trade. The petition states that in the course of the year 300 men pass their examinations, and that in the same period thirty assistants (at the most) become proprietors by "concession," and about 100 by "purchase." This leaves annually 170 as assistants, many of whom in preference to remaining as such for probably a very considerable period, devote themselves to another calling. This accounts in a large measure for the great scarcity of assistants. The petition also maintains that as the greater portion of prescriptions are dispensed, and the most important operations conducted by the assistants, the public are as much, or even more dependent on them than on the proprietors themselves. Nevertheless, the only men to whom the pharmaceutical profession opens a career of independence, are either those who are already in possession of considerable means for the purchase of the few businesses for disposal, or those who expect a "concession" of a pharmacy from a father or near relative. After looking at the matter from other points of view, the petition closes with the remark, that the longer legislation on the point of free trade is postponed, the more difficulties will it present; as every year by the concessions granted for new pharmacies, there will be a proportionately greater number of proprietors requiring compensation for existing rights and privileges.

How this and similar petitions will be received by the German Parliament will be seen in the course of a short time. Walter Hills.

Berlin, December 6th, 1872.

Disinfectants and Disinfecting.

Sir,—In your editorial article of 9th November on "Deodorizers, Disinfectants, and Antiseptics" you very properly point out the fact that, "In spite of the highly poisonous nature of carbolic acid, it is generally preferred as a disinfectant." You also suggest, that could some harmless and efficient variety of carbolic acid be introduced to the public it would be readily adopted. Permit us to point out that such preparations have for many years existed in the form of "M'Dougall's Patent Carbolic Disinfectants," which are now coming into general use. These preparations, whilst possessing all the valuable antiseptic properties of carbolic acid, have also the powerful deodorizing effects of sulphurous acid, both these substances being in a neutral form, *i.e.*, as combinations of carbolate of lime and sulphite of magnesia.

The public should be informed that carbolic acid acts as a poison simply through its powerful causticity, which destroys the skin and the mucous membrane, and that may be neutralized by admixture with lime, soda, or other alkali.

This causticity, whilst most useful to the surgeon, in no way increases the antiseptic properties of carbolic acid, and the carbolates are as efficacious in this respect as the raw carbolic acid, whilst perfectly free from danger.

We have for many years endeavoured to instil this fact into the public mind; and since carbolic acid in combination with sulphurous acid (in a neutral form) was recommended by the Royal Commission on Cattle Plague as the best disinfectant, it is time that these harmless and efficient preparations should be universally adopted.

It is supposed by many that because the soap prepared with carbolic acid instantly destroys insect life, that it must therefore be poisonous to animals. Such is not the case. It destroys these parasites not by poison, but by coagulating the albumen of which they are chiefly composed (instead of blood), thus stopping their circulation and causing death.

Animals dipped into a solution of the soap suffer no harm, even should they drink some; and many thousands of sheep are yearly dipped in a carbolic dipping.

The fluid carbolate recently introduced is likely to prove an invaluable lotion, gargle, etc., for hospital and domestic use, and is perfectly harmless.

M'Dougall Brothers,

Table of Food Values.

Sir,—I am obliged to you for your, on the whole, favourable notice of my "Table on the Relative Values of Different Articles of Food," at the pharmaceutical meeting of the 4th ult. With regard, however, to your objection that the method of valuation I have adopted is somewhat hypothetical, allow me to say that the method is none of mine, but is to be found in Professor Huxley's 'Manual of Physiology.' If I err, I am content to err in such company.

All I have attempted to do is to expand and to render graphically the lessons given in Professor Huxley's excellent manual and in works by other authorities treating of the same subject.

Charles Ekin,

Bath, Jan. 9th, 1872.

Lady Students.

Sir,—At the last meeting of the Council of the Pharmaceutical Society, Mr. Bottle is reported to have said in the course of the discussion whether lady pharmaceutical students should be eligible to compete for the prizes and scholarships of the institution, that "it would be hardly fair to the male students to put them on the same footing with a young lady who had nothing whatever to do but study the particular subject in which she wished to gain a prize." As Mr. Hampson justly remarked, the same objection is not urged against those of the male students who may have all their time at their disposal. The statement itself, however, does not in any way express the actual circumstances. One of us—the three ladies now attending the pharmaceutical lectures—is engaged from the time she leaves the lecture-hall till late in the evening in dispensing; another has, until very recently, been similarly engaged until a late hour at night, and is now seeking re-engagement; and the third has, besides domestic duties, her time largely occupied by other studies and serious pursuits. Being thus engaged we find but little time to read for the lectures and examinations, and we vainly wish for the opportunities for study and investigation enjoyed by the male students in the laboratory. The Pharmaceutical Society has thus far closed its laboratory to us; and if we shall be able to present ourselves at all for the final examination, it will be at an immense disadvantage as compared to the male students, and by supplying the want of laboratory instruction by personal effort. All that we ask is to be allowed the same opportunities for study, the same field for competition, and the same honours, if justly won. To grant this would complete the just and generous initiative which the Pharmaceutical Society has already taken.

Rose Minshull,
Louisa Stammwitz,
Alice M. Hart.

Dec. 9th, 1872.

Adulterated Milk.

Sir,—In to-day's and in a previous copy of the Journal you report some cases of conviction under the Food Adulteration Act for selling adulterated milk, when it is said that the milk in question had too little cream. I would esteem it a favour if you would say in a note next week what is authoritatively given as a fair average of cream for *pure* milk. I have some standing by me just now obtained from a large country dairy farm where thirty cows are giving milk. It has 7 per cent. of cream.

Two or three years ago I made a survey of the town's dairies. I examined over thirty samples of milk; the highest percentage of cream I got was 13; the lowest, 3; both being obtained where one cow only was kept for private use. The richest one was attached to a brewery and confined, the other was in the outskirts, and getting out every day.

Some other samples, containing 5, 10 and 20 per cent. of water added, had 10, 7 and 5 per cent. respectively of cream. One sample with 10 per cent. of water had 9 per cent. of cream.

With such a variation I am afraid that it is just possible considerable injustice may be done if the quantity of cream is to be made an element in the case.

Analysis.

Dundee, November 30th, 1872.

[*** The yield of cream in genuine milk ranges certainly from 7 to 14 per cent., and it is unsafe to condemn a specimen of milk sold on account of its yielding little cream. If, however, the percentage of fat in the milk fall considerably below 3 per cent., and the "total solid residue" fall below 11·5 per cent. the milk may be safely condemned as more or less skimmed. In view of the present interest attaching to the question of milk adulteration, we purpose furnishing in early numbers a few facts respecting the characteristics of pure milk and the methods for detecting adulteration.—Ed. Pharm. Journ.]

A. H. Crundall.—We think your communication unsuited for publication. To be patronized is about the last thing that the ladies require.

"*Persevere.*"—There is nothing illegal in the course you describe, and we think it would operate as its own remedy for whatever is objectionable in it.

"*Cinchona.*"—(1) We have no doubt but that we could mention the names of gentlemen competent and willing to undertake the duties, but we consider that it would be far preferable that they should be performed by some one living in the same district as the members of the Association. (2.) We should advise "Fownes" to be studied in addition to the other book mentioned. (3) *a.* The B.P. and any works bearing on analysis and materia medica; *b.* Yes.

C. Crook.—Add the oil to as much water in a bottle and shake well; then add the liquor potassæ, again agitate and pour in gradually the remainder of the water, with the acetate of morphia dissolved in a portion of it, shaking well after each addition until the whole is added.

T. G. Batting.—The sp. chloroformi, B.P., is generally used in dispensing.

"*An Associate.*"—A plan frequently adopted is to add to tinct. iodi a sufficiency of liq. ammon. fort. and filter. Squire gives the following as Sir J. G. Simpson's formula for liquor ammoniæ iodidi:—"Liq. ammon. fortiss., 2 oz.; iodine, 10 grs.; iodide of potassium, 20 grs.; rectified spirit, 1 oz.; dissolve."

"*Justice.*"—In reply to our correspondent, he only is responsible. It is the duty of every person entitled to registration to see that not only his name but his address is correctly set forth in the published Register. Any one failing to ascertain for himself that the Registrar appointed under the Act does enter those particulars has only himself to thank for any inconvenience that may arise from the default.

"*Arte et Labore.*"—We have no qualification for giving advice upon the subject you inquire about.

H. A. K.—(1) "Liquor Vandelliæ Diffusæ." *Vandellia diffusa* is a Scrophulariaceous plant, a native of Brazil and Guiana, used sometimes in diseases of the liver or as an emetic. See vol. II. p. 849. (2) "Liquor Panaceæ." *Arnica montana* is on the Continent sometimes called *Panacea lapsorum.* Some preparation of this is probably referred to; but the prescription is evidently intended to be dispensed by some special or foreign chemist.

S. K. Bennett.—(1) No payment other than the fee for the examination is necessary. (2) The best way of ascertaining the questions set at the Minor or Major examinations would be to present yourself for examination. Apply to the Secretary for a copy of the Regulations of the Board of Examiners.

L. V. Z.—(1) We suppose the examiners would have no objection to chemical testing where it was necessary. (2) We believe not.

A. P. S.—We think your view is the correct one.

J. E. Richardson.—The entire bulk of the mixture, even if it were water, would be insufficient to dissolve the quantity of sulphate of magnesia. The quantity intended must have be ℨ xij. and not ℥ xij., and the mixture would be so dispensed in London.

Communications, Letters, etc., have been received from Professor J. Léon Soubeiran, Messrs. L. V. Rees, Jenkinson, Tichborne, Ekin, Sanger and Sons, Symes, Brookes, Norris, Dr. C. Kidd, Chemicus, Vigil, Silentium, W. J.

COWS' MILK AND THE BEST METHODS OF DETECTING ITS ADULTERATIONS.

BY CHARLES EKIN, F.C.S.

The physical properties of cows' milk are too well known to need description. It is a slightly alkaline liquid, and has a specific gravity varying from 1026 to 1031; according to the most recent analyses, it contains in a hundred parts,

Water	87·55
Fat	3·07
Casein	4·04
Milk Sugar	4·63
Ash	·71
	100·00

Milk has all the essential constituents of food-stuffs, viz., proteids, fats, amyloids and minerals in exactly the proper proportions to form a typically perfect food. These, measured by their carbon and nitrogen percentages, give 6·8 parts per hundred of the former to 0·7 of the latter. The phosphate of lime in milk is especially important to the process of the formation of bone, and this combined with the easy digestibility of milk, and as we have seen, by its containing in proper proportions all the essential constituents of a perfect food, explains why it should and does form the diet, *par excellence*, for the infant stages of life. It would seem a work of supererogation in these days of advanced knowledge to point this out; and, indeed nature has been teaching the lesson from time immemorial; but I have frequently heard mothers boast that their children have been brought up entirely without milk, whether human milk which is better, or its substitute from the cow, and that my experience cannot be altogether singular is sufficiently proved by the number of so-called infants' foods which we see everywhere advertised.

Although for adults the mixing of foods which long experience has justified is no doubt the best, still it is quite possible under certain conditions to live on a milk diet alone; and we have here at all events one instance where theory and practice are perfectly in accord. I have been assured by one whose authority is undoubted, and who has lived several years amongst certain tribes of Arabs remarkable for their fine physique and great strength, that they have but one meal a day, and that that meal consists entirely of camels' milk. The meal, it is true, must be rather a tedious affair, for owing to the stomach not being able to accommodate a sufficient quantity of the fluid at one time, they have to wait whilst they slowly pass the bowl from one to the other, until the casein has been coagulated in the stomach, and there is literally room for another draught. I am not informed whether this process is facilitated, as is reported of children at school feasts, by "standing up."

The white and almost opaque appearance of milk is an optical illusion; examined by the microscope it will be seen to be a perfectly transparent fluid, in which float numbers of transparent globules of fat. These globules are surrounded by an albuminous envelope, and the mechanical breaking of this, as in churning, causes the fat to agglomerate and become what is known to us as butter.

In the process of churning, a portion of the cheesy matter or casein of the milk becomes mixed with the butter, but this can be removed to a great extent by repeated washings in water, and decanting off the particles of casein which are suspended in it.

In the best kinds of butter the cheesy matter rarely amounts to more than one per cent.; in the inferior kinds there is often several per cent. present. As a rule, the more the casein is left in the butter, owing to its liability to putrefactive changes, the more likely the butter is to become rancid.

We have been treated of late years to several sensational articles in the newspapers as to the adulteration of butter, but they have no foundation in fact. The adulterants are almost invariably water and common salt. Good honest butter, if fresh, contains 82 or 83 per cent. of fat, about 1 per cent. of salt., and 16 per cent. of water; if salted, it should never contain more than 7 per cent. of salt. It is sometimes adulterated with as much as 35 per cent. of water. The fat should be estimated by washing with ether and evaporating down the ethereal solution. Where much water is present a rough estimate may be formed by melting the butter at a gentle heat in a graduated tube, and measuring off the proportion of water, which will of course sink to the bottom.

Cheese is made by coagulating the casein of milk; in this country by means of rennet, in other countries by such diverse substances as hydrochloric acid, vinegar, tartaric acid, sour milk, the juice of figs or thistles, etc. etc.; but though the manufacture of cheese offers many points of interest to the chemist, a discussion of them here would be foreign to the purpose of this article.

The cow stands first amongst all animals as a milk giver, both on account of the quantity and quality she yields.

The quality of the milk is much influenced by the age, the breed, the food, and the general conditions under which the animal is kept; and it becomes a point of importance to the analyst to know the extreme limits of this variation.

It used to be the custom to speak as to the purity and goodness of milk from the size and number of the fat globules as revealed by the microscope, but it is needless to say such a test is very unreliable, as is also the test of specific gravity. With regard to this latter test, it is evident that the removal of all or part of the cream, which is lighter than water, would increase the specific gravity, and a milk thus treated would actually in this way be pronounced better than it was before it was deprived of its cream.

Within the last two years, thanks to Mr. Wanklyn, who during that time has made several hundred analyses of milk, the results of which analyses he has published from time to time in the 'Milk Journal' and elsewhere, the assay of milk has been put upon an altogether more satisfactory footing than it has ever been before. Mr. Wanklyn has based his conclusions upon the amount of total solids milk contains; and although this method is not of his originating, it has been brought in his hands to a completeness and degree of accuracy which leaves little to be desired.

In examining a milk according to his plan, small thin platinum dishes containing carefully weighed quantities of milk are to be maintained at a temperature of 212° F. by means of a water bath for three hours. The residue once dried is not found to be very hygroscopic. This, of course, gives the total solids. If it is desirable to estimate the ash as well, the precaution must be taken (to avoid overlooking chloride of sodium, which is slightly volatile) to ignite the residue for as short a time as possible and weigh the ash, then ignite very strongly until the ash is completely whitened, and reweigh.

Four samples of genuine milk treated thus gave per cent.:—

Total solids dried at 212° F.	Ash.
12·12	0·61
12·16	0·63
12·51	0·66
12·47	0·76

Genuine milk of average richness, and neither skimmed nor watered, contains approximately 12 per cent of solids, and gives about 10 per cent. of cream. Milk which has been skimmed, but not otherwise maltreated, contains about 10 per cent. of solids. From the departure from these standards we can judge of the extent to which skimming and watering have been practised, the removal of 1 per cent. of cream lowering the solids of milk by 0·2 per cent.

Analyses extending throughout a whole year were made of the mixed milk of fifteen cows, and they show that the milk scarcely ever varies. In but four instances did the water fall below 86·6, and in four only did it rise above 88 per cent.

In making a complete analysis of milk, the water is found by deducting the weight of solids.

The fat, by treating the total solids with ether, and evaporating down the ethereal solution.

The milk-sugar is dissolved by water out of the milk residue which has been deprived of its fat and moistened with alcohol. The aqueous solution of milk sugar is evaporated in the water bath and dried until constant in weight. The weight of the salts dissolved out of the milk residue by water is ascertained by igniting the dry residue containing the milk-sugar and is deducted; the difference giving of course the milk-sugar.

The casein, coagulated in the usual way and separated by filtration, being on a filter cannot be accurately weighed, and may be found as difference.

Notwithstanding the statements to be met with in works treating of the Adulteration of Food, as to sheep's brains, etc., etc., being occasionally added to milk, water is really the only adulterant that is ever met with. There can be no doubt that in large towns the practice of watering exists to a large extent. In London, especially, according to the 'Milk Journal,' the samples of pure unskimmed milk form only a small minority.

Mr. Wanklyn has lately suggested that his method of limited oxidation by means of a strongly alkaline solution of permanganate of potash may be very well applied to the examination of milk, casein yielding 6·5 per cent. and albumen 10 per cent of ammonia. I am not aware that he has published any experiments bearing upon this, but those who have had experience in the estimation of albuminoid matters in potable waters, according to his plan, will readily understand that it may be adapted with great advantage to the examination of milk.

[⁂ In a letter received from Mr. J. F. Brown, of Dover, in reference to the testing of milk, he suggests that a determination of the amount of sugar present might form the basis of a convenient and trustworthy test. He says, "I remember applying it some years ago, by first separating the casein by heating with 1 per cent. of acetic acid, then diluting the whey to a definite measure and dropping it from a burette into a measured quantity of the solution of cupric potassio-tartrate, kept boiling in a flask until the colour was discharged. This copper solution was made from the directions in Attfield's Chemistry, so that 100 grains was equivalent to 5 grains of lactose."—Ed. Pharm. Journ.]

PERCOLATION.*

BY JULIUS SCHWEITZER.

The subject which I am going to deal with in this paper is a pharmaceutical process for preparing fluid extracts, tinctures or any other liquid preparation; it is the process called percolation. It is not a new process, although only recently introduced into the last edition of the Pharmacopœia. Some thirty years ago, Mr. Deane contributed a long paper about this subject, an account of which is in the first volume of the Pharmaceutical Journal; and so recently as at this year's meeting of the Pharmaceutical Conference here in Brighton, Mr. Stoddart gave us the results which he had obtained in preparing tinctures by this process and by simple maceration.

The different writers on percolation, after referring to the various difficulties which this process presents, usually finish by recommending a proceeding of their own, slightly different from those of their predecessors. I consider it, therefore, not out of place to bring the subject forward once more. I do not pretend to tell anything original or new, but will simply give an account of my proceeding. In working for many years in a large laboratory, I have had opportunities to try nearly every drug used in pharmacy, both on the large and small scale, and I never found any great difficulties to success. I usually carried my experiments on with cold water. The different opinions of the various writers on this subject I consider have principally arisen by their working with small quantities. If you work on the small scale, and if you are careful in the selection of your drugs, and see that they are properly powdered, and if you watch the subsequent process with the desire to produce a good article, you are almost sure to succeed whatever plan you may follow; but if you adopt the same proceeding on a large scale, the results are not near so certain and satisfactory; on the contrary, you find success very doubtful, and failure in many instances unavoidable; and no process can be considered sound and recommendable that is not applicable for large quantities. I consider also, that a certain amount of confusion and difficulty may be caused to a beginner by not keeping the two processes of displacement and percolation more distinct and separate from each other. That there is a difference in these two processes I consider sufficiently proved by their different names.

Displacement.—Displacement means the displacing or the removing of the soluble matter from your drugs and nothing else, and consequently you remove, eliminate or displace this in the highest state of concentration, and by means of the least possible amount of fluid; it is a process more applicable for small quantities where the ingredients are reduced

* Read at a meeting of the Brighton Association of Pharmacy, December 6th, 1872.

to a fine powder, the menstruum or solvent being usually strong or absolute alcohol, ether or chloroform.

Percolation.—Percolation, on the contrary, means simply the flowing through of your menstruum. It is a process specially adapted for large quantities. You usually work with proof spirit or more frequently with water; it is, moreover, a process where you usually have to use more fluid than absolutely necessary for the mere exhaustion of your ingredients.

The Percolator.—After these preliminary remarks let us consider the best form of our percolator. I think it is now generally admitted that the cylindrical form is the best, while the cone, which found many advocates in the commencement, is rejected. The conical percolator was first of all selected, because the ingredients when packed in it can readily rise when moistened and swelling out; consequently there was no danger of blocking the percolator up or bursting it; but the same loose attachment of the species with the sides of the percolator which enabled the solid ingredients to rise, allowed also the fluid to pass without penetrating right through them. Besides this most serious objection, a conical percolator is unnecessarily bulky, while the principal amount of the ingredients is of necessity in the upper and wider part where the fluid exerts the least pressure and has the least solvent action. But whatever percolator may be used, it will be found an additional advantage to have a tap at the bottom for the check and regulation of the outflow of the fluid.

The Species.—With regard to the condition of the ingredients, they must be in a uniform, more or less, finely divided state; the larger the quantities used and the more mucilaginous the nature of the ingredients, the coarser the species may be; while the smaller the quantities worked with and the more insoluble and woody in fibre, the finer the ingredients can be. These are, of course, only general rules, and those who have experience in the process will find no difficulty in percolating a cwt. of finely powdered opium or ergot of rye at one time.

In such cases it is necessary to mix the powder with some inert, insoluble, and light material; in the above-mentioned instances I took the rumex fruit and residue, so abundantly obtained in the preparation of extract of opium, and ordinary rye-husks. In fact, I found husks or straw, either cut fine as chaff or in whole pieces, a most useful help to facilitate in many instances the process of percolation. The ingredients themselves must be of a uniform powder to allow the fluid to pass through every particle at an equal rate; the fineness, as I have stated before, may vary from a powder passed through a sieve of 36 to 144 meshes to the square inch. They ought, moreover, to be moistened with the menstruum used for percolation, and allowed to absorb as much of it as possible, taking care that the single particles retain their shape or individuality, and that the mass does not form a shapeless magma. During this absorption of moisture, some vegetable ingredients will increase very materially in bulk, and this swelling out ought to be allowed to go on to its full extent before packing them in the percolator. If you percolate with water you will find that some ingredients, such as poppy-heads or orange-peel, absorb a great amount; in fact as much as they contained in their fresh condition. The dry vegetable cellular tissue retains the power to fill these cells and vessels with moisture again, and it is of great importance for the process of percolation that this is so; and pains ought to be taken to see that the ingredients are thoroughly impregnated and soaked by sprinkling them from time to time with the menstruum, and turning them over and over.

The Packing.—After the ingredients are brought to the proper condition for packing, a little tow or cotton-wool is placed in the bottom of the percolator, over the tap, and on this the ingredients are packed. Where it is possible it is best to use the hand, to ensure a uniform and close position without jamming or smashing the ingredients, the hand being the best guide for the amount of pressure required to effect this; a little tow or cotton-wool is again covered over the top and some weighty and not acted upon substance placed over it to prevent the floating up of the mass. I have found old glass stoppers very serviceable for this purpose. Sufficient fluid is now added to cover the species, and it is well before starting the process to allow the apparatus to stand quiet for a couple of hours, after which the tap may be turned on so as to enable the fluid to escape drop by drop in quick succession.

The Percolating or Exhausting.—The exhaustion of the species is effected by the means of two agencies, the force of gravitation compels the fluid to descend, and the capillarity of each single particle absorbs the descending fluid and facilitates and enables it to pass right through the mass from particle to particle, carrying with it the soluble portion. The first portions which pass out of the percolator are those most highly charged with extractive matter, and are best kept separate from those obtained last, especially where water is used for percolating, and where the products have to be concentrated by evaporation; in these cases the evaporation ought to commence with the more diluted portions obtained at the end of the process, adding the first products last.

Conclusion.—I cannot leave this subject without throwing out some suggestions. Percolation enables us to separate the active, soluble and volatile aromatic principles of plants in a highly concentrated and natural condition; and from my experiments I have but little hesitation in stating that all our proof tinctures, such as tincture of orange-peel, henbane, cinchona bark, etc. etc., could be made much more uniformly and economically by exhausting the respective drugs simply by water, concentrating the percolated products to such a degree that three parts of it added to five parts of rectified spirit would produce eight parts of tincture of Pharmacopœia strength. Such a plan, if once introduced, would naturally lead a step further; after ascertaining the best solvent for each drug, concentrated standard solutions of each would be made, and from these, by addition of spirit or wine, or by mixing one or more together, all our tinctures and wines, simple and compound, could readily be made at a moment's notice, with the certainty that in each case they really possessed all the soluble active principles of the drugs. A chemist in thus preparing his stock preparations with the least amount of spirit, and in a concentrated form, would usually select the time of the year when orange-peel, henbane, conium and all our indigenous plants are in proper season; in many cases he would buy the fresh plants and dry them himself, instead of, as now, using them whenever wanted all the year round, immaterial whether in or out of season. He would find, moreover, that in many of the present preparations he has to commit great waste of material, throwing many ingredients away before they are half exhausted. I cannot help thinking that by possessing such stock liquors containing all the soluble active portions of our drugs in a simple and definite form, the labour of the physician as well as that of the chemist would be facilitated; the one would readily know what he had to prescribe, and the chemist would better know what he really dispensed; tinctures, liquors and wines would become clear indicators of what they really are, a number of old and obsolete compounds would disappear from our shelves and store-rooms, and make place and throw more light on those preparations of importance that remained behind.

BORATE OF LIME IN PERU.*

BY M. THIERCELIN.

Borate of lime is found in the great pampas of Tamarugal, especially upon the western boundary, in the dry bed of a river which once ran from the north-east to the south-west. It is collected by breaking through the saline crust which covers the soil, and digging up the subjacent sand. The mineral then presents itself in nodules of various sizes, but having an average weight of from forty to fifty grams. There are besides myriads of smaller concretions a few millimetres in diameter, which are neglected because of their size. The pieces are rounded and white, with a brown tint derived from the earth. Their fracture is shining and pearly, and presents a lamellar crystallization, which recalls boracic acid. Small prisms with a yellowish reflection reveal the presence of glauberite. The solubility of the entire mass in water is very slight, varying from one to five per cent., according to the proportion of its elements. Acids, on the other hand, especially hydrochloric acid, dissolve it nearly completely in a short time. Dilute acids only partially dissolve it.

By qualitative analysis the author has obtained from it the following: — HO, BO_3, SO_3, CaO, NaO, Cl, SiO_2, Fe. He has not, however, met with potash or ammonia, the presence of which has been stated by some authors to be constant.

The neighbourhood of the volcano of Isluga, about twelve or fifteen leagues to the north-east, explains the origin of the boracic acid; either it was conveyed in the steam which the ordinary winds would drift towards these parts, or else, dissolved in cold water, it was brought down in the river which formerly ran in the now dry bed. It would also be accompanied by sulphurous acid, which would account for the sulphuric acid now found. The numerous masses of easily disintegrated carbonate of lime that are scattered about upon the soil, would necessarily furnish a base to the two acids vomited from the volcano, and borate and sulphate of lime would thus be formed. But in the presence of a large quantity of common salt which is spread over all the neighbouring country, the sulphuric acid has formed a double salt of soda and lime, or glauberite, which is besides found in nearly every part of the province. Boracic acid, on the contrary, not being able to decompose the chloride of sodium in the cold, would remain free from the soda. This in reality proves to be the case upon analysis.

Various analyses show that the salt contains two equivalents of acid,—that it is, therefore, a biborate of lime,—with eight equivalents of water. If this salt were in a pure state in the mineral, it would have the following centesimal composition:—

BO_3	41·18
CaO	16·47
HO	42·35

* From the 'Bull. Soc. Chim.' and 'L'Union Pharmaceutique.'

But this is not the case, and without speaking of silica, iron, etc., there is always a proportion of glauberite present, and sometimes a considerable quantity. Analyses would therefore give a varying proportion of the different elements, according to the quality of the specimen examined. The following are the results of some analyses made by the author:—

	No. 1.	No. 2.	No. 3.
HO	20·15	28·74	28·78
BO_3	16·42	17·67	25·40
SO_3	21·56	17·80	18·00
CaO	15·15	13·29	17·36
NaO	7·75	6·89	6·97
Insoluble (SiO_2)	10·42	8·37	0·14
Alumina and iron	4·31	5·10	,,
NaCl	4·00	1·95	3·57
	99·76	99·81	100·22

The first two represent two commercial specimens, the last some nodules chosen for their purity, and separated from glauberite and earth. It would appear, therefore, if the first two were of average richness, that boracic acid is present in the mineral to the extent of from sixteen to eighteen per cent. The water found over and above the eight equivalents of crystallization must be considered as hygroscopic; its proportions vary considerably.

The proportion of boracic acid in relation to the lime proves clearly that it is a biborate, and as the rest of the lime and soda are required to constitute the glauberite, it is evident that soda is not present in the borate.

According to the formula of biborate of lime ($2\,BO_3CaO$, $8\,HO$), in which the acid represents 41·18 per cent. it might have been expected that all the specimens analysed would contain less acid than was found in the pure salt. It is astonishing to see in published analyses quantities of acid out of all proportion to the composition of the mineral. For instance, in 'Watts's 'Dictionary' analyses are given in which boracic acid figures as 34, 43, 44, 45, 46, and even 49·5 per cent. These must certainly have been analyses where the determination of the acid has been by difference. If the method is easy, it runs the risk of not being very exact.

It must be admitted that the direct analysis of boracic acid is difficult, and that this circumstance has without doubt influenced the processes employed. In order to render his analyses as exact as possible by working directly upon the acid, the author had recourse to the volumetric method.

It has already been stated that dilute hydrochloric acid does not entirely dissolve the mineral; in fact, it leaves all the glauberite intact, and acts only upon the borate. If, therefore, hydrochloric acid, say of fifty per cent. strength, be dropped from a burette into a vessel containing a determined quantity of borate well powdered and suspended in a little water coloured blue with tincture of litmus, after the acid has decomposed all the borate it will remain free and redden the solution. The quantity of hydrochloric acid employed will indicate the quantity of boracic acid displaced, from which the proportion per cent. may be calculated. This easy method gives very exact results, and allows an analysis of borate to be made in less than an hour.

THE FLORA OF THE QUANTOCKS.*

BY W. TUCKWELL.

The geological formation and the historical associations of the Quantock Hills have been abundantly investigated. Their natural productions, animal or vegetable, have not yet, so far as I know, been described or

* Read before the Somerset Archæological and Natural History Society September 12th, 1872, and reprinted from *Nature*.

catalogued, although they contain specimens in both branches of Natural History singularly rare and sought after, and though more than one zoologist or botanist of note gazes on them daily from the windows of his home. A paper whose conditions are that it should be light and popular, and that it should not exceed ten minutes in the delivery, cannot throw much scientific light upon the plants of the most limited region; but it may reveal sources of enjoyment and raise individual enthusiasm, and it may remind this meeting that the time has possibly come, when our association should use the means at its command to encourage the gradual creation of such a flora and fauna of the county as no single naturalist, unassisted by a public body, can in any case trustworthily compile.

In this beautiful valley, fat with the rich red soil that countless millennia have seen washed down from the surrounding hills, the flora is everywhere so unusually rich as to win the envy and delight of strangers. It has been my lot to pilot botanists from all parts of England in search of local rarities; and I have found their chief raptures given not to the uncommon flower they had come to see, but to the profusion of form and colour which includes almost every English genus; manifest in the common turnpike roads which skirt the hills, but revealed in full perfection to those only who penetrate the interior of the range. In the sheltered lanes of the less wooded combes; in the road from Kilve to Parson's farm, the footpath from the Castle of Comfort to Over Stowey, above all in the lane from the Bell inn to Aisholt, the hedge-banks and the wide grass margins of the road are scarcely surpassed in beauty by the mosaic of a Swiss meadow or an Alpine slope. From the beginning to the end of June the colours are blue and yellow; the blue represented by the ground ivy, the germander speedwell, the brooklime, the late bugle and the early self-heal, the narrow-leaved flax, the long spikes of milkwort, and the varieties of the violet; the yellow by the birdsfoot trefoil large and small, the St. John's-wort, golden mugweed, and hop trefoil, the agrimony, the yellow vetchling, and the countless kinds of hawkweed. In the hedges above are the mealtree and guelder rose, the madder, white campion and lady's bedstraw, half hidden by the twining tendrils, white blossoms, and tiny cucumbers of the bryony; while here and there, where the hedge gives way to an old stone pit or deserted quarry, the tall foxglove and the great yellow mullein stand up, harmonious sisters, to fill the gap. By the middle of July the colours shift. The flora of early spring is gone: the milkwort shows its pods, the speedwell its bushy leaves; the yellow still remains; but the blue has given way to pink; to the lovely musk mallow, the horehound, doves' foot, cranesbill, restharrow, painted cup, and calaminth. With August a third change arrives; the small short clustering flowers are gone: instead of them we have the coarse straggling fleabanes, ragworts, and woodsage: the great blue trusses of the tufted vetch and the pure white trumpets of the bindweed take possession of the hedges; the yellow sagittate leaves of the black bryony and the red berries of the mountain ash warn us that summer is past. Our September visit marks the closing scene. The flowers are few and far between; but the ivy bloom is musical with bees, the hazels put forth clusters ruddy brown as those with which the satyr wooed the Faithful Shepherdess; the arum pushes its poisonous scarlet fruit between the mats of dying grass; and the meadows which slope upwards from the brooks are blue with the flowers of the colchicum.

These are all common flowers, whose names and habits, if education did her work, we should learn in childhood from our mother and our nurse: it is their immense profusion, not their rarity, that calls for notice; and they represent but a small part of the hill flora. To exhaust this fairly we must visit four different regions—the hill tops, the bogs, the coppices, and the slopes toward the sea. Of the first it is difficult to speak without a rapturous digression as their familiar sights and sounds occur to us—the breeze that seems half conscious of the joy it brings, the musical hum of the bees, the warble of invisible larks, the popping of the dry furze pods in the stillness, the quivering air above the heather, the startled spiders with their appended egg-bags, the grasshoppers, the green hair streaks, the gem-like tigerbeetles on the wing, in the distance the Mendips and the yellow sea, or the long rich valley, closed by Dunkery and Minehead.

Heath, furze, bracken, and whortle berries, are the four tetrarchs of the hill tops, giving endless shades of red, and green, and yellow. The heaths are three, and only three—the heather, the cross-leaved heath, and the bottle heath, the last exhibiting rarely a white variety, which in the language of flowers tells the tenderest of tales. From beneath their shelter peep the eyebright, the spring potentil, the heath bedstraw, and the creeping St. John's-wort; amidst them springs the uncommon bristly bent grass; everywhere the green paths which wind amongst them are carpeted with the mœnchia and the little breakstone, and bordered by the red and yellow sheep's sorrel and the pale yellow mouse-ear. On many of the prickly furze beds grows the wiry leafless dodder; every ditch is filled with masses of lemon-scented oreopteris, and every patch of stones is hidden by the pink blossoms of the mountain stonecrop. At 800 feet above the sea we meet with mat grass and the cross-leaved heath. Higher still we find the slender deers' hair, first cousin to the isolepis of our greenhouses; and highest of all grow, for those who know their haunt, two species of the stag's horn club moss.

The bogs are very numerous. They form the summits of the combes; and some of them descend the hill until they join a deep cut stream. All are covered with the turquoise bloom of the forget-me-not and the glossy peltate leaves of the marsh pennywort, and choked with the little water-blinks. They all include liverwort with its umbrella-shape fructification, sphagnum, marshwort, and pearlwort; and on their margins grow the ivy-leaved hair-bell, the lesser spearwort, the lousewort, and the bog pimpernel. In a few of them are found the oblong pondweed and the marsh St. John's-wort; in two combes only, as far as I know, grows, alone of its genus, the round-leaved sundew.

Of the coppices, Cockercombe and Seven Wells are the best known; but their large trees check the growth of flowers; and the botanist will find more to please him in Butterfly Combe and Holford Glen, which are smaller and less frequented. Here in early spring masses of the white wild hyacinth rise amidst last year's dead leaves; here grow the cowwheat, woodrush, golden rod, sheep's scabious, wood pimpernel, wild raspberry, sanicle, and twayblade. The helleborine is found in Crowcombe; in Tetton woods the rare pink lily of the valley; in Gothelstone the adders' tongue and mountain speedwell; in Ashleigh Combe, thelypteris; in Aisholt wood the white foxglove, white herb Robert, and white prunella; while under the famous hollies of Alfoxden, sacred to the memory of "Peter Bell" and "We are Seven," grow the graceful millet grass and a rare variety of the bramble.

On the St. Audries slope the changed soil and the influence of the sea give birth to several new plants. The autumn gentian, the tufted centaury, the round-headed garlic, and the sea starwort are abundant near the cliffs; the perfoliate yellow wort is common; fluellen grows in the stubbles, the lady's tresses near the lime-kiln, the sea pimpernel between the stones, the arrow-grass and hard-grass just above the sea, to which we descend between banks covered, as no other banks are covered, by the magnificent large flowered tutsan.

A few rare plants remain, which come under neither of the groups described. The Cornish money-wort abounds in a small, nameless combe near Quantockshead; the rare white stonecrop is indigenous or naturalized at Over Stowey; the white climbing corydalis is found close to Mr. Esdaile's lodge; the lady's mantle.

goldilocks, and bistort grow in the Aisholt meadows; the stinking groundsel hard by the remains of Coleridge's holly-bower. In the same neighbourhood I have twice found the purple broomrape; and Wilson's filmy-fern, one of the rarest of British ferns, is established in the Poet's Glen.

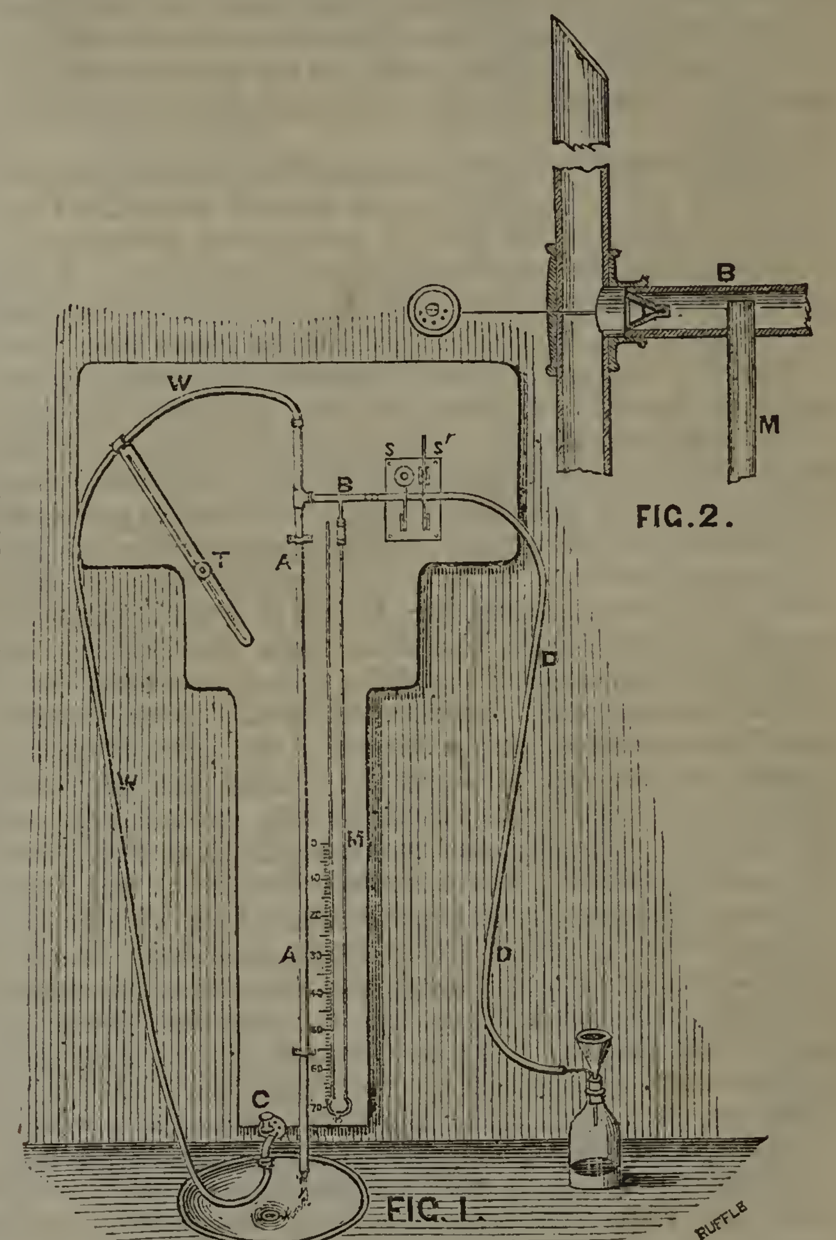
I venture to hope that there is no one present to whom this catalogue of plants is a catalogue and nothing more, Our English wildflowers are so charming in themselves. they awake in all of us so many associations, they hold so large a place in our poetical literature, their popular names reveal so many an etymological secret and recall so many a striking superstition, that almost every one, whatever be the line of his mental culture, is willing to own their interest and to linger over their recital. To the Shakspearian scholar they bring memories of Perdita at the shearing-feast, of Ophelia in her madness, of Imogen sung to her untimely grave, of the grey discrowned head of Lear, with its chaplet of "rank fumiters and furrow-weeds." The lover of Milton points to the "rathe primrose," the eye-purging euphrasy, and the amaranth, which was twined in the crowns of worshipping archangels. The historian of the long-buried past sees in the Cornish money-wort, the filmy-fern, and the Lusitanian butterwort of our hills evidence distinct and graphic of the time when Scotland, Ireland and Spain formed with our own peninsula portions of a single continent. The student of folk-lore tells his tales of the ceremonies which surrounded the vervain, the St. John's-wort, and the rowan, and of the strange beliefs which clung to the celandine, the hawkweed, and the fumitory. The etymologist will elevate the names familiar to us all into records of the origin and habits of our remote forefathers; he will disinter the fragments of myth and history which lie embalmed in the centaury, the pæony, the carline thistle, the flower-de-luce, and the herb Robert; he will tell us how the laburnum closes its petals nightly like a tired labourer, how the campion crowned the champions of the tournament, how the foxglove, the troll-flower, and the pixie-stool, bring messages from fairy land; how the scabious, the lung-wort, the scrophularia, and the wound-wort, bear witness to the grotesque beliefs of a pre-scientific medical community. Of the botanist I need not speak. Not a flower that blows but will furnish him with the text of an eloquent discourse. Forms that yield to other men artistic and sensuous enjoyment only, lay bare before him secrets of structure and of function as wonderful as those which characterize his own bodily frame; suggesting each its truth of design, and natural selection, and adapted change, and mysterious organic force. In the fructification of the orchid, the stamens of the barberry, the hairs of the nettle, the leaf of the sundew, he reads lessons as profound and similes as graceful, as were taught to Chaucer, and Southey, and Wordsworth, by the daisy, and the holly, and the lesser celandine. Year after year he greets the early spring with an enthusiasm which his neighbours know not, as one by one his friends of many years, the snowdrop and the violet, and the crimson hazel stigma, and the stitch-wort, and the daffodil, and the coltsfoot, come back to him like swallows from their winter sojourn out of sight. Year after year, as the seasons die away and the earth is once more bare, he looks back delighted on the pleasant months along which he has walked hand in hand with Nature; for he feels that his intelligence has been strengthened, his temper sweetened, and his love of God increased, by fellowship with her changes, study of her secrets, and reverence for her works.

Persian Saffron.—Dr. Hager reports that he has received under this name some agglutinated cakes having a fatty odour, which contained a few crocus stigmas, but consisted chiefly of narrow yellow petals saturated with a thick oil readily dissolved in ether. He states that it may be easily distinguished from true saffron by its imparting a yellow colour to petroleum ether.

AN IMPROVED FORM OF FILTER PUMP.*

BY T. E. THORPE, F.R.S.E.

In the 'Berichte der Deutschen Chemischen Gesellschaft' (No. 7, 1872), Dr. Mendelejeff is reported to have described a new form of filter-pump devised by M. Jongo, or Moscow, which is so exceedingly simple and efficacious that it will doubtless be universally set up in laboratories. The disposition of the apparatus will be readily understood from the annexed figure,



which represents it in the modified form about to be described. It consists of a tube A A about 1 metre in length and from 8 to 10 millimetres in diameter, to the side of which is affixed a side tube B about 5 centims. in length. The upper end of the vertical tube A is cut slantwise in the manner represented in the enlarged figure (fig. 2), and is connected by means of a strong but sufficiently elastic caoutchouc tube with the stopcock C in connection with the water-supply. In the original apparatus a Bunsen valve was fitted into the side tube; that is, the caoutchouc tube D D was stopped at the upper end with a short piece of glass rod and cut along its length near the end by a smart blow from a chisel. The edges of the slip were thus left sharp; and on applying any outward pressure to the tube they readily adhered, making a perfectly air-tight conjunction. The valve was then pushed within the tube B, which was narrowed at the end so as to retain the caoutchouc tube perfectly air-tight. The other end of the caoutchouc tube D D was connected with the vessel to be evacuated. On allowing the water from the main to flow through the vertical tube, the caoutchouc tube commences to pulsate rapidly as it falls over the upper edge of the tube A, and periodically closes the opening. The Bunsen valve in consequence intermittently opens

* Read before the British Association at Brighton, 1872; reprinted from the 'Philosophical Magazine' for October.

and shuts, and rapid suction is set up; and it is thus easy to obtain a vacuum equivalent to 0·7 metre of mercury. The working of the apparatus is obviously akin to that of the hydraulic ram; so easily and efficaciously does it exhaust, that it will doubtless take the place of the Bunsen filter-pump. It has the great advantage of portability over the older form, since it may be so constructed that it can be transported to any position in the laboratory: it obviates the necessity of a fall of upwards of 30 feet, and therefore requires no alteration in the existing arrangements of pipes and fittings; and, lastly, its cost need not exceed a few shillings.

There are a few disadvantages connected with the use of the caoutchouc valve above described. Owing to the gradual diminution of its elasticity by long-continued working, its efficacy diminishes after a time; it not only then fails to bring about rapid exhaustion, but so soon as the conjunction of its edges ceases to be perfect, it allows the water to flow back into the caoutchouc tube. To obviate these inconveniences another form of valve was devised. A hollow metal cone shaped like a funnel is soldered air-tight into the end of the side tube B (fig. 2). This cone is pierced near its apex with a number of holes, and into it is fitted a piece of unvulcanized sheet caoutchouc shaped like a filter. This is retained in its place by a small screw passing through the sheet caoutchouc and into the apex of the cone. By its elasticity the india-rubber sheet presses firmly against the sides of the cone, and effectually prevents the entrance of air or water from the tube A; but the slightest pressure from within B is sufficient to disturb the adhesion, and to allow of the ready transmission of air through the holes in the cone. This valve is of a more durable and permanent character than the original form, and permits of a more rapid exhaustion. In the modified form of the instrument a manometer M is fixed to B; this allows the degree of exhaustion to be immediately ascertained from the position of the mercury along the graduated scale. The rapidity of the pulsations in the caoutchouc tube W W may be regulated by the moveable arm T, which by means of a screw can be clamped in any desired position. The screw S serves to regulate the rapidity of the exhaustion, or, in cases of simple aspiration, the amount of air passing through the holes in the cone. S' is a clamping arrangement, by which the vacuum within the pump can be maintained without disturbing the screw S if it should be necessary suddenly to disconnect the caoutchouc tube D from the vessel to be exhausted.

This brief account of the slight but serviceable modifications in the original instrument of M. Jongo is made with the object of introducing an exceedingly valuable piece of laboratory apparatus to a more extended notice than it has hitherto met with in this country.

THE AMOUNT OF CAFFEINE CONTAINED IN COFFEE, AND ON ITS PHYSIOLOGICAL ACTION.

BY HERMANN AUBERT.

Although the quantity of caffeine contained in raw coffee is known, no attempt has ever been made to ascertain how much of the alkaloid is contained in a cup of coffee, and it is also uncertain whether the beans should be slightly or strongly roasted, and whether the ground coffee must be boiled to extract its active principles or simple infusion is sufficient. By extracting the coffee with water, either by percolation or decoction, and evaporating to a syrup, which is then treated from five to eight times with chloroform at nearly 60° till all the caffeine has been dissolved out, he obtains a larger quantity than previous experimenters. Raw beans of the yellow Java kind yielded 0·709–0·849 per cent. by this method, while they gave only 0·474 by Garot's method of precipitation with basic lead acetate. When much roasted, coffee loses a certain quantity of caffeine, which sublimes, whereas it loses none by slight roasting. Notwithstanding this, the coffee made in the usual way by percolation from strongly roasted coffee contains rather more caffeine than that made from an equal weight of slightly roasted coffee, as the roasting renders it more easy to extract.

When coffee is prepared in the usual domestic fashion by pouring six to ten times its weight of boiling water three or four times over ground coffee, nearly the whole of the caffeine is extracted, hardly one-fifth of it remaining in the grounds. The quantity of caffeine in a cup of coffee prepared from 16⅔ grams of coffee is about 0·1 to 0·12 gram. A cup of tea prepared in the ordinary way from 5–6 grams of Pekoe tea contains also about 0·1 to 0·12 grams of caffeine. Caffeine acts upon the spinal cord and causes tetanus in doses of 0·005 gram for a frog, injected subcutaneously; for a rabbit, 0·120 gram (injected into the jugular vein); for cats, 0·200, injected in the same way; and the same quantity for dogs. It has a peculiar action on the muscles of frogs, especially when directly applied to them, causing them to become rigid and white, apparently from coagulation of the myosin. It does not exert this action on the muscles of mammalia. The tetanus is removed by artificial respiration, and if this process is kept up for about a quarter of an hour, no recurrence of the tetanus takes place, even though the respiration is then discontinued, showing that the caffeine is quickly eliminated or destroyed in the organism. Occasionally it produces a paralysis of the hind legs in rabbits, but the author is uncertain to what cause this is to be attributed. It quickens the heart and at the same time reduces the blood pressure. This effect he believes to be due to stimulation of the cardiac ganglia, combined with diminution of what he regards as cardiac *tone*, due to paralysis of the nerves passing from these ganglia to the muscular substance.

The action of caffeine does not explain the stimulating and reviving action of coffee.—*Journ. Chem. Society.*

CLOSING OF THE DUBLIN EXHIBITION AND AWARDS OF THE JURIES.

The Dublin Exhibition was closed on the 30th of last month by the Lord Lieutenant and the Countess Spencer by a ceremonial of some hours' duration.

Mr. Lee, the manager, who some time since was connected with the Crystal Palace, London, received at the hands of his Excellency the order of knighthood. This exhibition, although more of a national one than international, has been attended with a considerable amount of success. The real promoters of the undertaking were Sir Arthur and Mr. Cecil Guinness, and it is generally supposed from the success that has attended it that their munificence will not be taxed to any great extent.

It was not originally intended to give medals, but a short time before the close, and at the request of some of the Executive, it was determined to change the original plan. The following will be found to be the awards of the jurors in Section A (natural products, food, raw materials). The awards were only publicly announced on the 1st of December, and in the official list of the awards, there is no intimation given of what the medal is given for. It merely gives the name of the firm to whom the award has been given, but the following list will be found to be correct. The exhibitors are divided into four sections or classes, but as the exhibitors in the three other sections would not interest the readers of the PHARMACEUTICAL JOURNAL, Section A alone is given.

The Jurors in Section A were—

John Adair, Esq.; John Bagot, Esq.; Prof. Barker, College of Surgeons; Prof. Cameron, City analyst; Charles R. C. Tichborne, F.C.S., etc., Apothecaries' Hall of Ireland; Alderman Purdon, etc.

Medals were awarded to—

Andrews and Co., Dublin, for a general collection of food products.

Berger, Spence and Co., Manchester, for alum.

Boileau and Boyd, Dublin, for a general collection of fine chemicals.

Bewley and Draper, Dublin, for mineral and medicinal waters.

Boyd and Alexander, Dublin, for chlorinated lime and manures.

Belfast Cement Company, Belfast, cement.

Colman, J. and J., Norwich, pure mustard and rice starch.

Croft, Thomas, and Co., Cheshire.

Cantrell and Cochrane, Dublin, mineral waters.

Crawford, Alexander, and Son, Belfast, for fine samples of wheat starch prepared as food for sundry purposes.

Cooney, Charles, Dublin, for ball blue and blacking.

Drogheda Manure Company, Drogheda.

Dublin and Wicklow Manure Company.

Eckford, A. L., Dublin, manures.

Fry, J. S., and Son, Bristol, chocolate.

Field, J. C. and J., London, for ozokerite and general collection.

Goulding, W. and H. M., Dublin, manures.

Hayes Brothers, Dublin.

Killaloe Slate Company, Nenagh.

Lewis, Fred., and Co., Dublin, perfumery and soaps.

Mining Company of Ireland, The, Dublin, for general collection, including the chief preparations of lead and silver.

M'Kenzie, T., and Son, Dublin.

Marine Salts Company of Ireland, Dublin, for iodine, and products from kelp.

McMaster, Hodgson and Co., Dublin, for general collection—linseed and rape oils, fluid annatto, Warren's sweet essence of rennet, etc.

Metcalf, Samuel, Dublin.

Ordnance Survey of Ireland, Dublin.

Price's Candle Company, London, glycerine and general collection.

Royal Dublin Society, The, for models of vegetable products.

Richardson Brothers and Co., Belfast, manures.

Rathborne, John C., Dublin, bleached wax, spermaceti and sperm products.

Rimmel, Eugene, per Mr. Griffin, London, perfumes.

Raynbird, Caldecott, and Co., Basingstoke.

Stanford, E. C. C., Dunlocker, iodine, and various patent processes.

Tallerman, London, for Australian preserved meats.

Victoria Slate Company, Dublin.

Certificates of Merit were awarded to—

Bolton, W., and Co, Dublin, whisky.

Burke, John, Dublin.

Green, John, London.

Holt, Norwich and Co., London, for oil soaps.

Hickisson, John, London.

Kelly, John, Graigue, for rice starch.

Moses, Mr. T., Dublin.

Pickering, D., Dublin.

Rumsey, W. S , London, polishing pastes, etc.

Wright, Freeman, Suffolk.

THE INCOME TAX.

On Friday, December 13th, a public meeting was held in the Guildhall of the City of London, under the presidency of the Lord Mayor, to consider the incidence of the Income Tax, and the justice of its final repeal. It was attended by many members of Parliament, and deputations from various parts of the United Kingdom.

Mr. W. M. Massey, M.P., moved the first resolution —"That the Income Tax is inquisitorial in its character, unjust in its operation, and demoralizing to the national character." He said that the tax was almost peculiar to this country, and here it was adopted formerly only in times of great pressure, such as during the latter period of the great revolutionary war, and again in 1842, upon the accession of Sir Robert Peel to office. At that time that minister had to deal with a chronic deficit in the revenue, a million and a half of which was due to the reduction of postage charge, besides having to provide for the great fiscal changes he intended. Even then it was vigorously opposed, and Lord Brougham submitted a series of resolutions to the House of Lords protesting against its adoption as a permanent source of revenue. Those propositions were even more applicable at the present time than they were then. Since that time no Chancellor of the Exchequer had ventured to suggest that this tax was ultimately to be adopted as a permanent part of our fiscal system. On the contrary, each one had pledged himself to the final repeal of the tax. That period of repeal, however, seemed still indefinite, and it was necessary that the tax-payers should express an opinion whether the present time of the prosperity of the revenue was suitable for such abolition. He was not there to advocate the exemption of any class from bearing its share of the burden. If it were necessary that the trading classes should pay two millions in the shape of direct taxation, let that contribution be made; but he maintained that no two millions of taxation was levied in a form more objectionable than that which was levied under Schedule D.

The motion was supported by Sir John Bennett and Mr. C. E. Lewis, M.P., and carried unanimously.

Mr. John Glover moved the second resolution, to the effect that the continued imposition of the Income Tax is contrary to the pledges of Governments of both parties; is a direct breach of faith with the tax-payer, and having been always relied on as an extraordinary tax, ought now to be repealed. This was seconded by Mr. John Jones, a liveryman, and carried unanimously.

A resolution, that with the view of giving effect to the forgoing propositions, the meeting should resolve itself into a National Anti-Income Tax League, was proposed by Mr. Alderman Sydney, supported by Mr. Seaton, of Hull, Sir Charles Dilke, M.P., and Mr. Alderman Hawkes, of Birmingham, and carried unanimously.

Mr. Samuel Morley, M.P., proposed a vote of thanks to the Lord Mayor for his conduct in the chair. The Lord Mayor, in replying, said he felt certain such a meeting would have great effect on the Government, and lead Mr. Lowe to the reconsideration of the question of the Income Tax. At all events, if it, or any portion of it, were to be continued, the course of proceeding adopted within the last few years towards those who paid it should be so amended as to give no offence.

Administration of Metals in Cod-Liver Oil.—According to the *Practitioner*, Herr Godin recommends, in place of the ordinary solutions of the metallic salts, their solution in cod-liver oil by means of benzoic acid. Cod-liver oil can thus be made to take up benzoate of iron and benzoate of mercury. Benzoate of iron is a beautiful orange-coloured salt of stable character, which increases the therapeutic activity of the oil, conceals its unpleasant taste, and renders it more digestible.

Laurel Leaves as a Febrifuge.—M. A. Doran has communicated a note to the French Academy recording the febrifuge and antiperiodic properties of the leaves of *Laurus nobilis*. The green leaves are prepared by drying them at a gentle heat in a closed coffee roaster, to avoid the loss of the volatile constituents, until they become brittle, but without undergoing any alteration. They are then reduced to a fine powder of which one gram, macerated in a glass of cold water for ten or twelve hours, is administered as a dose.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 21, 1872.

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

WOMEN AS PHARMACISTS.

THE admission of female students to the lectures of the Pharmaceutical Society, and their prospective admission to the laboratory practice, have called forth from the Press a considerable amount of favourable comment, and, as far as we can learn, no adverse criticism in that quarter.

The promoters of this new movement in the pharmaceutical world, and the ladies most directly concerned, may certainly be congratulated upon its cloudless inauguration. For notwithstanding the assertion of the *Pall Mall Gazette*, that "there are no objections worth naming against the sexes being instructed together," when "the subjects treated of are botany, chemistry, and the knowledge of drugs," the newness and singularity of the event, might well have occasioned some slight alarm in this country of grave traditions and precedents. Some are persuaded that such alarm would have been the result more of habit than of thought, and that women would be welcomed as pharmacists by all true devotees of the art; while any pharmaceutic lore they might add to the general stock, would be greeted with all the respect and acclamation it deserved, just as if it had sprung from the industrious brain of the most able masculine pharmacist.

Respecting the article in the *Pall Mall Gazette* upon this subject, above referred to, which has been reproduced in our columns, it may be remarked that it has given occasion for pungent criticism on the part of some of our correspondents. With the memory still green, however, as to former exploits of our contemporary when dealing with technicalities of pharmacy, it is hardly probable that too much importance will be attached by pharmacists to any fresh opinions expressed in the same quarter on analogous subjects. But as a reflex of public opinion upon the policy or justice of the recent decision of the Council, it cannot be denied that the article has considerable interest, especially to a body to whom the public has delegated considerable powers. For the rest, we quite agree that the time has scarcely come when the business can be correctly described as "at once scientific, privileged and profitable;" or as one in which the stock is not perishable, or the profits range from 400 to 600 per cent. Such rosy visions, it is to be feared, must at present remain *in nubibus*; together with a correspondent's dream that we are likely to introduce to his notice "a nice gushing young lady who is anxious to be initiated into the mysteries of our lucrative calling," in order that he might make arrangements for taking her as an apprentice.

By the force of circumstances, "the dispensing of medicines is an occupation in which many women are engaged." This fact justifies the provision of facilities for and incentives to study being made for women who purpose entering into the vocation of pharmacy; and in the interests of the public, as well as of pharmacy, it becomes a necessity that women should have the same opportunities that are enjoyed with so much advantage by men.

Whatever may be the ethical considerations for or against the suitableness of women for occupying the position of pharmacists, the public are the ultimate arbiters of this as of most other important questions. If it be found that educated women pharmacists are incompatible with the requirements of modern Society—a conclusion which we do not anticipate—they will soon withdraw from the scene.

In the meantime, let this interesting social experiment be fairly and equitably tried. Let the conditions as far as possible be the same, without favour and without prejudice, for the students of both sexes, and the result, whatever it may be, will be accepted as decisive and final.

DEPUTATION TO THE LOCAL GOVERNMENT BOARD.

IT is astonishing, and to those uninterested it might be amusing, to observe in the newspaper reports of what took place on this occasion how totally the objects of the deputation have been misrepresented.

The complaint that the Adulteration Act would prevent the appointment of properly qualified chemists was never urged by the deputation, nor were any hardships or grievances affecting chemists and druggists brought before Mr. STANSFELD. There was indeed no occasion for any such steps, inasmuch as the interpretation of the Act by the law officers of the Crown may well be taken as conclusive in upsetting the notion that the mere specification of *medical* knowledge being required of analysts meant that they could only be medical practitioners.

However, the mistaken reports published in the London papers have been sent on to the country, and, in some instances, have been made the opportunity for foolishly abusive comments. It is, therefore, desirable to mention that the object of the deputation from the Pharmaceutical Society was simply to obtain an official enunciation of the principle affirmed in the law-officers' opinion, viz., that the eligibility of any person for the office of analyst was to be determined as a question of fact, and that the possession of competent *medical* as well as chemical and microscopical knowledge was to be determined as a matter of fact without reference to any Registers of medical practitioners, pharmaceutical chemists, chemists and druggists, or the roll of membership of any body of microscopists.

THE TESTING OF MILK.

The question as to the most efficient and convenient method for testing the quality of milk is one that just now is of considerable interest, in consequence of the first operations of the public analyst appointed under the Adulteration Act having resulted in several prosecutions against vendors of that article; another result, by the way, being that the old proverb "tam similem quam lacte lacti est" has been completely upset. It has come under our notice that, notwithstanding the defects of the lactometer are now pretty generally recognized, there is an inclination in some quarters to use it for this purpose. We, therefore, take the opportunity of pointing out that the instrument in question represents exceptionally rich milk and watered milk as of the same quality; and further, that it enables a skilful dealer to pass off milk which has been partially skimmed as if it were unsophisticated. This feat is accomplished by adding to the partially skimmed milk a little water, whereby an article is produced which is of the same specific gravity as fresh milk, and which, at the same time, yields the normal proportion of cream. In fact, neither the lactometer (lactodensimeter, as it is sometimes termed), nor the combined use of that instrument and the creamometer is to be depended upon. The testing of milk has, however, been recently put on a more scientific basis, and we have great pleasure in directing attention to an article on the subject by Mr. Charles Ekin, which appears in another part of this Journal. A valuable suggestion has also been made by Mr. J. F. Brown, of Dover, who titrates the milk-sugar with standard solution of copper. All authorities agree in representing the proportion of lactose in milk as being very constant. We should, therefore, expect good results by this method.

THIRST FOR KNOWLEDGE.

Under the above title a correspondent has forwarded to us the following paragraph, taken from a circular issued by the Council of the Liverpool Chemists' Association:—

"The chemistry class has not been carried on "owing to a sufficient number not having joined. "If six members will join on Thursday, the 19th "inst., at 7 p.m., the class will be commenced."

At the time of going to press we have not been informed whether this modest *desideratum* has been satisfied, but we hope for the best, that there may be no precedent for the obliteration of Liverpool as a centre of pharmaceutical education.

In the meantime it may be remarked that the above quotation has a special interest in its bearing upon the opinions that have been lately expressed respecting the demand for pharmaceutical education, and we fear it is also generally characteristic of the actual case, together with the financial prospects of any attempts to supplement that supply.

THE NEW ADULTERATION ACT.

At the meeting of the City Commission of Sewers, on Tuesday last, the Court proceeded with, but did not complete, the consideration of the reports of the Sanitary Committee, as to the preparations for carrying out the Adulteration of Food Act of last session. With the consent of Dr. Letheby, who has been appointed analyst, it was decided not to fix at present any salary or scale of remuneration for the performance of the duties of that office until there has been better opportunity of estimating their extent. The three inspectors of streets are appointed inspectors under the Act, with an addition of £25 per annum each to their former salary. The following summary of the arrangements with respect to the appointment of public analysts in the metropolis is taken from the *Times* of Wednesday:—

"In St. George's, Hanover Square, and Chelsea, it has been resolved to include the office of analyst in the duties of officer of health. In St. Saviour's it was voluntarily undertaken by the medical officer of health. In Poplar the appointment was offered to the medical officer of health and accepted by him, payment being made for each analysis on a scale. Dr. Bernays, Professor of Chemistry at St. Thomas's Hospital, has been appointed analyst for Camberwell, and he is to be paid by fees the first year; and in Marylebone Dr. Whitmore, the medical officer of health, has been appointed, his salary having been some time since increased, to include a laboratory assistant. In St. James's, Clerkenwell, a salary of £100 has been decided upon; and in St. Luke's, Dr. Pavy, medical officer of health, has been appointed, at a salary of £150. In St. Martin's-in-the-Fields, Hampstead, Holborn, Mile End Old Town, St. Pancras, Bermondsey, and Woolwich, the subject is still under consideration. In Limehouse, Dr. Rogers, medical officer of health, has been appointed; and in St. George's-in-the-East, Dr. Rygate, medical officer; and a similar course has been adopted in Bethnal Green. In Whitechapel, Dr. Liddle, officer of health, has refused to accept the appointment on the ground that the medical officers of health, as a body, are not properly qualified to undertake the duties indicated by the general intentions of the Act. In Lambeth and in St. George's, Southwark, a chemist, Dr. Muter, has been appointed, with the fees only as his remuneration. In Hackney, Dr. Tripe, the medical officer, has declared himself to be not qualified within the meaning of the Act, and the local authorities appear to be disposed to allow the Local Governing Board to exercise the power which they have of themselves nominating an analyst."

In consequence of the occurrence of Christmas day in the forthcoming week, the next number of the Journal will be published on Saturday instead of Friday.

Provincial Transactions.

LEEDS CHEMISTS' ASSOCIATION.

The second meeting of the session was held in the Philosophical Hall, Park Row, Leeds, on Wednesday, December 11th, 1872; the President, Mr. E. Brown, in the chair. R. Parkinson, Esq., Ph.D., delivered a very interesting and instructive lecture on "The Chemistry of a Piece of Coal;" demonstrating by experiments the process of obtaining coal-gas, and likewise referred to the other products, *i.e.* ammonia, ammoniæ carbonas, nitro-benzol, aniline, picric acid, etc. There was a large attendance of members and invited friends, and at the close of the lecture Mr. Reynolds, F.C.S., proposed "That the cordial thanks of the meeting be given to Dr. Parkinson for his interesting lecture;" the resolution was seconded by Mr. E. Yewdall, and carried unanimously.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL ASSOCIATION.

The third general monthly meeting was held on December 11th; Mr. W. V. Radley, President, in the chair.

The meeting, which was well attended, proceeded to the election of three gentlemen as associates, after which a lecture was delivered by T. W. Hime, Esq., M.B., L.R.C.S., etc. etc. (President of the Natural Science Section of the Sheffield Philosophical Society), on the "Sources of Vital Activity."

The lecture, which was listened to with great attention, was of a highly interesting character, and during its delivery elicited frequent applause. At its close a cordial vote of thanks to Dr. Hime was proposed by the President, who, in the course of his remarks, regretted that only a limited number of members of the trade could have the advantage of being there to hear the lecture; he hoped, however, that it might be put into such a form as should enable members generally who had not that advantage to enjoy the next most desirable privilege, viz. that of reading it.

This met with the hearty approval of the meeting, the vote of thanks to Dr. Hime being carried by acclamation.

[We hope to be enabled to publish the lecture in a future number.]

The attention of the meeting was then called to a valuable collection of old engravings, being portraits of past medical celebrities, which had been kindly lent for the inspection of those present by Mr. E. Wilson, Local Secretary of the Pharmaceutical Society.

A vote of thanks to Mr. Wilson for his kindness brought the meeting to a close.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

This society has been devoting itself unremittingly to hard class-work, holding regularly three meetings for study every week. In order to vary the proceedings, a lecture was delivered before the members on Thursday evening, the 12th inst., at their rooms in Halford Street, by John Burton, Esq., entitled "Elementary Structural Botany." The subject was treated with considerable skill, and illustrated by a number of carefully prepared slides, shown under powerful microscopes, including the various forms of cells, their contents, combinations, etc.

At the conclusion of the lecture, on the motion of Mr. S. H. Cadoux, seconded by Mr. W. Thirlby (Hon. Sec.), a cordial vote of thanks was passed to the lecturer for his kindness, which was suitably replied to.

Proceedings of Scientific Societies.

THE MEDICAL SOCIETY OF THE COLLEGE OF PHYSICIANS, DUBLIN.

Wednesday, April, 24th, 1872.

THE APPLICATION OF GASES AS A MEANS OF DESTROYING CONTAGION.

BY CHARLES A. CAMERON, PH.D., M.D., L.K., and Q.C.P.;
Professor of Hygiene in the Royal College, etc.

It is impossible to discuss in a scientific manner the subject of disinfection without at the same time considering that of the intimate nature of contagion. Enormous quantities of bleaching powder, carbolic acid, and other substances are annually used in these countries as sanitary agents. They are often solely employed for the purposes of preventing putrefaction; but no inconsiderable proportion of the quantities of "disinfectants" used is applied for the purpose of destroying the *materies morbi* of enteric and other fevers, small-pox, cholera, and other zymotic diseases.

During the decomposition of animal and vegetable substances, sulphuretted hydrogen, phosphoretted hydrogen, and other offensively odorous gases, as well as vapours, and probably solid particles, are evolved. The continuous inhalation of these aeriform products of the retrograde metamorphosis of organic bodies may, like intemperance and deficient nutrition, lower the vital powers, and thereby render the animal mechanism less able to resist the influence of small-pox, cholera, and similar maladies when they are epidemic. There is, however, no evidence of a satisfactory nature to prove that the ordinary emanations from decomposing animal or vegetable substances are the cause, *per se*, of any contagious disease.

If, during the decomposition of ordinary animal and vegetable substances, matters were evolved capable of producing fevers and other zymotics, it is difficult to conceive how the population of towns could escape complete extirpation from those diseases.

It is more reasonable to believe that zymotic diseases are each of them produced by the introduction of a specific *virus* or *germ* into the animal economy. It is probable that some zymotics are caused by germs which are incapable of multiplication in the body. Such diseases are not, therefore, contagious in the ordinary sense of that word; that is, they are not propagated by matters which are cast forth from the bodies of the sick. In the valuable Report on Yellow Fever, prepared by Dr. J. C. Nott, and published in the Annual Report of the Board of Health of the City of New York, for 1870–71, very strong evidence is adduced to prove that yellow fever is caused by germs, which are not bred within the body. It is, however, shown that those germs may be transported from place to place in the clothes and baggage of men. Dr. Nott brings forward the most convincing proof that decomposing organic matter does not, *per se*, produce yellow fever; and shows that the germs which cause the malady are devitalized by exposure to a temperature of 32° Fahr.

It is very easy to destroy the unpleasant matters that are given off during the decay of organic bodies. These matters obey the physical law of the diffusion of gases, and spread rapidly and equally throughout the atmosphere. When they are generated in, or enter, a room, they are readily rendered innocuous by admixture with a small proportion of chlorine or sulphurous acid gas. The use of disinfectants is, therefore, to be commended, because they preserve the atmosphere free from malodorous gases and vapours. Some kinds of so-called disinfectants* are also of great

* This term is used in its popular signification, and includes those substances which, like nitrous acid, destroy noxious matters, or which, like carbolic acid, act chiefly as antiseptics.

utility as a means of preventing the putrefactive decomposition of organic substances. These disinfectants are properly termed antiseptics. They do not altogether prevent animal and vegetable matters from decay; but they greatly retard that process, and then decomposition without sensible putrescence only takes place. It is well then to put into our sewers and other places containing effete organic matter such substances as bleaching powder, which destroy the fetid products of too rapid decay, or such compounds as carbolic or chromic acid, which prevent these hurtful products from being formed, except in almost infinitesimal quantities.

The application of disinfectants for the purpose of destroying the actual *contagion* of certain diseases is the most important use to which these substances are applied. And here the question arises—what is the physical nature of contagion? If we have not some clear conception relative to this point, it is evident that our use of disinfectants is merely empirical.

What is it that we try to destroy when we generate chlorine gas in a room which has been tenanted by a small-pox patient? Is it a gas, or a vapour, or an abnormal condition of one or more of the ordinary constituents of the atmosphere? If the cause of the disease lies in an abnormal condition of the atmosphere—in the occurrence of a "pandemic wave" in that fluid, the disinfection of the air of a particular room, would be useless, because, where ordinary ventilation is adopted, the purely gaseous contents of an apartment are wholly renewed many times in an hour. What, therefore, would be the use disinfecting a room if the atmosphere, on entering it, be already tainted! There are many physicians who believe that epidemic diseases are caused by an abnormal condition of the atmosphere; but even those, or at least the majority of them, admit that they may be propagated directly from the sick to the healthy. Who can deny that the matter taken from a small-pox pustule will produce small-pox, if introduced into the blood of a healthy man? It is clear that in this case a palpable agent produces the disease, and the observation of mankind during countless ages has incontrovertibly established the fact that some diseases are communicated from individual to individual. If cholera, small-pox, rinderpest, and other zymotic and epizöotic diseases are caused by abnormal atmospheric conditions, why is it that they speed along the highways of commerce, that they spread most rapidly as the density of population increases, and that they prevail most in those places where least attention is paid to the removal of organic filth? If the amount of carbonic acid in the atmosphere were increased from its normal proportion of 4 parts in 10,000 parts of atmospheric air to 4 parts in 100, serious disease would be the result; but it would afflict all classes alike, and would ravage the country regions equally with the urban districts.

A careful examination of acknowledged facts relative to nearly all the more important epidemic diseases fully justifies the belief that each is produced by the introduction of a *materies morbi*, or germ, or virus, or some palpable substance from the bodies of the sick into those of the healthy; and by that way alone. This view of the mode of propagation of zymotic diseases is, perhaps, most conclusively proved by admitted facts in relation to two contagious diseases—namely, *scabies*, or common itch, and syphilis. Is either of these diseases ever produced by atmospheric causes? Who would be believed if he stated that he caught syphilis from the air? True, we have not isolated the actual poison of syphilis; but we know that an extremely minute quantity of a liquid, containing solid particles, includes this poison; and it is further clearly established that sporadic cases of syphilis do not occur in our time. With respect to common itch, it was proved long ago that the disease was produced by a small insect, and that it was propagated from individual to individual. If all the *acari scabiei* and their *ova* now in existence were destroyed, there would be an end to the itch for ever. Huxley, who is by no means an ultra vitalist, admits that there is no evidence of spontaneous generation occurring in our time.

The itch is a good example for the purpose of illustrating the nature of contagion. The *materies morbi* is easily seen; it is an entity, it possesses reproductive powers, begetting its own kind, and it is never found except in the bodies of higher animals. The non-contagionists must admit that at least in the case of this disease the theory of the contagionists is proved to demonstration, and simply because the virus of the disease is so large as to be almost seen by the unassisted eye.

The weight of evidence and of opinion too, in the case, at least, of epidemiologists, is in favour of the germ theory of zymotic disease, but most important problems relative to the intimate nature of the different contagia and to their co-relation, are still to be determined. In general the contagious matter appears to be excessively minute. Chauveau ('Comptes Rendus,') October 19th, 1868, diluted the liquid taken from the pustules of sheep-pox with 10,000 parts of water, and found that it still retained its power of producing small-pox in the sheep. Vaccine matter from man may be diluted with ten times its weight of water without losing its contagious property to a sensible extent, but if diluted with 500 parts, it becomes perfectly inactive. Hence it is evident that the contagious liquid of sheep-pox is many times more powerful than vaccine, probably because it contains a larger number of the actual particles, or germs that produce disease. These germs have been carefully sought for by such eminent pathologists and microscopists as Béchamp, Estor, Cohn, Nägeli, Hallier, Chauveau, Sanderson, De Barry, Thomé, Klob, Hoppe-Seyler, and Lionel Beale. On the whole, the results of the investigations of these inquirers have not been barren. It is shown that vaccine contains, in suspension, minute quantities of two kinds of solid particles—*leucocytes* (which resemble pus corpuscles), and smaller particles not exceeding the $\frac{1}{20000}$ of an inch in diameter. The leucocytes may be easily separated from the other particles and the serum; and they are found to be perfectly inactive. The vaccine property must, therefore, reside either in the small particles or the clear serum. By means of the diffusion apparatus, Burdon-Sanderson and Chauveau have succeeded in obtaining the serum free from the small particles, but failed to produce vaccinia with it either in man or in the ox. These important and accurately conducted experiments prove that the actual cause of cow-pock, and inferentially of other kinds of small-pox, is a minute solid and insoluble body.

In liquids containing decomposing organic matter we usually find large numbers of minute living beings in a state of great activity. Some are spheroidal, others resemble knotted rods. The former are termed monads: *micrococci*, or *microspores;* the latter are called *bacteria*, *zooglœa*, *vibriones*, *etc.* The micrococci are each about $\frac{1}{20000}$ of an inch in diameter; they move about with great rapidity, and multiply by cell division. When they elongate into roots, they acquire a peculiar vibratory movement, which has led them to be termed vibriones. Béchamp and Sanderson include under the generic name, *mycrozyme*, both the spheroid particles and the rod-like bodies, into which they are developed. No doubt there are numerous varieties of microzymes, but the minuteness of these infusorial animals renders it extremely difficult to discriminate between the different species.

Hallier regards the bacterium, notwithstanding its activity, as a plant. He asserts that the micrococci or their germinal matter exist in all contagious liquids. It is remarkable that Sanderson did not detect either mycrozymes or their germinal matter in ordinary pus, whereas in pyæmic pus he found swarms of these objects.

It has been strongly urged as an argument against the germ theory of disease that it fails to account for epidemics. Why should small-pox die out in Ireland and then suddenly reappear and rage with great violence in many parts during the last twelve months? How is it that cholera periodically invades the west from the east? Why does an epidemic gradually increase in intensity, attain a maximum of virulence, and then gradually die out? It is difficult to answer these questions satisfactorily, because all the factors concerned in the propagation of zymotic disease are not known. The anti-contagionists contend that small-pox and similar diseases are propagated by other means than by emanations from the bodies of persons suffering from the diseases, and they believe that at particular times the condition of the atmosphere and of the constitution of the population are peculiarly favourable to the spread of these maladies.

If it be admitted that small-pox and certain other diseases are sometimes caused by matters thrown off from the sick making an entry into the bodies of healthy persons, then the phenomena of epidemics may be shown to be explicable without abandoning the theory that small-pox and some other diseases are only communicable from individual to individual. We can readily understand that the low forms of life which produce epidemic and epizöotic disease might, under favourable circumstances, multiply to a greater extent than usual. Under such circumstances the chances of their getting into the bodies of animals would be proportionally increased, and a local epidemic would be the result. Intercommunication between the place where the germs were first developed and other places would soon scatter them over areas more or less considerable. During the siege of Paris small-pox germs largely multiplied in that city, because, owing to privation and depressing influences of every kind, the population were rendered peculiarly susceptible to the influence of zymotic diseases. The stock of small-pox germs accumulated in Paris during the siege has since, there is little doubt, been distributed over a large part of Europe.

In some epiphytic diseases we find the analogues of epidemic and epizöotic maladies. The "blights" in the cereals and other plants are caused by the ravages of minute parasitical fungi. A common disease of wheat grain is occasioned by the presence of the fungus *Uredo caries*, the seeds or sporules of which are so minute that, according to Bauer, a single grain of wheat may contain 4,000,000 of them. The fungi which produce the diseases of plants do not originate sporadically, nor are they ever found except as parasites. For years a whole locality may be absolutely or comparatively free from them, when suddenly those pests will appear and destroy whole crops. It is the same with respect to the ravages of plants by insects; suddenly the caterpillars of moths will appear in vast numbers in localities where they had previously been very scarce. A few years ago the extensive plantations at Dunsany Castle, county of Meath, became suddenly the abode of myriads of caterpillars, which speedily stripped the barks and leaves of a large proportion of the trees. On investigating the nature of the caterpillars, it was found that they belonged to a rare species of moth, which had never been observed in the locality before, but which occasionally appeared in large numbers in certain districts in England. Amongst the numerous insects which ravage our gardens and fields, it is interesting to note that in the seeds of wheat there is occasionally found an infusorial animalcule, termed *vibrio tritici*. It is, however, very many times larger than the vibriones above referred to.

Phytologists acknowledge that they cannot account for the sudden appearance of vast numbers of epiphytical fungi and other pests of the higher members of the vegetable kingdom; but their ignorance in that respect in no way detracts from the positive knowledge which they possess relative to these fungi and insects being the actual cause of epiphytical diseases. Unsuitable soils, excessive damp, and other causes predispose certain plants to succumb to the attack of parasites, but the germs must be at hand, for there is absolutely not the slightest evidence to prove that any of these fungi originate spontaneously. No matter how sickly a wheat plant may be, it could not suffer from the blight unless there are fungi to prey upon it.

That which is true of what we may term epidemics amongst plants, also holds good with respect to epidemics amongst animals. We do not as yet certainly know, though we may venture on hypotheses, why the germs of disease long absent from a locality may reappear, and fructify to an extraordinary degree. But our want of information on this point is not the slightest obstacle in the way of our belief in the "germ theory" of zymotic diseases. On the contrary, to abandon this theory would be simply to reject the only reasonable explanation as yet advanced as to the means by which contagion is propagated and maintained. If we give up this theory we lay ourselves open to the charge of being believers in the doctrine of spontaneous generation.

If species of bacteria or similar objects are the contagia of certain diseases, then we can understand why it is that so many persons who are near small-pox and fever patients escape, whilst persons not in contact with the infected catch the disease. The bacteria thrown off from the bodies of the sick are not equally diffused throughout the air as a gas or vapour would be, but, for the most part, are scattered about on the clothes and on other solid surfaces, from which they may be conveyed to great distances without making their entry into the body of any one. Ordinary bacteria are not found floating about in the air: if proper precautions are taken an animal liquid may be exposed for months to the air and yet be found free from bacteria; whilst on the other hand, if the liquid be allowed to comci nto contact with a wine-glass, or a wall, or ordinary water (unless the latter has been heated to a point at which animal life is impossible), it will soon teem with bacteria. Contagion in general is conveyed by means of clothes or other solid substances, and is rarely directly propagated through the air. In the Report on Yellow Fever, by J. C. Nott, which appears in the Report of the Board of Health of the City of New York for the year 1870–71, page 388, that writer says,—

"No evidence, I think, could be more complete to establish the probability of a disease. All facts being opposed to its contagiousness, I can come to but one conclusion, viz., that the germ may be closed up in trunks or boxes, or be shut up in the baggage car of a railroad, transported from one point to another (as from Mobile to Grove Hill and Citronelle), and turned loose to propagate and do its work of destruction. The disease was equally fatal at Citronelle and Spring Hill. Contagionists will doubtless regard this as a case of communication by contagion, but from the facts that I have never seen anybody communicate the disease, where luggage was not taken with the patient, and that the disease generally goes everywhere that steamboats go from our infected ports in epidemic years, I see no other conclusion than the one I have before given, viz., that the germ is carried closed up with baggage, and not generated and communicated by personal contagion."

Dr. Nott believes that the germs of yellow fever are not bred within the bodies of men; but still men carry about these germs in their clothes just in the same way that the nurse from a fever hospital conveys contagion from the sick to the healthy, without herself becoming affected with the disease. My friend, Professor Moore, has favoured me with the following letter, the facts contained in which show how the first cases of zymotics in towns originate:—

"*Wexford Infirmary, March 5th*, 1871.

"My dear Sir,—A railway labourer, from Glasgow, came to Wexford on or about the 30th December, 1870; sickened on the 2nd January, and died of small-pox on the 12th. In the house he died, a case appeared early in February, and in the same locality we had over twenty cases, and in other parts of the town say ten or twelve. I have had two cases in private, modified and mild. We have had five deaths, and no new case repeated since the 24th of February.—Yours faithfully,

"H. H. Boxwell.

"Dr. Moore, King's Professor of Medicine."

There were no cases of small-pox in any of the southern counties of Ireland, in December, 1870; but the disease was epidemic in Glasgow at that time.

(*To be continued.*)

Parliamentary and Law Proceedings.

Charge of Arson against a Chemist and Druggist.

At the Winter Assizes at Lewes, William Henry Funnell, 45, described as a chemist, was indicted on Tuesday last before Mr. Justice Byles for wilfully and feloniously setting fire to his dwelling-house at Brighton, one Thomas Foat and other persons being therein at the time.

The charge was varied in different counts of the indictment, and by one of them he was charged with attempting to set fire to his house under such circumstances as that if the house had taken fire he would have been guilty of felony.

Mr. Merrifield conducted the prosecution; the prisoner was defended by Mr. Willoughby.

The circumstances of this case were of a very extraordinary nature. It appeared that the prisoner occupied a house, No. 13, Charles Street, Brighton, and he used the front room on the ground floor as a chemist's shop, and the back room as a consulting-room, and the upper floors of the house were occupied by a Mr. Foat and his family, who rented them of the prisoner. On the 11th of October the prisoner seemed to have insured his stock in trade as a chemist in the front shop, and his furniture in the back room, with the agent of the Scottish Union Fire Office at Brighton, for £100, and the fire that was the subject of inquiry took place on Monday, the 4th of November. On the previous day, Sunday, the prisoner appeared to have gone to his shop, which was unusual for him, and it was suggested by the prosecution that he was engaged in making preparations for the event which took place on the following day. On the Monday morning he was at his shop about ten o'clock, and he then appeared to have informed Mrs. Foat that he had received a telegram which required him to go away immediately, and he left in a hurried manner, having previously locked up his shop and the door that communicated from the shop with the back room. From this time no one could have had access to the prisoner's premises, and nothing seemed to have occurred until about three o'clock in the afternoon, when the person who lived in the house adjoining the prisoner's observed a peculiar blue flame burning in the partition between the two houses. An alarm was given, and it was at first thought that it was an escape of gas, and a gasfitter named Slatter was sent for, and he broke into the room at the back of the prisoner's shop. He was astonished to find that the flames were proceeding from a hole that had evidently been purposely made in the wooden partition of the room, and the combustion was of such a character that although he poured a considerable quantity of water into the hole, it did not seem to have any effect upon the flames, which appeared, on the contrary, to burn all the more fiercely, and it was evident that the fire was not at all of an ordinary character. He then scraped out the burning material, which appeared to consist of a quantity of lint, sawdust, and paper, and a portion of the lint which was not lighted when he pulled it out burst into a flames when it fell upon the floor, and it was evident that some chemical ingredient had been used to occasion the fire. A portion of the lint was subsequently submitted to Mr. Schweitzer, an analytical chemist at Brighton, for examination, and he ascertained beyond a doubt that it and the paper also had been impregnated with phosphorus, and he succeeded in extracting thirteen grains of pure phosphorus from a portion of the lint. He also explained that a person acquainted with chemistry, and the peculiar qualities of phosphorus, might have so arranged his preparation for the fire that the ignition would not take place for several hours, and that consequently all the arrangements for the fire might have been made by the prisoner at the time he was last seen at the house at ten o'clock, although no discovery took place until five or six hours afterwards. In consequence of the timely discovery it appeared that very little damage was done. In addition to these facts, which appeared to be almost conclusive to show the guilt of the prisoner, evidence was given that the furniture in the back room was not worth more than £5, and that the stock in the shop was also of very trifling value. When the prisoner was apprehended and the warrant charging him with the offence of arson was read to him he made no reply, and he never attempted to give any explanation of the extraordinary facts that were apparent when the discovery was made.

Mr. Willoughby, at the close of the case for the prosecution, submitted that there had not been a sufficient burning of the house to support the first counts of the indictment.

The learned judge, however, said that without deciding that question, it was certainly impossible for him to withdraw the last count, which alleged that the prisoner had set fire to the place under such circumstances as that if the house had taken fire he would have been guilty of felony, from the consideration of the jury.

Mr. Willoughby then addressed them for the defence, and he endeavoured to show that the evidence with regard to chemical matter having been used to occasion the fire was purely theoretical, and that the charge, which was one of a most serious character, rested entirely upon circumstantial evidence, which was not sufficiently cogent to justify them in convicting the prisoner.

Mr. Justice Byles having summed up, the jury, after a short deliberation, found the prisoner guilty of attempting to set fire to the house.

The learned judge said that the prisoner had been found guilty of a very serious offence. He must have known that persons were in the house when he made his arrangements for the fire, and although probably from the hour of the day at which the fire was likely to have broken out, they would not have incurred the same peril that they would have done if it had happened in the night, his crime was a very serious one, and he felt it his duty to sentence him to seven years' penal servitude.

It transpired in court that there had been three other fires in premises occupied by the prisoner, and that there was a suspicion in every case that they had been occasioned by some chemical agency.—*Standard.*

Charge of Fraud against a Herbalist.

At the Hull Police Court, on Saturday, December 14th, Henry Jackson was charged with obtaining money under false pretences. The warrant only charged the prisoner with obtaining £25, but it was stated that the sum really obtained was upwards of £250. The prosecutor was a farmer named John Richardson, residing at Easington, in Holderness. In the month of February, 1871, he was in Hull, and, in passing down Blanket Row, where defendant kept a herbalist's shop, his attention was attracted by a bill displayed in the window setting off the advantages of the "Famous Indian Remedy" as a restorer and establisher of life. At that time he was sickly and suffering from general debility, and, allured by the announcement in the window, he entered the shop and stated his case to the prisoner, who said he would give him a month's trial for two guineas. Any extras he required Richardson was to pay for, but he was to be supplied with medicine in the usual way. From that time Richardson appears to have paid a visit to the prisoner about once a week. The actual offence charged in the warrant was alleged to have been committed in July, when Richardson paid prisoner £25 for a box of medicines. He was shown a number of what were called testimonials from distinguished persons, and was by this means induced to pay £3 10*s*. for a box of medicine, which, it was stated there was evidence to prove, was worth only a few shillings. A bottle, produced, was in the £25 box. It was labelled "for the heart." Prisoner told Richardson he had the heart disease, and gave him the medicine for the disease. He also said his kidneys were diseased, and gave him medicine for them. It was stated that it would be proved that neither of these bottles contained anything that could effect such cures. The prisoner was remanded upon bail until Friday. On the previous day, when the warrant was applied for, it was stated that a great portion of the so-called medicines had been examined, and had been found to consist of water coloured with a magenta dye. In several instances Jackson had posted the arms of the Pharmaceutical Society upon his nostrums. Amongst the articles which he stated possessed such wondrous virtues, and for which he charged almost fabulous prices, were such things as aniseed balls, smokers' bonbons, chocolate creams, etc. In a peculiarly shaped bottle he had placed some diluted muriatic acid, which he represented as being the great restorer of life and for which he charged several guineas. He also sold to Richardson some bottles containing a liquid, which he alleged he had himself extracted from the Temple of God in South America.—*Eastern Morning News*.

Death from Opium.

On Monday morning, December 16, an inquest was held at Scarborough, before Mr. R. Collinson, Borough Coroner, respecting the death of Elizabeth Brown. She resided at the house of a labouring man, named Watson, and had been known to Mr. Meggit, surgeon, as being addicted to taking opium for the last twelve years. On Wednesday night last she complained of headache, when Watson accused her of having taken opium. She made no reply, and was helped upstairs to bed, where she became so ill that at about two o'clock in the morning Mr. Meggit was sent for. His assistant attended immediately, and found the woman suffering from the effects of opium. He administered the usual remedies, and at nine o'clock she was visited by Mr. Meggit, who considered the case hopeless. The remedies were continued, but she died on Friday evening. A small box containing about 25 or 30 grains of extract of opium was found in her bed, and was believed to have fallen from her pocket. Mr. Meggit said that four grains were sufficient to cause death, and he had no doubt that deceased had died from an overdose of the drug. The jury returned a verdict of "Died from the excessive use of opium." Deceased was 51 years of age. — *Sheffield Telegraph*.

The Attempt to Poison by Arsenic.

At the Central Criminal Court on Wednesday, before Mr. Justice Brett, Samuel Hoy, 12, was indicted for attempting to administer a dose of poison to Emily Hoy, with intent to commit murder.

The evidence as to the circumstances under which it was charged that the prisoner attempted to administer a quantity of arsenic to his stepmother, in a cup of tea, was described last week (p. 475).

The jury found the prisoner guilty, and he was sentenced to ten years' penal servitude.

Reviews.

Elementary Treatise on Natural Philosophy. By H. Privat Deschanel: translated and edited by J. D. Everett, M.A., etc., Professor of Natural Philosophy in Queen's College, Belfast. London: Blackie and Son.

Professor Everett has done good service to science by this excellent translation of Deschanel's well-known treatise on Physics. But the work is much more than a mere translation. It has the far higher merit of containing much original matter of considerable value. The amount of these additions may be roughly estimated from the fact that though there is rather more text in a page of the English edition than in a page of the French, yet the former volume contains fifty pages more than the latter. Both editions are before us; we know them each pretty well, and there cannot be a doubt that Professor Everett has very much enhanced, in every way, the value of the original work. Even the woodcuts, which we thought so splendid in the French edition, look far better on the toned paper of the English copy. One or two of the additions made by Professor Everett catch our eye at once. Regarding the cause of capillary phenomena, Deschanel gives an altogether poor and unsatisfactory account, occupying but one page; on the other hand, Everett has dealt with the subject in the light of recent investigation, and devotes eight pages to it. The chapter on the pendulum, too, has eleven pages added to it. An entire chapter is also added to the treatise on sound, and there are some useful additions to the parts on heat and optics.

The additions on the subject of electric potential and electric and magnetic units are extremely valuable, and supply a want long felt by students of physics. For at the present time these terms are constantly used, but are little understood by those who are not electricians, as none of the ordinary text-books explain their meaning. Our readers may therefore be glad to read the following useful remarks on electric potential and electric force, which Professor Everett gives in chap. 39 A:—

"When electrical potential is constant throughout a given space, there is no electrical force in that space; and conversely, if there be an absence of electrical force in a given space, the potential throughout that space must be uniform. These propositions apply to the space within a hollow conductor. They also apply to the whole substance of a solid conductor, and to the whole space enclosed within the outer surface of a hollow conductor. Whenever a conductor is in electrical equilibrium, it has the same potential throughout the whole of its substance, and also through any completely enclosed hollows which it may contain. When a conductor is not in electrical equilibrium, currents set in tending to restore equilibrium; and the direction of such currents is always from places of higher to places of lower potential. In like manner, when a small positively electrified body experiences electrical force tending to move it, the direction of this force is from higher to lower potential. When flow of electricity is compared with flow of heat, potential is the analogue of temperature. Heat flows from places of higher to places of lower temperature.

"The precise direction of the force exerted upon a positively electrified particle (or upon an element of positive electricity) when brought to a place where potential has not a constant value from point to point, is the direction in which potential diminishes most rapidly. A negative electrified particle (or an element of negative electricity) will be urged in the opposite direction, which is the direction in which potential increases most rapidly. We here use the words increase and decrease in the algebraical sense. . . . *Lines of electrical force* are the lines along which resultant electrical force acts. . . . . An analogy is thus suggested between different potentials and different levels. Positive electricity tends to run down from higher to lower potentials, and when it does so run down, there is a loss of potential energy equal to the product of the quantity which runs down, and the difference of potential through which it runs down. When the quantity which runs down is unity, the loss of potential energy is equal to the loss of potential. It is usual to assume, as the zero of potential, the potential of the earth at the place of observation; but this assumption is not rigorously consistent with itself, since the existence of earth currents demonstrates that different potentials may exist at different parts of the earth. Electrical potential is rigorously zero at places infinitely distant from all electricity. An *equipotential* surface is the surface over the whole of which there is the same value of potential." We refrain from quoting any more, as we are afraid that the recurrence of the word potential will by this time have nearly exhausted our reader's patience as well as our printer's type.

Whilst Professor Everett has thus raised the character of the work, we miss, to some extent, the clear and concise language of the French author. There are some parts, too, in which we fear the student is likely to be puzzled or misled. In sect. 97 we are told that capillary phenomena cannot be attributed to the action of the atmosphere, as they take place alike in air and in vacuo. But further on in sect. 97 D we read that two parallel vertical plates are urged together by capillary action, because "the portion of liquid elevated between them is at less than atmospheric pressure, and therefore, is insufficient to resist the atmospheric pressure which is exerted on the outer faces of the plates." The explanation of the charging of the prime conductor by an electric machine is also ambiguous; all that is said on the subject is that the rubbed glass "gives off its electricity through the points to the prime conductor, or, what amounts to the same thing, the conductors give off negative electricity, through the points to the positively electrified glass." We do not think these two statements *do* amount to the same thing; moreover, nothing is said about the inductive influence exerted by the rubbed glass on the points, and which, necessarily, precedes the discharge of the opposite electricity from their extremities. In current electricity there is no description of Grove's battery, and in the explanation given of of Bunsen's no notice is taken of the chemical changes going on in the cell. Surely, also, it is a mistake to say in England that Bunsen's form of voltaic battery is the one chiefly used for class experiments, though it may be true enough on the Continent.

The weakest part of the original work to us appears to be the article on magnetism; though Professor Everett has much improved it, more remains to be done. The whole of the large subject of diamagnetism and magnetocrystallic action are dismissed in a couple of short sections, and there is no mention whatever of diamagnetic polarity. We notice also one or two little inaccuracies and omissions that we are surprised to find have escaped Professor Everett's observation. For example, in sect. 308 an ingenious mode of determining the law of inverse squares as applied to radiant heat, is ascribed to Professor Tyndall, in both the French and English editions, when really it is due to Melloni. It will be found fully described in his famous work 'La Thermochrose.' A reference to Professor Tyndall's 'Heat as a Mode of Motion,' at once shows how the mistake has arisen. There is a very good account of Melloni's experiments in radiant heat, but an extremely poor record of what has been done since. In this respect Atkinson's edition of 'Ganot's Physics' is far superior. In the treatise on sound there are one or two noticeable omissions; we find no reference whatever to sensitive flames, nor to Wheatstone's Kaleidophone, nor to a recent and more perfect form of this same instrument known as the Tonophant, which might well have been described in the paragraph relating to the various modes of producing Lissajous' figures.

These are, however, but slight blemishes in a work of real excellence. Indeed, it is not too much to say that this work may be regarded as the best text-book in Experimental Physics that we possess in the English language. As we write this we cannot but feel that English physicists, and also English draughtsmen, ought to be ashamed of themselves. Why should we have to go to our continental neighbours for physical handbooks, and for cuts to illustrate them? Even in the two or three treatises on Physics written by Englishmen, the illustrations are in nearly every case almost unintelligible. Compare, for example the woodcuts in Balfour Stewart's 'Physics,' or Airy's 'Magnetism,' with the clichés of the exquisite French engravings to be found in the volume before us. How is it that with our South Kensington Schools of Art we cannot get a bit of apparatus decently engraved in England? Illustrations are by no means an unimportant adjunct to scientific text-books. Instrument-makers have to construct many pieces of apparatus solely from what they see figured in a new work. To them, therefore, much depends on this matter. And those who have not access to apparatus, are often misled in their conception of things by the rude unmeaning cuts which are the common offspring of the English wood-engraver.

Science and Commerce: their Influence on our Manufactures. A Series of Statistical Essays and Lectures, describing the Progressive Discoveries of Science, the Advance of British Commerce, and the Conditions of our Principal Manufactures in the Nineteenth Century. By P. L. Simmonds. London: Hardwicke. 1872.

Only a few persons comparatively have any idea of the mass of valuable, yet crude and undigested, information that is locked up in what are popularly known as "blue books." Not many tasks, however, are more repulsive than to have to hunt for it through page after page of consular reports or revenue returns, although many of them contain matter pregnant with interest to the public. Therefore when a book is published by so indefatigable a labourer in the field as Mr. Simmonds, the critic's favour is already bespoken on its behalf. But even a desire to speak well of the work bearing the rather ambitious title placed at the head of this notice, cannot blind us to the fact that, as a whole, it is but a sorry specimen of book-making, and that a considerable proportion of it has little other *raison d'être* than that it consists of lectures delivered by the author before various audiences during the last twenty years.

We say "as a whole," because taken apart there are several essays containing valuable information upon various subjects, which information is made more readily available by an index. That this measure of praise cannot be extended to the whole book is the more regrettable, since the evil that vitiates it was one that was foreseen. In the Preface the author says that his literary and professional engagements have prevented him from rewriting and condensing some of the treatises, but that he has supplemented them, and brought down the statistical and general information to the present time. The result is unfortunate, as, we think, will presently appear.

The book opens with two lectures upon the obligations of science to commerce, and on the vegetable, mineral and animal products entering into commerce, which formed the Travers' course of Lectures at the London Institution in November, 1871. These lectures are based upon information of comparatively a recent date. But the next is a lecture on almost the same subject delivered in 1859, or *twelve years previously*, and the effect of reading this one after the other is sufficiently perplexing. To give a typical instance, after being told on p. 32 that we import annually nearly 21,000,000 rattans, on

p. 101 we are told with a note of exclamation that in 1857 we imported of reeds, canes, and rattans together 12,000,000. The promise to bring down the statistical and general information to the present time is performed in a manner that adds to the confusion. The fresh matter is sometimes placed in the text without a mark, or between brackets, or sometimes as a foot-note. One consequence is, that after meeting with dates as late as 1869, preceding and following 1858, spoken of as "now," the reader is puzzled as to what time the "last eighteen years" "a quarter of a century ago," or "the present moment" represent. Another consequence is that aluminium is spoken of as a new metal which might do for plating purposes. The improvements which in manufacture have so reduced the price of sodium, are referred to as matter of hearsay; potash, we are told, is collected on a large scale *only* in those countries where wood is the principal fuel; in a lecture on the scientific discoveries of the nineteenth century, we are gravely told that England is within ten days of America, and can speak to Continental Europe across the Channel (not a hint of the Atlantic telegraph); and in an article on dyes and colouring stuffs, the aniline dyes and the artificially-prepared alizarin are not mentioned.

In treatises which owe their principal value to statistics, a little padding as a relief might be expected and allowed. It would not be fair, therefore, to criticize too severely such passages, although we had marked one or two specimens of "high falutin" for quotation. But when the padding of various treatises is pitched together without sufficient supervision, there is danger of a disagreement. Thus, although not prepared to concur altogether in the remark, that without colonies and commerce (if such a state of things could now be) England would sink to a petty fourth-rate state—for England made her mark in Europe before she had one or the other—we are disarmed when we find that England's greatness is afterwards attributed in different places to Christianity and the gold discoveries!! In one place the year 2000 is fixed as the probable era when manual labour will cease through the extension of machinery; although in another it is stated that machinery has not in any way diminished the demand for labour.

Again, on p. 89, we read, "There has been obtained from the earth in England in the last quarter of a century more rude stone than, when converted into railway bars, would form an iron girdle round the earth itself." Considering England's share in the iron trade, this statement remains pretty safe, but becomes rather obsolete in the presence of another on p. 137, that the railways in existence measure 642,000 miles (450,000 miles of which are in Europe) and are increasing at the rate of 100,000 miles a year.

To wind up our catalogue of criticisms, we may remark that it is scarcely correct science to say that "carbon exists more abundantly in charcoal than any other fusible substance, and the smoke that goes up from the charcoal forge is carbon in a fluid state;" this is a definition not likely to suffer from plagiarism.

Notwithstanding these serious blemishes, the book is in many respects a useful one, some of the essays containing a quantity of curious information which Mr. P. L. Simmonds is peculiarly well-fitted to deal with. Such are his lectures on "Shells and their Uses," the woollen, silk, iron, and other industries; also that on Nuts, which has already been printed in this Journal, and for which the silver medal of the Society of Arts has been awarded to the author. But had he waited until he had leisure to weed out all repetitions and obsolete matter, and to reduce antiquated statistics to their proper proportions, the book would not have numbered so many pages, but more readers beginning to read it would have persevered to the end, and these who did so would have been spared the vexation of seeing good materials ingeniously spoilt.

Notes and Queries.

*** *In order to facilitate reference, correspondents are requested to mark their answers in each case with the title and number of the query referred to.*

No notice can be taken of anonymous communications. All queries or answers should be accompanied by the name and address of the writer.

[323.]—GLASS LABELLING.—One part of Nelson's gelatine, two parts of acetic acid, digest 24 hours, then boil ten minutes in an enamelled saucepan, kept stirred with a glass rod, answers admirably.—H. J. LUTWYCHE.

Mr. R. W. Watson, of Sheffield, states that glaziers' putty answers the purpose admirably.

[324.]—SYRUPUS CALCIS LACTO-PHOSPHATIS.—*S. W.* having made several unsuccessful attempts to obtain Syrupus Calcis Lacto-Phosphatis, wishes for a good formula and instructions for preparing the same.

[325.]—STEARINE IN BUTTER.—A correspondent wishes for information respecting the detection of stearine when present in butter.

[325]—LYCOPERDIUM GIGANTEUM. — Professor J. Léon Soubeiran has kindly forwarded the following answer to "*L.*," taken from Dr. de Beauvoys:—"The *Lycoperdon giganteum* and some other species are eaten while young. In order to prepare this fungus for use in stupifying bees, it should be compressed while it is yet spongy and before it has become brown and soft, in order that it may be better preserved, but it is not necessary to steep it in solution of nitre or of starch. A small piece is cut off and put into the fumigating vessel and burnt with some well dried chips. A piece the size of a five-franc piece is sufficient to stupify for nearly half an hour."

APPOINTMENT.

Mr. Frederick F. L. Robertson, pharmaceutical chemist has been appointed by the Camberwell Board of Guardians dispenser to the Infirmary in Havil Street, Camberwell.

BOOKS RECEIVED.

JAHRESBERICHT ÜBER DIE FORTSCHRITTE DER CHEMIE UND VERWANDTER THEILE ANDERER WISSENSCHAFTEN. Für 1870. Erstes Heft. Giessen. 1872.

MEDIZINISCHE JAHRBÜCHER. Herausgegeben von der K. K. Gessellschaft der Arzte; redigirt von S. STRICKER. Jahrgang 1872, IV. Heft. Vienna. 1872.

LESSONS IN ELEMENTARY PHYSIOLOGY. By Thomas H. HUXLEY, LL.D., F.R.S. Sixth Edition. London: Macmillan and Co. 1872.

A TABLE GIVING THE RELATIVE VALUES OF DIFFERENT ARTICLES OF FOOD IN COMMON USE. Compiled by CHARLES EKIN, F.C.S.

The following journals have been received:—The 'British Medical Journal,' December 14; the 'Medical Times and Gazette,' December 14; the 'Lancet,' December 14; the 'Medical Press and Circular,' December 14; 'Nature,' December 14; the 'Chemical News,' December 14; 'English Mechanic,' December 14; 'Gardeners' Chronicle,' December 14; the 'Grocer,' December 14; the 'Journal of the Society of Arts,' December 14; 'Grocery News,' December 14; 'Zeitschrift des allgemeinen österreichischen Apotheker-Vereines' for December 10; 'Druggists' Circular' for December; the 'Eastern Morning News,' from a correspondent; 'Canadian Pharmaceutical Journal' for December; 'Brewers' Guardian,' December 15; 'American Journal of Pharmacy' for December.

Correspondence.

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

The Universal Pharmacopœia.

Sir,—Let me express my intense satisfaction with the recent leading article on the Universal Pharmacopœia. I had hoped to have said something on the subject but was under the impression that the proposed work described at a late evening meeting was under the sanction of our authorities. Every Pharmacist of whatever nation would hail the appearance of any new good book of reference which might present in a clear and well-ordered manner the formulæ of the world—but I *do* object to the title Pharmaconomical. No one country can lay down the law of Pharmacy for another. We may endeavour by proper means to suggest, and by persevering labour, to effect assimilation of strengths and uniformity of names—but that is the limit of our power until we can arrange for our convenience the atmosphere in which we breathe and the soil on which we live—till we can arrange moreover hereditary habits and individual constitutions.

Secondly, an editor may print according to his own judgment, formulæ in assorted type, but I totally dispute the right of any one to dictate to me the importance of a particular formula. This is a pure matter of nationality and accidental circumstance. Our British Pharmacopœia is admirable for *us*, but it would be a vain idea to make it binding in the City of Paris. The Codex is excellent for France: in London its authoritative teaching would amount to foolishness—yet both compendiums are consulted with mutual benefit by Dumas and Professor Redwood; by the foreign médecin and the English physician.

A sensible plan for lessening national differences is described in a most lucid manner in your editorial notice—its accomplishment will necessitate time, infinite research and large accommodation amongst learned bodies. Let me add one remark. A splendid work of reference (Hager) is alluded to by yourself. I have no wish to depreciate other manuals, but I may be permitted to direct the attention of dispensing Pharmacists to an Universal Pharmacopœia which without exaggeration I have successfully consulted many hundred times—it is by Jourdan—I have never found it fail. By its employment most of the inquiries now weekly submitted to editorial consideration respecting international information would disappear. Its arrangement, as far as my lights go, is perfect. An English translation by Rennie (edition scarce) would prove an infinite convenience to those thrown in contact with formulæ which to us are foreign. Kindly observe this phrase—the word foreign has no actual, but a relative, meaning—and the word *important* follows the same rule. With these two Pharmacopœias in our possession we may await the publication of the Pharmaconomical Society with Christian placidity and calmness.

Joseph Ince.

Pharmacists as Analysts.

Sir,—I think the best thanks of all pharmacists who wish to see the gulf that exists between our present status and that of a profession bridged over will be given to the deputation that lately waited upon Mr. Stansfeld respecting the appointment of analysts under the Adulteration Act, for their able advocacy of our claims to recognition. It is the first door that has been opened to us, and we ought not, if possible, to allow it to be closed against us with the sentence, "Depart from me, for I know you not." Is it possible that the present shyness of Government is the shadow of that Nemesis which Mr. Giles foretold would come upon us, if we broke faith with it on the Poisons Bill? I think it not improbable that it is so; but be this as it may, it is evident from the tone of some of the observations that some higher standard of attainments in general science is necessary to be taught at our school in Bloomsbury Square before the certificate of that Institution will place the holders of it in a first position as regards public appointments. I am not going to advocate any additional subjects to the Major as compulsory; but I do think, and I hope many others will be of the same opinion, that some other honorary title of a higher standard (but quite voluntary) should be attempted, in which microscopy, some physiology and pathology, entomology, and natural science is included in the curriculum Is it not strange that the business from which has sprung so many of the greatest chemists should be ignored as not possessing any members competent to fill such an office? I believe it would be quite possible at the present time, to select a score of pharmacists from our body as competent or more so than out of the ranks of the medical profession for this special duty.

I care but little for the immediate appointment of any of our body to the office, for it is at present doubtful whether it will be worth holding, but the recognition of our eligibility is all important. It would be a solid reason for a higher standard of scientific teaching.

T. M. Rimmington.

Bradford, December 15th, 1872.

The Working of the Pharmacy Act.

Sir,—I think with your correspondent, Mr. Metcalfe, that the Pharmacy Act has fallen short of what it was intended to be. So far as protection goes, I think it is a perfect failure. For instance, take the small shops whose ignorant proprietors are called "quack doctors." What protection has the qualified chemist from them? Simply next to none at all. They are not allowed to sell any of the poisons mentioned in the schedule, but that does not prevent their selling soda carb., acid. tart., rad. gent., sarsaparilla, and such articles which really constitute the country chemists' business; neither does it prevent their prescribing for any deluded person who is foolish enough to go to them, and of the latter there are plenty. It does not prevent their opening shops and calling them "Botanical Dispensaries," and themselves professors or members of some society which never existed. Neither does it prevent the abominable insults which chemists and druggists are subjected to by quacks who hold forth in our country markets, and at the street corners in our country towns. It is against these ignorant men that protection is needed, not only by chemists but by the public needs.

As to the evasion mentioned by Mr. Metcalfe, I know of a similar case. This sad state of things might, I think, be very easily remedied. In place of allowing certain poisons only to be sold by registered men, I would restrict the sale of all the articles mentioned in the Pharmacopœia to those men who have shown themselves to be fit and proper persons to be entrusted with the sale of such articles. By so doing, the grocers would be prevented, not only from selling cream of tartar, etc., but patents also. To my mind, it is a question whether a grocer or stationer who now sells a bottle of Collis Browne's or Towle's chlorodyne does not commit a breach of the Pharmacy Act, and render himself liable to prosecution.

I hope the matter will receive thorough ventilation through the columns of your Journal.

J. N. M'Neil.

Crewe, December 3rd, 1872.

Sir,—Evasions of the Pharmacy Act are not at all unfrequent, and I quite fail to understand how your correspondent (W. Metcalfe) has in his power the remedy for such cases as are within his own cognizance. I am strongly of opinion, and it is the opinion of chemists generally, that the sale of all medicines intended for internal use shall be in the hands of qualified persons only.

Notwithstanding the fact that many patent medicines act as powerful narcotics, and in not very excessive doses as poisons, it is possible that through the present imperfect state of the law, any person may, by paying the licence fee, sell such articles indiscriminately.

Though we enjoy the very doubtful monopoly of the sale of acid. hydrocy., morphia, belladonna, etc., yet by mixing these drugs, and calling the mixture by some arbitrary name, any grocer or small shopkeeper may purvey the "nostrum" *ad libitum*. Indeed, there is nothing to prevent the sale of morphia itself, pure and simple, providing only that it is called by some mysterious name, and sent out as a "patent."

As regards this (not unimportant) branch of the business, raising the cost of the licence three or four fold might to some extent palliate the evil, but it can only be effectively suppressed by an amendment to the Pharmacy Act as suggested by Mr. Metcalfe.

I shall be glad to see this question taken up by those in "high places," as at present it is evident neither of the objects of the Pharmacy Act are attained, viz.—the protection of the trade and safety of the public.

J. Rymer Young.

Warrington, Dec. 5th, 1872.

The Duties of Local Secretaries.

Sir,—The question has sometimes occurred to me—what are the duties of the local secretaries? Is the title one that is conferred on certain individuals pointing them out as the representatives of the Pharmaceutical Society, but having no functions to perform? With some few exceptions, this does appear to be about the state of the case, judging from the lethargic indifference that reigns over the majority of those holding this important office. But it does occur to me that one of the duties that ought to attach to this office is to see that the integrity of the Register is not infringed by unregistered persons commencing and carrying on business without let or hindrance. If this be permitted without protest, it will not require the powers of a prophet to foretell what will be the consequences. The Pharmacy Act will become a dead letter, and the Council will be laughed at. I, therefore, in the name of right and justice commend this matter to the consideration of the Council.

Justitia.

November 29th, 1872.

Lady Students.

Sir,—The ladies now attending lectures seem by their manifesto to be rather aggrieved that the laboratory is not open to them, and suggest that to admit them would complete the generous initiative already taken by the Council.

I am tempted to ask in the interest of the ladies themselves (broadly), what possible good can arise by their admission; do they hope to obtain employment in first-class pharmacies? If so, I fear ancient usage would compel the proprietors to prefer their male competitors, and surely they have not the hardihood to venture into business on their own account without first gaining that practical knowledge which can only be obtained behind the counter.

This is not a question of gallantry but of expedience, and I maintain it to be inexpedient both to present members and future possible female students. With the new regulations looming in the not far-distant future, containing that most salutary clause requiring three years to be actually passed with a qualified man, I am afraid another difficulty would arise. What master with more than one assistant would care to introduce a fair young maiden of sweet seventeen behind his counter? and if she have to gain her experience where only one is kept, her lot will not be very enviable. In sober earnestness I would recommend her parents or guardians to choose some other sphere for her usefulness. A liberal education she must have had to enable her to pass the Preliminary, and I will assume she is of gentle birth; is such a one fitted to wield a pestle heavy enough to thoroughly incorporate a pill mass weighing 12 oz. or lb j? Would she more easily accommodate herself to a 12-inch drum sieve? And if she possess the strength, would her previous training be at all likely to make her feel happy in her new occupation?

The past shows plainly that the female chemist and druggist never attained any position worth notice in the trade. Would it be different now that examination is compulsory? And, if not, would it not be wiser to close the door of the lecture-room to her, for she who enters there will certainly not leave care behind her, and will, I much fear, be a victim to that hope deferred that maketh the heart sick.

A London Member of nearly 20 Years' Standing.

December 17th, 1872.

The Amended Regulations of the Board of Examiners.

Sir,—I see on looking over the Amended Regulations of the Board of Examiners in your issue of the 7th, that those who present themselves for examination on and after October, 1874, must present a certificate as to having been three years in the employment of a pharmaceutical chemist or a chemist and druggist.

Now, on the north side of the Tweed, I am sorry to say, there are a great number of young men who cannot comply with this regulation, there being so many surgeons keeping open shop for the dispensing of medicines, who, almost without exception, employ apprentices or young men who have not served their whole apprenticeship, or who I may say have forsaken their first love. I regret to think that young men will be drawn into the surgeon's net, I may say, unawares; with this one temptation, viz., that they will receive more remuneration for their services than if they entered a highly respectable chemist's. If it were not for this the surgeons would be unable to procure apprentices. Besides, the surgeons are indifferent as to whether their apprentices pass the necessary examinations or not.

Now, the subject developes itself into this, can a certificate granted by a surgeon be legally accepted by the Board of Examiners in conformity with the amended regulations? My impression is that it cannot be accepted, for section 23 of the Pharmacy Act, 1868, distinctly sets forth that persons registered under the Medical Act shall not be or continue to be registered under this Act. Hoping that some of my fellow-pharmacists with a more able hand may take the subject into consideration and cast more light upon it, I am, etc.,

A. Strachan.

Ellon, N.B., December 14th, 1872.

The Edinburgh Chemists' Assistants' Association.

Sir,—In the end of April last a few formed themselves into a committee for the purpose of having a social gathering of the chemists' assistants and apprentices of this city. Notices were sent out and between eighty and ninety responded to the call. When I mention that this was brought about in less than a week, I think you will agree with me in saying that it betokened a healthy sign on our part for forming a more mutual intimacy than has hitherto existed amongst us.

At this meeting the proceedings throughout the entire evening were marked by the most cordial unanimity of feeling, and when the chairman (who was one of the most active originators of the meeting) in speaking of pharmaceutical education, referred to the cord of friendship amongst us which he was sorry to say, was very "slack," and expressed the hope that this state of matters would soon be remedied by the formation of an association to be called the Edinburgh Chemists' Assistants' Literary or Mutual Improvement Association, an impression seemed to pervade the minds of all that a new era was about to dawn on our hitherto isolated existence.

The suggestion was received with hearty marks of approval, and the most sanguine hopes were entertained of its success.

A meeting was subsequently held for the purpose of framing a code of rules and making such other arrangements as might seem necessary, but, alas! the great block in the path seemed to be, who were to render the contributions in the way of essays, debates, etc. This stumbling-block could not be got over, and the meeting had to be dispersed, resting itself content with the election of a committee who were empowered to use such measures as they thought best towards the putting of the association in working order. The gentlemen forming this committee were the very persons who formed themselves into the committee for getting up the social gathering.

They held several meetings, but the spirit of their zeal seemed to wane, notably that of the worthy chairman who made the suggestion, and a final meeting was held, declaring the scheme an utter failure. Now, Sir, is it not sad to think that with our numbers there is not sufficient talent to carry on the work of a mutual improvement association? Every opportunity is offered to us; I believe, were we to memorialize the North British Branch of the Pharmaceutical Society, they would grant us the use of their new rooms gratis for the purpose of holding our meetings: and what more could we want?

A meeting of that Society was held here recently, and the subject of pharmaceutical education was discussed, but no light was thrown on that perplexed question. I am convinced that the cure lies in the assistants and apprentices setting themselves to with a right good will, and preparing themselves for the respective examinations; I am sure they could have no better assistance than what they would get by connecting themselves with an association, and I hope that this fact will be a new stimulus for our now defunct committee "to try again what they failed in before." *Nil desperandum!* Apologizing for occupying so much space.

AN EDINBURGH ASSISTANT.

Edinburgh, November 26th, 1872.

PHARMACEUTICAL EDUCATION.

Sir,—Having carefully read the various schemes published in our trade journals respecting pharmaceutical education, I think every one, like myself, must have come to the disheartening conclusion, that we are as far off any definite plan as we were at the commencement of the discussion.

It has been proposed that the Pharmaceutical Society should cease to be an educating body; but how will it be possible to get rid of so enormous a surplus as is now accumulating unless it be spent upon educational purposes?

In the discussion which followed Mr. Mackay's paper, read at Edinburgh, a remark fell from Mr. Mackenzie which I think worthy of attention, viz., "That the Society should pay competent men to edit a work of the nature of 'Cassel's Popular Educator.'" Now, having derived great benefit from that periodical myself, I am of the opinion that lessons on chemistry, botany, materia medica, etc., published in the same manner, would be much more beneficial to the country student than lectures in a few large towns, as it would place all on a more equal footing, in which object every system hitherto proposed seems signally to have failed.

I do not wish to enlarge further upon the efficiency of the plan, but simply to bring it forward, so that if thought worthy of discussion, it may be taken up by more competent and experienced persons.

CECIL.

December 3rd, 1872.

[*** We cannot give insertion to this letter without expressing our opinion that such a proceeding as that advocated by its writer would be constituting a high road to "cram."—ED. PHARM. JOURN.]

THE PATENT MEDICINE LICENCE.

Sir,—Will you allow me through the medium of the PHARMACEUTICAL JOURNAL to suggest what I think would be a satisfactory settlement of the patent-medicine licence. Let the wording of the Act be altered from medicines liable to stamp duty, to all medicines and medicinal compounds. I would not take off the stamp duty on patent medicines, but allow that to remain as at present, and let the licence be 20*s*. throughout the country. By adopting this plan, a great benefit would be derived by the trade, and those who have no right to deal in medicines would probably be excluded.

H. G.

DISINFECTANTS AND DISINFECTING.

Sir,—I have been preparing for some time "Disinfecting Sawdust," which, whilst it possesses all the advantages of carbolic acid (of which it contains 20 per cent.), is perfectly harmless and efficient. I cannot claim any credit for the ingenuity of the preparation, as the manipulation is exceedingly simple, but from experiments I find there is a great difference in the absorbent properties of the different woods; and I have taken care to avail myself of the best for the purpose, so that I am now able to produce a very even dust and one of a very absorbent character after it has had the required impregnation of the acid. It has been much used in this neighbourhood during the small-pox epidemic, being adopted by the sanitary committee of Helstone, where it was found that many of the poorer people especially, who objected to the wholesale sprinkling of liquids in their homes, did not object to the use of it.

It is self-evident that such a preparation cannot be swallowed by mistake, cannot corrode metals, furniture, cloth, etc., nor act so injuriously on the valves of water-closets, etc., as either liquid acid or any of the chloride powders or carbolate of lime will do, hence it must be valuable in public institutions, schools, asylums, and in the bed-room and nursery, and for general purposes, for using in stables, dog kennels, bird cages, and a variety of other places where many of the preparations in general use would be positively dangerous.

W. W. MILDREN.

Hayle, Cornwall.

"*Piper.*"—*Nepaul Pepper.*—Mr. G. B. Clarke, of Woburn, has kindly forwarded a specimen of "nepaul pepper," which he believes to be made from a small yellow *Capsicum* similar to one which was brought over by the gardener to the Prince of Wales, and used in this country for table decoration. The specimen sent is very pungent.

Proctor Jones.—The 'American Journal of Pharmacy' is supplied by Messrs. Trübner and Co., Paternoster Row.

W. Y.—The amended Regulations of the Board of Examiners do not come into operation until October, 1874. With respect to the regulations fixing the age of the candidate for the Minor at twenty-one years, we cannot agree either with your opinion or anticipation of its acting injuriously. With regard to your further remarks we remind you that the action of the Council is not regulated by the probability "that every youth of the age of sixteen or seventeen who had passed the Minor would immediately rush into business on his own account," but that it is the business of the executive of the Society to prevent such a possibility.

R. R.—Any person passing the Minor examination becomes thereby entitled to be placed on the Register of Chemists and Druggists, and to commence business as such.

Datura.—No other preparation is required than to roll it up in cigarette form, like an ordinary tobacco leaf. It should be used with great care. See Warin's 'Therapeutics.'

W. J.—Inquiry shall be made and the result communicated in a future number.

J. H. Pumphrey.—(1) It is published privately, and is not for sale. (2) The crystalline character is obtained by submitting the oxide to a high temperature, just under that sufficient to produce decomposition.

Dr. C. Kidd is thanked for his communication, but we think it treats rather too much of the medical aspect of the subject to be suited for our columns.

R. S. (*Gateshead*).—The eligibility of chemists and druggists who were in business before August 1st, 1868, to be members of the Pharmaceutical Society was prescribed by the terms of the Pharmacy Act, 1868. The same Act says (clause xv.) that a person who has passed the Modified examination "shall be eligible to be elected an Associate of the Pharmaceutical Society, and every such person so elected and continuing as such Associate, being in business on his own account, shall have the privilege of attending all meetings of the said Society and of voting thereat, and of otherwise taking part in the proceedings of such meetings, in the same manner as members of the Society.

"*Cuprum*" appears to have omitted putting the question that he wishes to have answered.

"*Juvenis.*"—Dissolve the borax in the elder-flower water, slightly warmed, and add the opium wine.

"*Nil Desperandum.*"—Equations are simply means of representing chemical facts, and without a thorough knowledge of the facts represented, it is impossible to understand the meaning of the corresponding equations. You are recommended to study carefully the introductory chapter in the work referred to.

W. T.—The examination for the Prize of Books is a written one, and is conducted under similar regulations to the Preliminary examination.

C. N.—The fluorescence is a physical character belonging to some substances in the same manner as sweetness is a character of sugar.

"*Incertus.*"—The words "Entered at Stationers' Hall" on the label would probably be held to indicate that you have or claim to have an exclusive right or title to the making or preparing of the article so labelled.

Philip Childs.—We agree with your remark, but think it probable that the article in question was intended to be highly coloured.

"*Linimentum.*"—The best way would be to well mix the liq. plumbi and oil, and gradually add the other ingredients previously mixed together. Even then it is doubtful if a perfect admixture could be maintained.

W. Litchfield.—Your letter and enclosure have been handed to the publishers.

"*Ranunculus.*"—Under the present regulations the Latin examination for the Junior Bell Scholarship is in Cæsar's 'De Bello Gallico;' but under the amended scheme, which comes into operation after the award in 1873, the subject will be the first three books of Virgil's Æneid.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Kay Bros., Atkins, Campbell, Rogers, Parsons, Stables, Simpson, Jenkinson, Wheeler, Mackay, "An Associate."

NOTE ON THE OCCURRENCE OF SILVER IN THE PHARMACOPŒIA PREPARATIONS OF BISMUTH.

BY CHARLES EKIN, F.C.S.

II.

Having found, as lately published in the Journal,* that silver is a frequent adulterant of commercial Bismuth. Subnit., it occurred to me to see if it is also to be found in the Liquor Bismuthi as met with in our Pharmacies. I again procured twelve samples from first-rate London and country houses, and, not to weary you with details, I found that two contained a large amount of silver, one sample a very appreciable trace, and that the remaining nine, so far as silver is concerned, were pure.

On communicating with the makers of the two first samples, I find that they were made strictly B.P., and the makers had not the least suspicion of the presence of silver.

I have also examined three samples of commercial metallic bismuth, two of which contained both silver and copper, and two samples sent out as Bismuthum Purificatum, B.P., both of which also contained silver and one copper as well. The sample of commercial bismuth which contained neither silver nor copper contained lead.

From my recent experience, I am inclined to wonder that only 25 per cent. of the samples examined contained silver. Mr. Umney's statement, in his paper published in the Journal of the 23rd ult., that "perhaps the officinal method is seldom resorted to for the production of the liquor," probably furnishes the explanation why this is so. Still, if we remember that these were all picked samples where we might fairly expect unexceptionable purity, it must be confessed that the bismuth preparations of the Pharmacopœia, as at present met with in commerce, are far from being satisfactory.

It is only just to Mr. Schacht, of Clifton, the inventor of the fluid preparation, to say that the liquor as prepared by him is invariably free not only from silver, but also from copper, antimony, and arsenic, and that in his, prescribers have at all events one preparation that they may at all times depend upon.

* See *ante*, p. 381

COWS' MILK AND THE BEST METHODS OF DETECTING ITS ADULTERATIONS.

BY GEORGE BROWNEN.

The article on milk by Mr. Ekin in the last issue was an able introduction to the subject of milk analysis. It is, however, incomplete, and I am, therefore, led to supplement it with a few remarks from my own experience with London milk. No trustworthy analysis of milk can be performed which leaves the albumenoid nitrogen unestimated. The process of Wanklyn has not only been adapted to the analysis of cows' milk, but an attempt was made only a short time since by the same test to connect certain forms of disease with the poorness of human milk. I have found very little difficulty in using the test myself in examining cows' milk. The estimation of the solid residue of milk is a more difficult operation. Casein and fat are not easily dried unless a known quantity of some inert substance be used to divide the mass; the heat also requires careful regulation to prevent decomposition.

A quick and reliable method of calculating the fat in milk is by means of Vogel's lactoscope—a glass cup the sides of which are parallel, and about ·5 of a centimetre apart—its action depends on the amount of milk required to be added to a known quantity of water to obscure a strong light. A little experience with the instrument soon decides a twofold question, viz., whether cream has been removed or the milk is rich in butter.

Mr. Brown's use of the copper test for glucose is a step in the right direction, as lactin is the most invariable constituent of genuine milk; but his test requires a little modification, as the results with milk are sometimes rather too high. I have adopted successfully the following modifications of Daubrawa's method:—Mix two volumes of alcohol sp. gr. ·833 with one volume of the milk; filter off the coagulated butter and casein; a spirituous solution of milk-sugar is thus obtained; every increase of ·004 above sp. gr. ·905, the sp. gr. of the alcohol and water of the milk indicates about 1 per cent. of milk-sugar. Evaporate the solution to a syrupy consistence, dilute with distilled water, and estimate the sugar by the copper test. An odorous or volatile reducing agent sometimes present in milk is thus got rid of.

The butter on the filter may be separated from the casein by any appropriate solvent and estimated.

Although the microscope cannot be relied on for the determination of fat globules, it is a valuable instrument in cases of diseased milk; misshapen globules, pus-like bodies and bacteria may thus be identified, which elude every other test. I had a sample of this kind of milk a short time since, and I afterwards obtained confirmatory proof that the cow was diseased.

[*** The difficulty referred to has probably in some cases originated in the taking of an unnecessarily large quantity of milk for determinations of solid residue, 30 to 100 grammes having been recommended by Goppelsröder for this determination. When so large a quantity is taken the operation of drying is very tedious and uncertain. If, however, a much smaller quantity of milk (five grammes, for instance) be employed the drying may be very readily accomplished, especially if a shallow platinum vessel be used to contain the milk during the evaporation. There is no necessity for the employment of sand or other porous material, which, indeed, is calculated to introduce error.—ED. PHARM. JOURN.]

THE CHINESE MATERIA MEDICA.

In a recent number* we mentioned the fact that a committee of the French Academy of Medicine had made a report upon a manuscript work by M. Dabry de Thiersant, French consul in China, and Dr. Léon Soubeiran upon this subject. The work is entitled 'Études sur la Matière Médicale des Chinois,' and from the report, which was read by M. Gubler, on November 19th, the following notes are extracted:—

In drawing up the present work, the authors have been able to take advantage of the labours of their predecessors in the same field, such as Tartarinov,

* See *ante*, p. 448.

F. Porter Smith, O. Debeaux, and especially Daniel Hanbury. But an inherent difficulty in the subject has existed in the fact that the medicaments used in China are nearly always in a state of mixture, altered by successive boilings in different liquids, and reduced, if not to powder, at least to such small fragments as to be almost unrecognizable. The investigations of one of the authors upon the spot have, therefore, been of great service.

The subtances of the materia medica are in this work divided into three classes, mineral, animal and vegetable. In looking over the list one is struck that it presents as a whole, and even in many of its details, many of the features of the European materia medica. The present work might almost be taken as one of the old treatises in which a nascent science, not yet confident in itself, has not disdained to adopt the errors of charlatanry and popular superstition.

The belief in the specific action of drugs seems to have strongly influenced medical practice in China, as it did but lately that of Europe. Besides, the Chinese believe, as Europeans did in the middle ages, that the appearance of a substance will give a clue to the services it may render to man, *i.e.*, the doctrine of signatures. Thus the luciole is recommended for affections of the visual organs; a madder (*Rubia mungista*), having a red root, is given for amenorrhœa; *Polygonum tinctorium*, which yields indigo, is reputed efficacious for eruptive fevers; the reniform fruit of the *Kadsura chinensis* is said to possess aphrodisiac properties; while ginseng, with its bifurcated root resembling the legs of a man, is looked upon as restoring virile powers to the sick and aged. Considerations of the same kind are, doubtless, the foundation of the reputation of the *Cordiceps sinensis* as exciting the genital organs; that of the *Bidens parviflora* as infallible in making the nails grow; of the *Vitex incisa* in making the beard grow; and of the *Apocynum juventus* as a rejuvenescent. These are strange illusions, but they merit indulgence from those whose ancestors administered the lungwort to cure phthisis, the gromwell to cure the gravel, and the carrot for the jaundice.

In other points the Chinese show more scientific tendencies. For instance, the astringent substances of the materia medica, whether vegetable (oak galls and Chinese galls, etc.) or mineral (alum, acetate and sulphate of iron, salts of lead, silver etc.), are used like the bitters as tonics and febrifuges (*Salix babylonica, Populus tremula, Dichroa febrifuga*), to arrest perspiration, for atonic diarrhœa and spermatorrhœa. The aromatics, essential oils, and balsams, obtained from the Labiatæ, Umbelliferæ, Compositæ, Myristicaceæ and Styracaceæ, garlic, santal, *Daphniduim cubeba*, etc., are used as diffusible stimulants, febrifuges, antispasmodics, and remedies for catarrhs; wormwood and saffron are considered emmenagogues, and the abortive power of the ergots of rice and maize is well known. Mercurial preparations have been employed from time immemorial in Chinese medicine for syphilis; arsenic for strumous and herpetic affections and certain intermittent fevers; iron as a blood restorer. Borax is prescibed for aphthæ; nitrate of soda as a diuretic; carbonate of lime as an absorbent, and an oleo-calcareous liniment for burns. Ancient writers recommended the ashes of sea-weed in cases of goitre. Other substances used by them as by Europeans are sulphur, acetate of copper, castor oil, gamboge, aloes, rhubarb, aconite, veratrum, colchicum, camphor, musk and opium. They have sternutatories, sialagogues and anthelmintics analogous to ours. Further, they pretend to possess a number of substances capable of preventing drunkenness (*Betonica officinalis, Hovenia dulcis, Chrysanthemum album*, nutmeg and borax), and others exercising an influence upon the lactic secretion, either by suspending it (sprouted barley) or increasing it (*Silene? Alisma plantago*).

One thing is very remarkable, that surgical anæsthesia, general and local, has long been used in China. The great surgeon, Houa-To, who advocated hydropathy, used a species of *Atropa* described in the 'Pun-Tsaou,' which produced an insensibility sufficient to permit him to perform important operations upon the abdomen. The *Datura alba* has similar properties. Besides these, the *Azalea procumbens*, which they often associate with andromeda and henbane as a narcotic, produces, when mixed with powdered aconite root, a local anæsthesia which is utilized for small operations.

Chinese medical men have recognized that there is an antagonism between certain substances; that they are incompatible in the same formula, and that they may be used reciprocally as antidotes. Thus, it is recommended to avoid the association of ta-ky (a species of *Carduus*) with *Glycyrrhiza, Chamædaphne* and *Helminthocorton*; wasp stings, and the bites of scorpions, and even of venomous serpents, are recommended to be treated by the *Bidens parviflora*; *Nelumbo* is to be administered to those poisoned by crabs, and the toxic effects of fungi averted by alum or the root of *Cichorium*, and those of aconite by *Libanotis*. An efficacious antidote to arsenic is said to exist in the *Phaseolus angulatus*, which would lead to the supposition that this species, belonging to a harmless genus, possesses exceptionally a pharmaco-dynamic activity comparable to that of the Calabar bean, and superior to that of another Leguminous plant, the *Cytisus Laburnum*, the toxic properties of which are perhaps analogous to those of the exotic *Phaseolus*.

Some of the observations of the Chinese show considerable sagacity, such as the favourable effects of sprouted barley in digestive disorders, the dispersive action exercised by nitre and sal ammoniac upon opacities of the cornea; the immunity from goitre enjoyed by persons drinking water preserved in leaden vessels, a circumstance which appears to point to the preparations of lead as preventitive of that disease. Moreover, some of the substances vaunted as remedies in the East probably deserve testing by experiment and clinical observation. Such are the *Anemarrhena asphodeloides* employed for the same purposes as squills; the *Pardanthus chinensis*, to which is attributed various and remarkable properties; the *Pupalia geniculata*, the acrid root of which is a sialogogue, and employed in cases of rheumatism, etc.; the *Passerina Chamædaphne*, a tincture of which is employed as a cordial, tonic and febrifuge; the *Rehmannia chinensis*, useful in general debility; the *Dimorephanthus edulis*, frequently prescribed for loss of blood, heart disease, etc.; the *Gynocardia odorata*, the seeds of which are extolled for skin disease and syphilis; and among the febrifuges, the *Tournefortia argusina*, the *Trichosanthes dioica*, and especially the *Dichroa febrifuga*, the reputation of which is great in Cochin China, and which doubtless has more claims than the others to be looked upon as a substitute for cinchona.

THE SULPHUROUS IMPURITY IN COAL GAS.*

BY A. VERNON HARCOURT, ESQ., F.R.S., SEC. CHEM. SOC.

The luminous flames we use to light our houses after sunset are all equally gas flames.

The gas which burns round the wick of a candle is formed by the action of heat on the grease of which the candle is made. The gas which burns over the wick of an oil lamp is formed by the action of heat on the oil. The gas which burns over a "gas-burner" is formed by the action of heat on coal.

By the heating of any of these substances many different kinds of gas are produced, some of which become liquids if they are allowed to cool, while others are permanently gaseous. In the case of candles and lamps, when the hot gas is burnt as fast as it is made, the uncondensable and the condensable are burnt alike, the latter contributing even more than the former to the luminosity of the flame. In the case of coal gas, which is kept for many hours, and has often to travel along many miles of iron piping before it is burnt, only very little condensable gas reaches the burner. In this respect "gas" illumination is at a great disadvantage as compared with candles or lamps. To counterbalance this disadvantage gas must be produced from some substance which is much cheaper than grease or oil, and such a substance we have in coal. But coal, like all minerals obtained on the large scale, is mixed with small quantities of other substances, and, in particular, masses of coal always contain a greater or less proportion of a mineral known, according to its form, as pyrites or marcasite, composed of eight parts of sulphur united with seven of iron. When coal is heated, a part of the sulphur from this mineral unites with the carbon and hydrogen of the coal, and thus the illuminating gas formed from coal is contaminated with at least two sulphur compounds—carbon bisulphide and hydrogen sulphide. Such gas yields when it is burnt, in addition to water and carbon dioxide, sulphur dioxide produced by the burning of the sulphur. This gas has a well-known pungent smell; it acts on various colouring matters, and it is gradually changed in presence of air and moisture into a far more destructive substance called hydrogen sulphate or oil of vitriol. Unlike sulphur dioxide, which is a gas and can be removed by ventilation, hydrogen sulphate is not volatile, and exercises a continued corrosive action upon organic materials or fabrics on which it is deposited. In a furnished room the leather bindings of books and coverings of furniture are especially liable to be injured thus; perhaps because this material, being a better conductor of heat than others which are used for the same purposes, is more bedewed after gas has been lighted in a room than they are, and also because it requires less often to be cleaned or renewed. Fortunately the conversion of sulphur dioxide into hydrogen sulphate takes place so slowly that in a room lighted with gas and well ventilated a very small part of the sulphur which gas is liable to contain remains in this destructive form. Fortunately, also, the quantity of sulphur which gas as at present manufactured is liable to contain is very small. In a room lighted with four gas-burners the volume of sulphur dioxide mixed with the atmosphere of the room in the course of an hour is about one-hundredth of a cubic foot. The amount actually present at any moment, if the room is fairly ventilated, is a small fraction of this volume. Nevertheless, it is possible, and even probable, that some injury, especially to the bindings of books, may in the course of years be caused under these circumstances; and it is desirable, with a view to avoiding any such injury, and also with a view to allaying the apprehension of it, that the proportion of sulphur compounds in coal gas should be reduced as far as possible.

A ton of coal may contain about 30 lb. of sulphur: it yields nearly 10,000 cubic feet of gas, and a considerable part of the sulphur contained in it is given off with the gas in combination with either carbon or hydrogen. Of these two elements, hydrogen claims by far the larger proportion, not less than ten parts for one that is united with carbon. For the purification of gas from hydrogen sulphide, excellent methods are everywhere in use. The gas is passed through layers of slaked lime or of iron oxide, by either of which substances all the hydrogen sulphide is capable of being completely absorbed. But the smaller quantity of sulphur existing in the form of carbon bisulphide is not arrested by these agents, nor is there at present any material or process known by which it can be effectually removed.

When coal gas which is pure from hydrogen sulphide is heated and tested again, it is found to contain this impurity, showing that some ingredients of the gas are capable of producing hydrogen sulphide by their mutual action. Hydrogen seems to have a much stronger affinity for sulphur than carbon has. One consequence of this difference is the unequal partition of the sulphur between the two elements in the gas retort. But this inequality does not reach its limit in the short time which elapses between the formation and cooling down of the gas; and accordingly, when foul gas (or gas which has not been purified from hydrogen sulphide) is further heated, the proportion of hydrogen sulphide in it is increased, and that of carbon bisulphide diminished. From a number of experiments in which foul gas was passed through an iron tube three inches in diameter, filled with iron turnings and heated for a length of about two feet to low redness, it appeared that the amount of carbon bisulphide could be so far reduced that the gas, after purification from hydrogen sulphide, contained five or six instead of thirty grains of sulphur in 100 cubic feet. The gas was driven through the heated tube at a rate of from one to two cubic feet a minute.

A somewhat greater reduction in the amount of sulphur is obtained by heating the gas after, instead of before, purification and purifying it a second time. If it is the case, as seems probable, that the sulphur present in coal gas distributes itself when the gas is heated between the carbon and hydrogen in a ratio dependent upon the relative affinity for sulphur of the two elements, the proportion of carbon bisulphide to the total sulphur in the gas will be always the same when the composition of the gas is the same, and when it has been heated long enough for the establishment of an equilibrium. Accordingly we should expect the removal of sulphur, by the conversion of carbon bisulphide into hydrogen sulphide and the absorption of the latter, to be accomplished more effectually with gas from which the chief part of the sulphur had already been extracted. And this, as has already been stated, is found to be the case.

The nature of the chemical change which takes place when coal gas is heated may be illustrated by passing hydrogen over the mouth of the tube containing carbon bisulphide, and thence through a piece of combustion tubing heated nearly to a red heat. The mixture of hydrogen and carbon bisulphide vapour has no action on a solution of lead acetate; but, after the application of heat, the gas which issues produces at once a black precipitate, proving that hydrogen sulphide has been formed. This change occurs readily with hydrogen which has been carefully dried; but the presence of moisture appears to promote it; and as coal gas contains a quantity of aqueous vapour, much more than sufficient to react with the maximum amount of carbon bisulphide, it is possible that the formation of hydrogen sulphide when coal gas is heated, may be partly due to the intervention of moisture.

If clean iron nails are heated to redness in a glass tube, and coal gas is passed slowly over them, a soft

* Paper read at the Royal Institution, Friday, April 19th, 1872.

black carbonaceous deposit is formed, and the gas is deprived of a part of its carbon. If, however, the gas be passed through more rapidly, no such deposition takes place, although the time of contact of the gas with the heated surface is still sufficient to effect the conversion of the carbon bisulphide into hydrogen sulphide. In the latter case it may be presumed that no change occurs in the illuminating power of the gas. But to establish a point which is of capital importance, some direct observations were made on the illuminating power of gas thus treated. It was found with gas passing at the rate of 5 cubic feet an hour through a half-inch iron tube, heated for a length of twelve inches, that, when the heat did not exceed low redness, no change was observable. When the heat was raised to bright redness, there was a perceptible increase in the illuminating power.

If the process of heating coal gas, in order to remove the sulphur contained in it, should be employed on the manufacturing scale, the rate of transmission of the gas through the heating apparatus would necessarily be such as to render any deposition of carbon very unlikely. But even where such deposition takes place, it is not necessarily accompanied by a diminution of the illuminating power.

An interesting experiment, from this point of view, is the decomposition of marsh gas by the electric spark. When a stream of sparks from a Ruhmkorff coil is transmitted between the ends of platinum wires through a small quantity of marsh gas enclosed in a glass tube over mercury, the gas gradually expands. In about ten minutes it is nearly doubled, and at the same time a black deposit appears on the tube, in the neighbourhood of the wires. Here the intense heat applied has effected an almost complete decomposition of the hydrocarbon into its elements. But at the same time there is found a small quantity of some more condensed hydrocarbon, probably acetylene. On expelling the gas through a jet attached to the upper end of the tube, and burning it, the flame is seen to be much more luminous than that of marsh gas itself. The fact of which this experiment gives a striking illustration is that the illuminating power of gas depends much more upon the nature of the hydrocarbons it contains, than upon the total amount of carbon. How great would be the gain to the manufacturers of coal gas, if such an operation as this were possible on the large scale, by which the volume of gas is doubled and its illuminating power, at the same time, greatly increased!

As far as chemistry is concerned, the simple operation of heating gas appears to offer the means of a sufficiently perfect purification. The construction of a suitable system of iron pipes for heating the gas, and the best mode of obtaining and applying heat, is a problem for the engineer. On the scale on which gas is manufactured, all the apparatus for dealing with it must be of a magnitude to which it is difficult to pass, even in imagination, from the small scale of laboratory experiments; but, otherwise, the problem does not appear to be one of any peculiar difficulty. It may perhaps be found possible to employ some of the waste heat of the retort-house for this purpose, and thus to effect the required purification without much increasing the consumption of fuel.

RESEARCHES UPON SANTONIN.*

BY M. L. DE SAINT-MARTIN.

Santonin is the active principle of *Semen contra*, and has been prepared for some years past, upon a large scale, for therapeutic use. The reactions of this principle have, however, as yet been little studied. It remained outside any methodic classification until Berthelot, in his *Traité Elémentaire de Chimie Organique*, included it in the grand class of organic compounds which in 1860 he instituted under the name of phenols. The author, therefore, undertook an investigation in order to ascertain its chemical relations. The investigation included its reactions with reducing, oxidizing and decomposing agents; but the present paper only deals with some reducing experiments.

If santonin be really a phenol, its formula $C_{15}H_{18}O_3$ indicates that it should be possible by its methodical reduction to obtain—

(1) A diatomic phenol ($C_{15}H_{18}O_2$);
(2) A monatomic phenol ($C_{15}H_{18}O$);
(3) A carbide of hydrogen ($C_{15}H_{18}$).

This last carbide would present the composition of a homologue of naphthalin, isomeric or identical with amylnaphthalin.

The author has succeeded in obtaining the monatomic phenol ($C_{15}H_{18}O$); and he hopes to obtain shortly the other terms of the series.

The monatomic phenol, to which compound the author has given the name of santonol, was obtained by introducing into a long green glass tube, between two plugs of asbestos, a mixture of one part of santonin and four parts of zinc in powder, and heating it over a gas stove, in a current of hydrogen. A thick yellowish-brown liquid condensed in the cool parts of the tube, which after a few days, was full of crystals. This crude product was neutral to litmus, insoluble in water, very soluble in alcohol and ether; treated with solution of potash in suitable proportions it dissolved completely. An excess of potash separated, under an oily form, potassic santonalate. This compound, or an analogous body very rich in potash, was also precipitated as an oily liquid when the original solution was diluted with pure water. Treated with an acid it reproduced santonol. These properties, and various others undescribed, show that the product was constituted by a body analogous to the phenols.

But the crude product of the reaction was not a pure substance. In fact, the crystals and the mother-liquor presented a different composition. The first answered nearly to the theoretical formula $C_{15}H_{18}O$, while the mother-liquor contained much less carbon, perhaps because of the presence of the compound $C_{15}H_{18}O_2$, intermediate between santonol and santonin. The crude product was therefore redistilled, which operation was effected without difficulty at about the boiling-point of mercury. The distilled liquid still separated into two portions, the one crystallized, and the other liquid; these were analysed separately, and found to be isomeric.

The crystallized santonol had the appearance of the stearin which separates in the fatty bodies. After being purified as much as possible by pressure, it acquires a tolerable degree of hardness. Its fusing-point was about 135° C. It was insoluble in water, very soluble in alcohol and ether. Sulphuric acid formed with it a compound sulpho-acid, of which the salt of baryta was soluble. Analysis gave—

	Found. I.	Found. II.	Calculated.
C	83·9	83·8	84·1
H.	8·8	8·9	8·4
O (difference) .	7·3	7·3	7·5
	100·0	100·0	100·0

The liquid santonol was a very unstable substance, which turned brown under the influence of the air. Like its solid isomer, it was insoluble in water and very soluble in alcohol and ether. Its properties are

* Memoir read before the Académie des Sciences, Nov. 11th, 1872 (Comptes Rendus, lxxv. 1190).

difficult to define individually, because it was evidently saturated with solid santonol. Analysis gave—

	Found.	Calculated.
C	84·1	84·1
H	8·9	8·4
O (difference)	7·0	7·5
	100·0	100·0

The author is continuing his investigation of this body, and of the other derivatives of santonin.

GALVANIC BATTERIES.*

BY THE REV. H. HIGHTON, M.A.

I shall not attempt to give any ultimate explanation of the phenomena of galvanism. It appears to me that it is true wisdom in science not to attempt to do more than to give an intelligent and comprehensive classification of the phenomena themselves. Deeper theories may sometimes be useful in suggesting experiments, if it be borne in mind that those theories must always be doubtful, and mere matters of guess, and, at best, simply provisionary. Thus Maxwell has shown that the laws of hydraulics may be applied to electrical currents, though he cautiously and wisely guards us against supposing that it follows from this that there is any real electric fluid similar to ordinary fluids. It would have been well if other well-known scientific men had been content to follow his example. In the same way I should object to the assumption of any ultimate theory of galvanism, beyond the mere intelligent and classified expression of the laws of the phenomena.

In the kindred subject of heat, I think great injury has been done by asserting that it is "a mode of motion," which has introduced many wild and visionary ideas. If the word "motion" be meant simply as a translation of the Greek word κίνησις, which includes nearly all kinds of change, and it also be meant that a change of temperature is a mode of motion in the ordinary English sense of the word, the assertion is, in a certain sense, true, but deceptive; if it be meant that simple heat, without change of temperature, is motion of any kind, this is not only extremely doubtful, but, I believe, absolutely untrue.† With regard to galvanism, then, I would merely say that it would appear that wherever there is a chemical there is also a galvanic action, which only requires proper arrangements to be made for exhibiting it.

Perhaps the simplest method of producing a galvanic current is by the formation or decomposition of water. Thus, if we have two plates of platinum, the surface of one of which is covered with a film of hydrogen, and the other with oxygen, on making a metallic connection between the two, a galvanic current passes, and the hydrogen and oxygen unite and form water. Conversely, if we take two metals, one of which has a greater affinity for oxygen than the other, and place them in water, then, on metallically connecting them, the water is separated into oxygen and hydrogen, the oxygen uniting with the more oxidizable metal, and the hydrogen being evolved on the surface of the other metal, and a galvanic current flows. I will show you both these actions by actual experiment. In both cases one pole of the battery is said to become positive and the other negative, and the action passing between the two is commonly called a galvanic current.

Take, again, the simplest of all forms of a galvanic battery—zinc and carbon, with a dialyte, as it is called, of dilute sulphuric acid between them; the oxygen of the water unites with the zinc, and forms oxide of zinc; the sulphuric acid unites with the oxide, and forms a sulphate of zinc, and the hydrogen is evolved on the surface of the carbon. This double chemical action gives rather more electricity than the single action, as you see.

Now, it is a well-known fact that chemical combinations frequently produce heat, and it is also a well-known fact that an electrical current in passing through a homogeneous conductor also produces heat; and it is an exceedingly interesting problem to ascertain what relation the heat of the chemical combination bears to the heat produced in the conductor of the current. An investigation of this kind requires the most delicate and expensive apparatus, much more delicate and expensive than I possess; but in searching into the records of the most trustworthy experimenters on this point, and comparing the results obtained by them, I have arrived at the following conclusions:—

1. That, in all cases of galvanic action, the heat evolved in the battery, plus that in the exterior circuit, is exactly equal to the heat produced by the chemical action.

2. That, in most cases, a certain portion of that heat is retained exclusively in the battery, besides what is due to the internal resistance of the battery, and is not transmitted through the circuit.

3. That the potential of the battery varies, not only with the total chemical heat produced, but also with the proportion which that part of the heat which is transmitted through the circuit bears to the total chemical heat produced by the action of the elements of the battery. Indeed, the potential of a battery is exactly proportional to the amount of heat transmitted through the circuit by each unit of the atomic weight of the metal or other substance consumed or chemically changed. Thus, if we take two batteries, one of zinc, sulphuric acid and carbon, and another of zinc, sulphuric acid and copper, the heat evolved by the sulphoxidation of the zinc is the same in both cases; but the potential of the former, and consequently the heat evolved in the circuit, is greater;—what becomes of the difference? Is the heat in some mysterious way lost? No; the surplus heat is not evolved in the circuit at all, but remains in the liquid of the battery, useless for the production of electricity. Now, it is an exceedingly remarkable circumstance that the only battery yet examined in which the whole of the heat produced is transmitted through the circuit, is that form of the Daniell's battery in which zinc, in a solution of sulphate of zinc, is used for the positive, and copper, in a solution of sulphate of copper, for the negative, and in which the sulphuric acid and oxygen are transferred from the copper to the zinc.

With zinc, strong sulphuric acid and platinum, about five-sixths of the heat produced is transmitted through the circuit, but this varies somewhat with the strength of the acid; with iron in sulphate of iron and copper in sulphate of copper, only about two-thirds are transmitted; with copper in nitrate of copper, and silver in nitrate of silver, about $\frac{39}{82}$. In this way we account for the circumstance that, with the same positive metal, the potential varies with the character of the negative metal, less of the heat of the oxidation of the positive metal being transmitted through the circuit, and more retained in the battery itself. I may as well say that I obtained these results by comparing some well-known experiments of M. A. Favre with some very important ones of M. Soret, which are scarcely known at all. I will illustrate this by showing you the amount

* Lecture delivered before the Society of Arts, Wednesday, December 11th, 1872.

† Aristotle, in his 'Physics,' suggests an important principle which might with advantage be studied by our modern theorists on the subject of heat. He says ('Physics,' v. 1, 5), 'Αλλ' ἴσως οὐχ ἡ λευκότης κίνησις ἀλλὰ ἡ λεύκανσις. That is, "But perhaps whiteness is not a mode of motion, but whitening is;" so by analogy heat and cold are not modes of motion, but heating and cooling are so—that is in the Aristotelian sense of the word.

of current derived from the oxidation of iron in conjunction with carbon, silver, and copper respectively.

But the whole subject of the relations between heat and electricity is one which requires deep and accurate investigation. M. Favre, in France, and Dr. Joule, in England, are the principal experimenters on this subject, and having spent very much time in carefully examining the published records of their experiments I have no hesitation in saying that the conclusions they deduce cannot be accepted till they are repeated and varied with the most careful precautions, either by themselves or by others. It is much to be regretted that the Committee of the British Association appointed three years since to investigate and report on the question in which these points are involved, and since reappointed from year to year, have not yet made public a single syllable by way of report as to their proceedings or conclusions.

I will only make one observation more before I leave this part of my subject, and that is, that chemical actions which produce cold create a galvanic current, and therefore produce heat, as much as those actions which primarily produce heat. Thus copper and carbon, acting on water, produce a current exactly the same in kind as zinc and carbon, although the heat produced by the oxidation of copper is less than the cold produced by the separation of the hydrogen and oxygen of the water. Again, you will see that while the combination of sulphuric acid with water, which produces heat, produces a galvanic current, the combination of acetic acid and water, which produces cold instead of heat, produces also a galvanic current of exactly the same kind as the combination of the sulphuric acid and water. Let me then show you these facts by actual experiment. And I may note, by the way, that it is a curious circumstance that the combination of many acids and other substances with water, while they produce a contraction of volume, at the same time produce cold, not heat. In the combination of an alkali with an acid, which also produces much heat, you will see that a strong galvanic current is produced, and in this case the alkali, like the water in the former case, acts as the positive, and the acid as the negative. These circumstances, with many others, illustrate the fact that the view of heat, as given in Tait's 'Thermodynamics' and other better-known treatises, namely, that there is a certain absolute zero of temperature, fixed at -272 C., where heat finally ceases to exist (just as there is a certain absence of motion when a body is at rest), and that all heat above this point is equivalent to a certain amount of mechanical force, is a view utterly erroneous; that, on the contrary, any variation of temperature, either upward or downward, involves mechanical force, and that the true zero of temperature is, when all contiguous bodies are of equal temperature, just as the true electrical zero is when all contiguous bodies, are of an equal medium of electrical tension.

But I now turn to the more practical view of the subject. And here let me begin by saying that, in order to understand practically the action of a battery, the most essential thing of all is thoroughly to comprehend what is called Ohm's law. I have no hesitation in saying that the discovery of Ohm's law was to electricity not a whit less important, indeed, I should say more important, than Newton's law of gravitation in astronomy and general physics; in fact, it has been like the rising of the sun to travellers groping their way in darkness. It is now, of course, universally acknowledged as the great law of electrical action, though I need hardly say that when first enounced it was received by the scientific men of the day with the utmost scorn, and actually denounced as the wild ravings of a madman. But Ohm was then an unknown man—now his name is a household word with all electricians. This great law then is, that the quantity of electricity passing through each part of a circuit in a given time is proportional directly to what is called the potential or electro-motive power of the elements, and inversely to the total resistance of the circuit. Thus, to express it algebraically,

$$Q = \frac{E}{R}.$$

Again, the resistance of the circuit consists of two parts—the internal resistance of the battery, and the resistance of the rest of the circuit. Calling these R' and R'', we have the equation,

$$Q = \frac{E}{R' + R''};$$

and in the practical comprehension of this equation under the different circumstances to which it is applicable consists the whole difference between a good and a bad electrician; everything as regards the relation between batteries, the work they have to do, and the cost of doing it, depends upon this equation. If we have many similar cells in a battery, say n cells, then the equation becomes

$$Q = \frac{n\,E}{n\,R' + R''}.$$

Q represents the amount of chemical action going on in a given time in each cell, and if R'' be small, it is plain that, though with many cells we get many times the waste of zinc and other elements of the battery, we get no addition to the current; on the other hand, if R'' be large, we want a good many cells to produce the same current, and, in fact, as I said before, in the practical application of this equation to every varying case lies the whole art of the proper or improper use of a battery, and the art of using such batteries as are properly suited to the object desired to be attained. It will be obvious, from what I have said, that the main points of merit in a battery are—

1st. A large potential, or electro-motive force.

2nd. A small internal resistance, for where there is much internal resistance a large part of the power of the battery is wasted in itself, in overcoming—if I may so speak—its own friction. To these two points I may add two more, viz.:—

3rd. Constancy, or a power of keeping up an action nearly uniform.

4th. Permanency, or the power of working for a long time without attention or fresh making up of the battery.

When I say that the heat produced in a given time—and in some cases the magnetic power—is as the square of the quantity, and not simply as the quantity, you will see at once the great importance of having a large potential.

The two instruments I have here will serve to show the first three points in different batteries, namely, the potential, the internal resistance, and the constancy for at least a short time. The permanency must, of course, be a matter of time to ascertain. The first instrument, a galvanometer with a large resistance, will, I think, show practically better than any other the potential of a battery. By either observing the degree of deflection with the same resistance, or the resistance through which the same degree of deflection is produced, we get a good practical idea of the potential of a battery. And this is really all we want; an exact theoretical determination is valueless, as it is always varying, more or less, from moment to moment.

I will now show you the practical potential of a large number of combinations. Let us take, as a convenient standard, zinc in sulphate of zinc, copper in sulphate of copper.

It is more convenient in practice, though a little larger than the British Association unit, which they call a "Volt," in which the negative is copper in nitrate of copper.

You see the degree to which it attains; now let us compare with this the following elements:—

Zinc, dilute sulphuric acid, platinum.
Do. do. carbon.
Do. do. silver.
Do. do. copper.
Do. dilute sulphuric (||)* nitric acid, platinum (or Grove's form).
Do. do. (||) nitric acid, carbon (or Bunsen's form).
Do. a mixture of dilute sulphuric and chromic acids, and carbon, without a porous cell, as recommended by Roscoe and Bunsen.
Do. dilute sulphuric acid (||) carbon and mixed sulphuric and chromic acids.

I add a little permanganate of potash to the negative, and you see the potential raised a little. Now I will show you some forms of my own.

Zinc, solution of potash (||) carbon packed in a mixture of carbon, precipitated sulphur, peroxide and of manganese with dilute sulphuric acid.
Zinc, common salt (||) . . . do. do.

Next what is in most respects, I think, the most convenient, and best and cheapest in action (for the power produced) of all batteries:—

Zinc, common salt (||) . . carbon packed in granulated carbon, peroxide of manganese, with a mixture of sulphuric, nitric, and chromic acids.

The potential of the first of these then is, as you see, very high, much higher than a Grove or a Bunsen, indeed, nearly 50 per cent. higher. The second and third also considerably higher; the third is very constant, very enduring, and, from the peculiar chemical action of the materials, emits none of those poisonous nitrous fumes which have so seriously and permanently injured the health of many who have used the Grove or Bunsen batteries. Now we will try the potential of iron instead of zinc; this, you will see, is about three-fourths that of zinc, so that four cells of iron will be about equivalent to three of zinc. But as iron is about one-third the price of zinc, and is much less liable to be affected by local action, it would seem as if there was great advantage in using iron. But as every pound of iron consumed will take a little more acid and manganese than the zinc (that is in the proportions of eight and seven), and the internal resistance of four cells will be more than that of three, there is, on the whole, probably not much economy in using iron. Here is another battery in which no acid is used, and in which the potential is as high, or nearly as high, as a Grove, and very constant in its action. It is zinc, solution of salt, (||) carbon, and the peroxide of manganese, with a mixed salt of sodium, tin, and mercury. For telegraphic purposes, where the use of acid is thought objectionable, I know no better form.

But instead of zinc or iron, or indeed any metal, we may use any oxidizable liquid, and collect the electricity derived from its oxidization by means of a carbon plate. The cheapest, probably, of all is common salt; you see this gives a very fair potential, in fact not very short of a Daniell. Again, take sulphate of protoxide of iron, a very cheap material, which may be kept in a state of protoxide by placing it in pyrites or other sulphide of iron, which is a material almost valueless. Cyanide of potassium, you will see, gives a good potential; also hyposulphite of soda, and sulphide of soda or potash. You will observe that the potential of this last is very much greater than a Daniell, and approaches that of a Grove. Sulphide of calcium—a waste material in many places—gives a very good potential. Again, brandy and water, sugar and water, milk, flour and water, all of which, being oxidized by the oxidizing materials of the negative side of the battery, produce a considerable galvanic current. Indeed, with these kind of materials the battery plays the same part as the stomach and lungs of the animal body, the negative part of the battery supplying oxygen to oxidize the food materials of the positive part, just as the lungs furnish oxygen for oxidizing the food supplied to the stomach and brought into circulation in the blood. You will observe that milk and tea are more easily acted on, and give a larger potential than brandy and water or flour and water. But before I conclude this part of my subject, I ought to show you the potential of some other of the common forms of battery, namely, the Wollaston, the Smee, and the Le Clanché. You will see they are much inferior to some of the forms I have shown you, besides having other disadvantages which I shall show you in due time.

* The mark (||) is intended to denote a porous diaphragm.

Well, let me next show you the internal resistance and constancy of some of the common forms of battery. In order to show this properly we must, of course, take elements of an equal size. This instrument is a galvanometer of very small internal resistance, so that, practically, it shows you what is the internal resistance of the battery, as that is the main element of resistance. Of course the potential also affects the result, so that the degrees in this instrument will practically show you the combined result of potential and small resistance, where a large amount of current with a small resistance is required; and the loss of power in a minute (I cannot afford time to show you the effect of a longer duration), will give you some idea of their constancy.

Let us just take that modification of the Daniell now used in the Post-office and generally for telegraphic use. You have seen that it stands low in the scale for potential; and you will now see that for small internal resistance it stands very low indeed, but that its constancy for one minute at least is perfect. But still the amount of electricity produced in a minute is so very small that it ought to remain constant, there being so little expenditure of force in the time. Now, compare with this two forms of battery introduced by myself for telegraphic purposes—zinc in salt or dilute acid for positive, and carbon placed in granulated carbon and peroxide of manganese with dilute acid for negative. You will see the comparatively enormously large quantity of electricity which this produces; though in the course of a minute, where there is no resistance, it of course partially exhausts itself, the peroxide not being able to furnish oxygen rapidly enough for the supply; but, after a short interval of rest, it recovers its full potential. On the London and North-Western Railway ten of these cells were found to work to Manchester equally well with 60 of the ordinary sulphate of copper batteries; not, of course, that the potential is six times as large—indeed, it is not more than double—but in damp and wet weather, where there is much leakage from the wires, the small internal resistance of these batteries enables them to supply enough electricity to make up for the leakage, whereas the larger internal resistance of the Daniell batteries prevents them from supplying in a given time more than a comparatively small given quantity, which will not bear much loss from leakage. I am glad to say that this form of battery is being fast adopted for railway use. Then we try the Wollaston—a small potential, a small resistance, and a very rapid fall of power; then the Smee—a small resistance, fair potential, and, in consequence of the rapid escape of hydrogen, considerable constancy. To this battery the hydrogen fumes are a great objection. Next try the Le Clanché, a fair original potential, moderate resistance, and rapid fall of potential. Next, the form I mentioned before as introduced by myself, with a higher potential than the Le Clanché, and much more constant, though, like the Le Clanché, used without an acid, and therefore quite as permanent. It is simply a solution of common salt with a combined salt of sodium, tin, and mercury in the negative. This combination has the peculiar property of being able to extract rapidly the oxygen from the peroxide of manganese. The tin causes in time a little local action, but if it be left out, the mercury by itself cannot so rapidly extract the oxygen, and the local action caused by the tin is very small indeed. Next the "Grove," a high potential, very little resistance, even an increase of potential as the liquid gets warm; Bunsen the same; but both, after a short time, producing intolerable poisonous fumes, which produce dangerous inflammation of the lungs, take away the voice, and when a man's system has once been injured by them, act upon the lungs on subsequent occasions with the utmost rapidity. For myself, I am now so sensitive to them that I cannot expose myself to them for even a few minutes without losing my voice, and my chest getting seriously affected; besides, they are far from permanent, as a few hours exhaust their power. Next, I try the bichromate battery, without porous cells; small resistance, high potential, but soon losing its power, and very expensive and wasteful in use, destroying itself by a single night's action. Next, the bichromate, with a porous cell, high potential, moderate resistance, moderate constancy, but very expensive in use. Next, let me take my own form, which, for general practical use—as for induction coils, for keeping up a powerful magnetic action when required, and other such purposes—I think is far superior to all others. Zinc in salt, carbon packed in granulated carbon and peroxide of manganese, filled in with dilute sulphuric acid, mixed with a little nitric and chromic acids. Here is very high potential, as I showed you before, moderate resistance and great constancy. I have had them standing for months, used occasionally, and using but little of their original potential.

For electro-plating, in power, convenience and long endurance, they exceed all others. Some electro-platers prefer iron as the positive, some zinc; for each has his own peculiar preferences and modes of working; but they are now becoming largely adopted, having more than the power of the Bunsen, without the inconveniences, and lasting, I may say, thirty times the length of time. Some electro-platers have had them in daily use for two months at a time. The chromic acid has the especially valuable property of absorbing all nitrous fumes.

To show you the power of the battery, here is an electro-magnet magnetized by a single cell. I will defy the strongest man in this room to separate the soft iron keeper from the magnet.

Where very great constancy and a very large current of electricity is not required, the nitric and chromic acids may be omitted, and then the local action becomes next to nothing; but with the latter a moderate-sized battery of a single cell has been used for plating six dozen forks at once.

I am afraid that I have occupied you too long, but, as it is, I have been obliged to compress my matter unduly, and to omit many points on which I should have wished to dilate.

APPEARANCE OF SWEET AND SKIM MILK UNDER THE MICROSCOPE,*

BY M. BOUSSINGAULT.

Butter-milk under the microscope appears very different from milk from which no butter has been made; it contains, however, a certain amount of the characteristic butter-globules.

The author's experiments show that the fourth part of the entire amount of butter remains in the butter-milk. In sweet milk the butter globules are numerous and crowded together; in butter-milk they are fewer, and widely separated from one another.

By the gathering together of these butter-globules, cream is formed on the surface of milk—milk which contained 3·62 per cent. butter, after standing 24 hours, still showed 1·4 per cent.—so that all the butter globules do not collect in the cream; a good cream contains 37–40 per cent. butter.

Skim milk contains less butter than butter-milk; the latter is therefore often adulterated with the former, but this admixture of skim milk may be detected by the the microscope.

* Dingl. Polyt. J., ccv. 65–68, and from the 'Journal of the Chemical Society.'

THE BROUGH FUND.

For the Maintenance and Education of the Five Children who have been left unprovided for, by the untimely death of the late

JOHN CARGILL BROUGH.

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The Pharmaceutical Journal.

SATURDAY, DECEMBER 28, 1872.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PUBLIC ANALYSTS.

For some years past it has been evident that there is a growing need for an organized system of dealing with certain questions of public interest, involving exercise of chemical knowledge and skill, especially of that technical nature which is requisite in conducting analysis. The various chemical questions affecting the Revenue have hitherto generally been dealt with in special laboratories attached to the Customs or the Excise departments under the direction of chemists who have gained experience in those departments, and in this way all requirements have been to that extent satisfied. But recent sanitary legislation has had the effect of raising, directly or indirectly, a multitude of other questions, for the solution of which chemical knowledge is required, and in many such cases the evidence of analytical data is indispensable. The want thus manifested has been to some extent met by the appointment of such officers as the inspectors under the Alkali Act, the inspectors of lime juice and the Rivers Pollution Commissioners, as well as by making the laboratories and chemical staff of the Excise or Customs departments available for any inquiry involving chemical or microscopical work. The Health Bill introduced by Mr. STANSFELD last Session contained clauses providing for the analysis of water supplied for domestic purposes, of matters polluting streams, and of samples of food supposed to be adulterated, etc.;* and although this part of the measure was deferred for the present, something of the same kind was carried in the Adulteration Act by the provision for appointment of analysts under that Act.

These various official recognitions of the necessity for chemical services may perhaps not unreasonably be regarded as foreshadowing the establishment of a department of State chemistry, much of the same general character as the department of State medicine which has done so much public service as a branch of the Privy Council, and has lately been merged in the newly constituted Local Government Board. When the Health Act of last session is supplemented by more detailed legislative enactments, it may be expected that the very general need for chemists' services will constitute an inducement for more general qualification in this respect on the part of those engaged in trade as druggists, and, at the same time, offer an opportunity of improvement in the character of the trade. The systematic testing of gas and water, as well as such other demands of the kind as may arise from time to time, must, we imagine, be provided for in future by some system more certain and convenient than the chance presence of a person competent to conduct such work, or the recourse to chemists in the metropolis. Very much of such work will be matter of daily routine, and must, therefore, be carried out by a person on the spot, though it is probably desirable that the plan on which it is done should be laid down and regulated by some central authority. The same may be said in regard to the analytical inquiries needed in cases of poisoning, or for other legal purposes.

To take for instance the working of the Adulteration Act, if such a thing be conceivable, there would be some five or six hundred appointments to be made throughout the kingdom, and we maintain that no class of persons would be more suitable for the purpose than pharmacists.

It has been objected that the fact of a pharmacist being a tradesman would render him unfit for the office of analyst, or, as a correspondent expresses it, for "sitting in judgment on the wares of his fellow-shopkeepers."

There is a narrow sort of plausibility about this objection, but even that is only apparent, and a moment's consideration will show that it has no better basis than ignorance of the provisions of the Act, and of the nature of the analytical work requisite in such cases.

There is no sitting in judgment at all,—but merely the production of evidence that is required of the analyst; it is not even necessary or perhaps desirable for him to know whose are the "wares" submitted to the scrutiny of his art. Even if it should turn out to be his neighbour's ware which fails to bear this test, we cannot see that any one could be blamed but the defaulter.

In reference to the functions of the analyst under the Adulteration Act, it may be well here to point out what seems to be a misinterpretation of the Act by Dr. LETHEBY, according to the report printed at p. 512, where he speaks of the analyst being clearly justified in directing the inspectors to purchase samples of articles suspected of adulteration. So far as we are able to read the Act, it confers no such dangerous power on the analyst, and although there is a strange absence of any indication who is to exercise the function of "suspecting," and thereupon to put the collecting inspectors in motion, there are many reasons for securing the entire independence of the analyst in this respect.

It is with much regret that we have seen such a precipitate attempt made by medical men, or at least

* See PHARM. JOURNAL [3] vol. II. p. 756.

by Medical Officers of Health, to monopolize the office of public analyst, and we think this course must have been taken without sufficient consideration.

The medical papers of last week appear to have taken especial umbrage at the representation of the claims urged by the Pharmaceutical Society on behalf of the eligibility of pharmacists for the appointment of analyst. Setting aside the element of abuse which is introduced into the remarks of one of our contemporaries, we will venture to point out in answer to the arguments of the *Medical Times and Gazette*, that in this case too much stress seems to be laid on the word "medical" when it is endeavoured to interpret it as properly signifying only the art of treating disease; for what kind of necessity is there for competence in that respect in order to make an analysis? Granting even that the pharmaceutical chemist "knows nothing practically of anatomy, physiology or pathology," what logic is there in the inference that he must, therefore, be incompetent to make a chemical analysis? It might even be added that in cases of poisoning or accident, knowledge of those subjects would not confer any fitness for the performance of the special work of deciding whether certain parts of an animal body or certain materials contained poison or not; and that is really the main point to be ascertained by the analyst. It is also conceivable that the important aid medical men can render in such cases would be more serviceable if it were not associated with the strictly chemical work, but merely brought to bear on the analytical results obtained by an experienced chemist.

In regard to the *Lancet's* remarks upon the misuse of the word "chemist," we object altogether to the insinuation that any "pretensions" have been founded upon that basis. All that is contended for by the Pharmaceutical Society is, that, considering the nature of the duties appertaining to the office of analyst under the Adulteration Act, they present no features which demand the skill of the qualified medical practitioner, and that in consequence eligibility for the office should not be restricted to that class. It is also contended that many persons in business as druggists—to use the least pretentious term—are fully competent both as chemists in the strict sense, and as microscopists, as well as by possessing a knowledge of medicines, to perform the duties of the office; this is, we believe, a modest contention and one which we venture to say cannot fairly be disallowed.

Lastly, we learn from the *British Medical Journal*, that in consequence of the Pharmaceutical Society having sent a deputation to the Local Government Board, a communication has been addressed to Mr. STANSFELD by the Chairman of the Parliamentary Bills Committee of the British Medical Association, for the purpose of pointing out to him the opinion of that body, that whereas an Act of Parliament exists, regulating the examinations which certify medical knowledge, subsequent Acts requiring medical knowledge should be interpreted by that light; and that, for any post which an Act of Parliament designates as requiring medical knowledge, those persons only should be considered eligible who have passed one of the recognized examinations. This suggestion is very reasonable within the limits of its applicability, but, since in regard to it Mr. STANSFELD's discrimination will no doubt enable him to appreciate the fact that the Act therein referred to is one appertaining solely to the practice of medicine, and having nothing to do with the chemical or microscopical qualifications essential for a public analyst, we may well leave this communication without further comment.

It is satisfactory to learn from Dr. LETHEBY's address that he has taken upon himself as representing the Association of Medical Officers of Health, to urge upon Mr. STANSFELD how important it is for the effective working of the Act that the appointment as analysts of persons having competent medical, microscopical and chemical knowledge, should be strictly carried out. We fully concur with him in this opinion, and we feel sure that all classes of tradesmen likely to be affected by the Act will, on consideration, perceive that it is of vital importance to them that these appointments should be efficiently filled up. It is still more satisfactory to learn from the same source that Mr. STANSFELD, in replying to the suggestions of the Association, has intimated that the Local Government Board will require satisfactory evidence of the qualifications of the appointed analysts.

As yet we believe the necessary approval of the Local Government Board has not been given to any of the appointments that have been made; and for the present we can only rely upon the assurance given by Mr. STANSFELD that proper attention will be given to the question of qualifications.

Our space does not permit us to deal with some other details of the Adulteration Act; but, as pointed out by a correspondent, there appears to be in some quarters a singular want of appreciation of the nature of the work that will be required from analysts, as evidenced by the proposition that it should be paid for by a fee of half-a-crown. It may be advisable in carrying out the Act that analyses should be obtainable by the public for very moderate sums; but if such analyses are to be of any value, it is obvious that under such a system the officer conducting them should, in matter of remuneration, be placed on a footing with other municipal officers, and adequately paid for his services out of the public funds, as part of the expense of carrying out this Act. It is idle to expect that trustworthy analyses, sometimes requiring two or three days, will be conducted by skilful analysts unless they have something more to look for than a trumpery half-a-crown fee.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

December 18th, 19th, and 20th, 1872.

Present—Messrs. Allchin, Barnes, Carteighe, Cracknell, Davenport, Edwards, Gale, Haselden, Ince, Linford, Martindale, and Southall.

Dr. Greenhow was present on the 19th on behalf of the Privy Council.

Major Examination.

Twelve candidates were examined. *Five* failed; the following *seven* passed and were declared duly qualified to be registered as Pharmaceutical Chemists:—

	*Hanbury, Frederick Janson	London.
	*Collishaw, John	Nottingham.
	*Edwards, David	London.
	Jones, David	Rhyl.
	Nuthall, Edwin	Norwich.
	Houghton, Robert William	Bermuda.
	Trist, Richard	Plymouth.

Minor Examination.

Fifty-one candidates were examined. *Twenty* failed; the following *thirty-one* passed, and were declared duly qualified to be registered as Chemists and Druggists:—

	*Richardson, Edward	Dresden, Staffs.
	*Samson, Ernest	Bristol.
	*Smith, Arthur Harry	Eccleshall.
	*Marson, William	Stafford.
	Price, Rees	Neath.
	Newhill, John William	Huddersfield.
Equal.	Almgill, John	Bedale.
Equal.	Scoley, Thomas Edward	Boston.
Equal.	Walton, Thomas	Bishopwearmouth.
	Smith, John Jacob	Yeovil.
Equal.	Ellis, Robert	Aberystwith.
Equal.	Roberts, William Henry	Bath.
	Deacon, Henry James	Norwood.
Equal.	Lansdale, John Anstey	High Wycombe.
Equal.	Lunn, Thomas	Worcester.
Equal.	Smith, Tenison	Cambridge.
	Jones, James Parry	Newcastle.
	Mellor, John Gilbert	Southport.
	Fletcher, Frederick William	Totton.
Equal.	Robinson, Richard Atkinson	London.
Equal.	Thomas, Llewellyn	Swansea.
	Smith, Nathan	King's Lynn.
	Hannah, Charles	Abergele.
	Hardcastle, Stephen Barnabas	Knaresborough.
	Sharrah, Richard	Hull.
	Nicholls, Theophilus	Lower Mitcham.
	Evans, Evan	Cardiff.
Equal.	Ashwell, Lawrence Thomas	London.
Equal.	Betts, Samuel	Oadby.
	Burder, Robert	Manchester.
	Sparshott, Harry	Birmingham.

The above names are arranged in order of merit.

Preliminary Examination.

Certificates were received from the following in lieu of this examination:—

Certificates of the University of Oxford.

Heywood, John Henry	Lincoln.
Walker, George	Liverpool.

EDINBURGH MEETING.—NORTH BRITISH BRANCH.

The second meeting of the present session took place in the Society's rooms, St. Giles Street, on the evening of Wednesday, 11th December, at 8.30. There was a large attendance, the room being crowded; Mr. Baildon, President, in the chair.

After a few remarks by the Chairman, Professor A. Crum Brown, of the Edinburgh University, was introduced to the meeting, who delivered a very interesting and eloquent address on "The Relation of Chemistry to Pharmacy." The Professor occupied fully an hour, but as he had no manuscript we are only enabled to give the following short abstract from one portion of the lecture:—

Pharmacy is an *art*, the art of preparing and dispensing drugs. The principles of this art, like the principles of other arts, are derived from various sciences, and as these sciences give help to Pharmacy by supplying it with principles, so they derive help from it in the form of facts and observations. Among the sciences thus related to pharmacy these may be mentioned:—botany, zoology, and chemistry. Pharmacy derives from botany the means of recognizing and identifying the various plants used in medicine. Botany has received compensation from pharmacy in the minute and careful study of plants and parts of plants which would otherwise have been left comparatively uninvestigated. The oldest lists and descriptions of plants are "herbals," and these were made with a purely pharmaceutical object. Similarly, though to a smaller extent, zoology and pharmacy are related. But chemistry has a much more intimate relation to pharmacy than either botany or zoology. The term 'chemist and druggist' shows that this relation is generally and popularly recognized. No one would call a pharmacist a "zoologist and druggist" and the term "botanist and druggist," or any similar phrase, is reserved for a class of persons with whom we do not wish to claim any relation.

The reason of this more intimate relation is obvious when we consider that, while pharmacy owes to zoology and botany some of its raw materials and the means of testing their genuineness, all pharmaceutical *processes* and *operations*, which are not purely mechanical, are chemical.

Thus nearly every fact or observation in pharmacy is of chemical interest, and a very large number of the discoveries of chemistry are of use to the pharmacist. Indeed, as every science originates in one or more arts, pharmacy may be said to be one of the roots of chemistry, the other being metallurgy. Chemists were for a long time the producers of metals and drugs, and their aim was to discover the philosopher's stone and the elixir of life. This relation may be very well seen if we consider what parts of chemistry have been most minutely studied, when we shall find that they are those of special pharmaceutical or metallurgical interest.

It is desirable that a druggist should have a good knowledge of the natural history sciences; it is essential that he should be a chemist.

As an instance of an eminent chemist and druggist, Dr. Crum Brown gave a short sketch of the life of Carl Wilhelm Scheele.

Born, 1742, the son of a merchant at Stralsund, he was apprenticed in his fifteenth year to a druggist at Gothenburg. He remained as apprentice and as assistant in Gothenburg till 1765. During these eight years he acquired a very complete acquaintance with chemical analysis, devoting all his leisure to the study of chemistry, reading such books as he could obtain, and experimenting for himself with such means as his master's shop afforded. From 1765 till 1775 (when he obtained the management of a pharmaceutical establishment in Köping, a small Swedish town) he acted as assistant in various places—Malmö, Stockholm and Upsala. He died at Köping in 1786 at the early age of forty-three.

Always a poor man, with limited means of study and of experiment, Scheele, in his short life, succeeded in making a larger number of important discoveries in chemistry than any other chemist before or after him. He discovered

* Passed with Honours.

tartaric acid, citric acid, malic acid, oxalic acid, gallic acid, mucic acid, lactic acid, uric acid, prussic acid, and glycerine. In the department of inorganic chemistry, he discovered molybdic acid, tungstic acid, arsenic acid, and baryta; he conducted series of valuable investigations upon fluorspar and black oxide of manganese, and discovered chlorine and (a short time after, but quite independently of, Priestley) oxygen.

This list is a marvellous monument of genius and industry, and we are sometimes tempted to speculate as to what Scheele might have done, with wealth, social influence, and long life. But the peculiarities of Scheele's work, its independence and directness, his confidence in Nature and distrust of authority, were no doubt greatly owing to the conditions of his life, which appear at first sight so unfavourable; and it is not impossible that with greater advantages he might have done less, as it is certain that scarcely any chemist had fewer advantages, and that none has done more.

Scheele's work was almost purely practical; towards the close of his life he published, in connection with his discovery of oxygen and of chlorine, important speculations on Air and Combustion, but it is with his discoveries of methods and facts that his name will always be associated.

There will always be pharmacists as poor and as unaided as Scheele, though we can scarcely hope that one of them will rival him as a discoverer; but all, whatever may be their circumstances, can imitate his industry and thoroughness, his quiet self-respect and devotion to the truth of nature, and by doing so each will make the most of whatever genius he may happen to possess.

At the close of the lecture a hearty vote of thanks was proposed by the chairman and seconded by Mr. Gilmore. Professor Crum Brown replied, and the meeting thereafter separated.

Provincial Transactions.

BRISTOL PHARMACEUTICAL ASSOCIATION.

The usual monthly evening meeting of the association was held on Friday, December 13th; the President, Mr. Townsend, briefly opened the proceedings.

Mr. Giles exhibited a modified form of copper siphon for the more convenient transference of spirits of wine or other liquids.

The suction tube was differently arranged (being placed at the top of the arch) so as to enable the operator to put the instrument into action with a less violent effort of the lungs than is necessitated by the usual vintners' siphon, and also to avoid the inspiration of strong spirit which almost necessarily attends the use of the old siphon for that liquid.

A lecture was then delivered "On the Processes employed in the work of Organic Chemistry" by Thos. Coomber, Esq., F.C.S., upon the following outline:—(1) Fractional distillation, with experimental illustrations of the process at work; (2) Pressure tube operations—illustration of the mode of conducting these operations. Collection and examination of ethyl; (3) Limited oxidation—working illustration of the process, and examination of the product; (4) Processes of Organic Analysis—Methods of Liebig, Will and Varrentrapp, and Dumas, in operation, with experimental illustrations of the principles on which these operations depend.

CARLISLE CHEMISTS' ASSOCIATION.

The monthly meeting of this association was held on Friday evening, the 20th inst., in the class-room, Barwise Court. Votes of thanks having been passed to Messrs. Maw, Son and Thompson, London, for their gift of several useful articles of chemical apparatus, and to Messrs. Barron, Harvey and Co. for their present of fifteen remarkably fine specimens of drugs, a very interesting paper on "Water and Water Analysis" was read by Joseph Pattinson, Esq., and illustrated by several experiments.

There was a moderate attendance of members and associates; Mr. A. Thompson, President in the chair.

On the conclusion of the reading of the paper, a vote of thanks was unanimously passed to Mr. Pattinson for his kindness.

Proceedings of Scientific Societies.

ASSOCIATION OF MEDICAL OFFICERS OF HEALTH.

On Saturday, Dec. 21, Dr. Letheby, the Medical Officer of Health and public analyst for the City of London, presided at a meeting of the Association of Medical Officers of Health, held at the hall of the Scottish Corporation in Crane Court. He opened an important discussion on the working of the new Adulteration Act, premising that he had transmitted to Mr. Stansfeld the suggestions of the association as to the effective working of the Act, and especially that in which they urged that the appointment as analysts of persons having competent medical, microscopical, and chemical knowledge should be strictly carried out. He had received a reply to the effect that the suggestions should receive the attention of the Local Governing Board, and that the Board would require satisfactory evidence of the qualifications of the appointed analysts. What that "satisfactory evidence" was to consist of he was not yet aware. He contended that it was advisable that the Act should be carried out with uniformity all over the metropolis, and he, therefore, proposed to suggest to his fellow-analysts what should be the mode of procedure. First, he said, it was necessary that the articles should be "suspected to be adulterated," and that suspicion might be either special or general. If special, and the suspicion was directed against one particular article or one particular man, he had ordered in his own district that forms should be kept in which any one could enter a complaint, and hand it for private retention to the inspector. They must not keep a book of complaints, because tradesmen and others in such a case could see who were the persons complaining and act accordingly. The suspicion ought to be a well-recognized and well-grounded one, and not mere idle gossip. If general, and the suspicion was directed against all the dealers in a certain article, say milk or coffee, in a particular district, the analyst would clearly be justified in directing the inspectors to purchase samples of such suspected article from each and all of them. There would be, in such a proceeding, no invidious selection made, and besides, the analysis, directed as it would be to one particular article, would be more conveniently made. The Act next provided that the purchaser or inspector must prove to the satisfaction of the justice that the article in question was delivered to the analyst in the same condition in every respect as it was when he received it from the seller. How was that to be accomplished? In the case of an ordinary purchaser, he must give notice at the time to the dealer of his intention to submit it for analysis, so that he might either put his seal to it, or at once accompany the purchaser to the inspector. But in the case of an inspector purchasing an article no such form need be gone through, for it was obvious that if once the officer declared himself he would never be able to purchase again. After a purchase, the purchaser wishing to have the article analysed would hand it to the inspector, and on payment of a sum to be fixed in each district, varying from 2*s.* 6*d.* to 10*s.* 6*d.*, an analysis would be made and a certificate given. The analyst had no business to receive any articles direct from the purchasers, for the Act provided that everything should be done through the inspector. In the case of an inspector buying and bringing an article to the analyst, he must designate the article by a number, enter in a memorandum-book all the circumstances relating to the purchase, and secure and seal samples of the articles, so that in case of dispute a further investigation might be made. The duties of the analyst were to witness the sealing of the articles, to conduct the analysis, and to give the certificate. As to the manner of conducting the analysis, he ought first to make a physical examination with reference to the appearance, colour, smell, or taste of the thing, then a microscopical examination to discover the structure of the substance, and, lastly, a chemical examination. Dr. Letheby strongly dwelt on the importance in all analyses of the incineration of the article, which, he said, was perhaps the greatest "tell-tale." He observed that the analyst was bound to give a certificate to an ordinary purchaser, but there was nothing to compel him to give one when the inspector himself bought the article. He advised his colleagues so to frame their certificates that they might not be used as trade "puffs," and he submitted a form of certificate which met his view on the subject. They must sign and write their certificates in the presence of the inspector, and those certificates would be then legal evidence, and there was no necessity for the analyst to appear in a court of law at all. By the Licensing Act, where the analysts were appointed by the Inland Revenue, it was provided that they should attend the Court for the purpose of cross-examination if need be, but there was no such provision in the Adulteration Act. The analyst, therefore, he contended, had finished his work when he had given the certificate on which the proceedings were founded. The difficulty in the Act was how to deal with articles which were debased, but not adulterated, such as skimmed milk, spices from which all the volatile oils had been extracted, tobacco and other things which by keeping had lost their active principles, and drugs produced in climates which did not bring out those principles, and he confessed he had not been able to solve it. He added that the Act should not be put into operation without due notice of all its provisions to the public, and he handed in a circular which was about to be issued in the City.

Dr. Liddle, in the name of the association, thanked the president for his interesting remarks, and for his very valuable advice and assistance.

Dr. Tripe disagreed with Dr. Letheby as to his opinion about general suspicion, and observed that the analysts were only required to give a qualitative and not a quantitative analysis.

Dr. Sarvis and Dr. Woodforde remarked that, to their great surprise, Mr. Bushby, a metropolitan magistrate, had held that any one was competent under the Act to give an analysis, that the inspector was not bound to receive the article from the purchaser and hand it to the analyst, and that all that was necessary was that the thing should be proved not to have been tampered with.

Dr. Hardwicke and Dr. Ross spoke strongly against the assertion made by members of their own body that, as a rule, medical officers of health were not qualified for appointment as analysts.

The meeting, after some further discussion, adjourned.

PHILADELPHIA COLLEGE OF PHARMACY.

At the pharmaceutical meeting held on Tuesday, November 19th, Mr. Remington made some remarks upon ceresin as a substitute for white wax. It is obtained by distilling ozokerite at between 250° and 300° C., to separate liquid oils, and treating the residue with Nordhausen sulphuric acid to separate impurities, and afterwards refining. It differs from paraffin by its greater opacity, its not being unctuous to the touch, and its behaviour with ether, boiling alcohol, turpentine and benzine. Chloroform dissolves both ceresin and paraffin to some extent, but upon the cooling of a warm solution, paraffin is deposited unchanged on the sides of the vessel, while ceresin forms a heavy flocculent precipitate. Mr. Remington also drew attention to a modified form of crystallized permanganate of potash, in which the ordinary needle-like character was entirely wanting, the crystals merely showing the pyramidal summit common to the usual salt. The modified form had led to suspicion of an adulteration; but it was thought to be probably due to the interference of salts of greater solubility present in the solution from which the specimen had been crystallized.

Professor Maisch exhibited some musk pods, obtained from Mr. Cramer, an importer. The following details from records kept by Messrs. Cramer and Co., were furnished to illustrate the yield of musk :—

No. of bags.	Weight of bags (troy). oz.	dr.	gr.	Weight of Musk (troy). oz.	dr.	gr.
2	1	3	0	0	5	0
3	2	3	15	1	2	0
6	4	3	10	2	2	10
4	4	1	0	1	1	30
12	10	0	0	3	2	40
1	0	5	40	0	3	0
1	0	6	23	0	3	23
29	23	6	28	9	3	43
Average for each bag—	0	6	34	0	2	36⅔

Professor Maisch also exhibited a sample of South Carolina opium. It is considered by persons engaged in producing opium in that State that the plants can be grown there with considerable profit. The sample sent had not been analysed; it was gathered when the plant was green and in its luxuriance of growth. In the discusion which followed, opinions were expressed that with care opium might be produced in the warmer States of the Union equal in quality to that obtained from the usual sources.

CHEMICAL SOCIETY.

Thursday, 19th December, 1872; Professor Williamson, F.R.S., Vice-President, in the chair.

After the ordinary business of the society had been transacted, several interesting communications were read. The first entitled "Analyses of Water of the River Mahanuddy," by Mr. G. Nicholson, gave the results of the author's examination, from which he finds that the water of this river contains less dissolved matter than that of any other river in India. The next paper, "Researches on the Polymerides of Morphine and their Derivatives," by Mr. G. Ludwig Mayer and Dr. C. R. A. Wright, gave an account of the various derivatives obtained from morphine by acting on it with zinc chloride, hydrochloric acid, and sulphuric acid respectively, and also of the physiological properties of the compounds produced. Three communications by Dr. H. E. Armstrong, from the laboratory of the London Institution were then read. No. VIII. "Derivatives of β-dinitrophenol." No. IX. "Note on the Action of Bromine in the Presence of Iodine on Trinitrophenol (picric acid)." No. X. "Preliminary notice on Iodonitrophenols." The last paper, by Mr. C. E. Groves was "On the Formation of Naphthaquinone by the direct Oxidation of Naphthalene," which the author effects by means of chromic anhydride.

The meeting was finally adjourned until Thursday, 16th January, when papers will be read "On Several Vanadates of Thallium," by T. Carnelly; "On the Heptanes from Petroleum," by C. Schorlemmer, and "On Ethylamyl," by Mr. Grimshaw.

THE MEDICAL SOCIETY OF THE COLLEGE OF PHYSICIANS, DUBLIN.

Wednesday, April 24th, 1872.

The Application of Gases as a Means of Destroying Contagion.

BY CHARLES A. CAMERON, PH.D., M.D.,

Professor of Hygiene in the Royal College, etc.

(*Concluded from p.* 494.)

Before the question of bacteria as a cause of zymotics arose, Haygarth, Murchison, Ryan of Lyons, and others denied that small pox poison was directly transmitted through any considerable space in the open air. Murchison asserts that the poison was not contagious in the open air at a distance of half a yard. Chauveau states that the contagious matter of small pox is volatile—that the solid particles float into the air at a temperature of 40° centigrade, but in his experiments the matter was carried away by a current of vapour. The pent-up gases in a sewer when they find an outlet into a house undoubtedly often carry up mechanically the *materies morbi* whatever it may be, of enteric fever.

It would appear that whilst minute plants and spores float about abundantly in the atmosphere, minute animals and ova adhere to walls and other solids. Now, in ordinary disinfection the principal object is to act upon the atmosphere. A bad odour is observed in the sick-room wherein lies a small-pox patient, but that odour is not actually connected with the cause of the disease; the contagious matter which produces small-pox is odourless. We might destroy the bad odour in the room without diminishing the quantity of contagious matter present.

The following experimental results prove that the ordinary disinfection by gases does not kill the bacteria which are usually associated with putrefaction, nor does it perfectly destroy the contagious matter of at least one zymotic disease:—

Several watch- and microscopic object-glasses were dipped into filtered beef-tea, which contained enormous numbers of bacteria, and whilst still moist they were placed in different positions in a hood, or small chamber made of wood and glass, containing 16½ cubic feet of space. Half an ounce of chloride of lime was placed in a capsule and introduced into the hood, and an equivalent quantity of hydrochloric acid was poured on the powder in such a way as to prevent the chlorine evolved from passing out of the hood. After the lapse of 24 hours the door of the hood was opened and the glasses removed. They were found to be covered with extremely thin films of solidified beef extract. A few drops of pure water were used to render the film semi-liquid, and its contents were examined with a microscopic power of 800 diameter. In a few seconds the bacteria were detected moving about with great rapidity, and with apparently undiminished vigour. It was clear then that fumigation at the rate of a little more than three ounces of bleaching powder per 100 cubic feet of space had no effect in destroying bacteria. The hood was more air-tight than a room is when its doors, windows and fire-place are closed. On opening the door of the hood after 24 hours the odour of chlorine was distinctly perceived at a distance of several feet. If a room 15 feet long, 10 feet wide, and 10 feet high, and having, therefore, a capacity of 1500 cubic feet, were disinfected by chloride of lime in the relative proportions employed in the foregoing experiment, it would be necessary to use nearly three pounds of chloride of lime.

As the gases evolved from three ounces of bleaching powder per hundred cubic feet of space did not destroy bacteria, an experiment was made with one ounce per 16½ cubic feet, or at a rate of nearly six pounds per 1500 cubic feet—the size of a small room. The result was similar to that of the first experiment, the bacteria being almost as lively after as they were before the process.

The next quantity tried was one and half ounces of bleaching powder per 16½ cubic feet, or at the rate of about eight and a half pounds per room of 1500 cubic feet capacity. After 24 hours' exposure to the highly chlorinated atmosphere produced by this experiment, the greater number of bacteria were not only alive, but most of them exhibited the utmost vitality. Two ounces of bleaching powder per 16½ cubic feet were next tried, and after exposure to the gases evolved from this quantity by the action of an acid, the bacteria, though languid, were still mostly alive, and a few of them were very active. The last experiment was made with three ounces of bleaching powder per 16½ cubic feet, or at the rate of 16½ pounds of the disinfectant to 1500 cubic feet; but even the enormous amount of gas evolved from this quantity failed to kill the greater number of the bacteria subjected to its influence. Films of moist meat extract containing bacteria were next exposed to an atmosphere of equal parts of chlorine gas and ordinary air. This operation was conducted on an air-tight glass vessel. After 24 hours they were examined, and no life could be perceived. Dried films of meat extract containing bacteria were submitted to the influence of this gaseous mixture, but after being moistened many of the bacteria were found still alive though almost inactive.

Similar experiments were made to ascertain the action of sulphurous acid gas upon bacteria, but this gas was also found to produce but little effect on these animalcules.

Having proved that the bacteria which exist in liquids are not destroyed by exposure to atmospheres highly charged with chlorine or sulphurous acid gas, an experiment was next made with the view of ascertaining whether or not the germinal matter of bacteria could be destroyed by ordinary gaseous disinfection. Accordingly filtered beef-tea, which did not exhibit any forms of life under the microscope, was divided into three parts. One portion (*a*) was placed in an ordinary test-tube, and loosely plugged with cotton wool, another portion (*b*) was placed in a test-tube, which had shortly before been heated nearly to redness, and loosely plugged with cotton wool, which had been highly heated to 350°; the third portion (*c*) was poured upon microscopic object- and shallow watch-glasses, and these were placed in the hood and exposed for 48 hours to the gases evolved from two ounces of bleaching powder, treated with acid. In 24 hours the liquid (*d*) which had simply been deposited in a test-tube, was found to swarm with microzymes; the liquid which had been placed in the tube that had been heated to redness was, after a week, found to be free from animal life,* whilst a few hours after their removal from the hood, the films of beef-tea exhibited swarms of vibriones, although every precaution was taken to prevent contamination from solid surfaces subsequent to the removal of the glasses from the hood.

The following experiment was made in a room of 1600 cubic feet capacity. Animal liquids containing microzymes were placed upon the chimney-piece, upon the window panes and other smooth parts of the apartment. Seven pounds of chloride of lime were then decomposed by oil of vitriol, and the room carefully closed up. After 48 hours the room was opened, and the films containing the bacteria were, with every precaution washed upon object-glasses, and examined microscopically. In every case there were large numbers of living microzymes.

The next experiment was conducted as follows:—

Four ivory points, charged with vaccine lymph, were

* Dr. Sanderson has shown that animal liquids, deposited while fresh in tubes which had been highly heated, and loosely plugged with cotton wool, remained free from bacteria for a long time.

placed in the hood, and subjected, during 24 hours, to the influence of the gases evolved from one ounce of bleaching powder, decomposed by acid. With these points I successfully re-vaccinated two persons, but with the other points I failed. Six charged points were next exposed to the gases evolved from two ounces of chloride of lime per 16½ cubic feet; but attempts to vaccinate with these points proved unsuccessful.

The results of these experiments show that bacteria and the contagious particles of vaccine lymph resist, when protected by an extremely thin film of solid, or semi-solid matter, the action of chlorine and sulphurous acid gases applied to them in larger quantities than are usually employed in disinfection. The filtered meat-juice used in these experiments contained only five grains of solid matter, per ounce of 480 grains—rather more than one per cent. The object-glasses were dipped in this liquid, and many of them allowed to drain before being subjected to experiment. We may readily conceive then how extremely thin the film was that separated the bacteria from the gases set free in the hood. It is extremely improbable that the actual contagious particles of small-pox or cholera, or similar diseases, are ever detached from the serum and other matter with which they are associated when thrown off from the body. They are, no doubt, invested with some such film as that which protects the contagious granules in vaccine. If ordinary gaseous disinfection sometimes fails to destroy the vitality of vaccine, and has no effect on ordinary microzymes, we cannot rely upon it as a means of destroying the contagia of zymotic diseases which certainly are near akin, if not to bacteria, at least to the virus of vaccine. The recent experiments of Crace-Calvert show that bacteria sustain a very high temperature without being killed; and on the other hand, Melsens in the 'Journal de Pharmacie et de Chimie' for September, 1870, shows that vaccine lymph retains its activity when exposed to the intense cold of 80° Centigrade. The low forms of life are often capable of resisting influences which, in the case of the most highly organized animals, would produce fatal results.

No doubt, chlorine, sulphurous acid, and some other of the so-called disinfectants, destroy bacteria and contagia; but in order to do this, they must be employed in much larger quantities than they have hitherto been used. *Strong* solutions of disinfectants, when mixed with liquids containing microzymes, kill these animalcules, and the germinal matter from which they are evolved; but gases appear to have comparatively little effect in destroying bacterium life.

The following directions for disinfection, issued to the medical officers of the army, will serve to illustrate the absurdity of the present methods of disinfection :—

"To fumigate a room 60 feet long, 20 wide, and 12 high,

1. Take common salt	4	ounces.
,, oxide of manganese	1	,,
,, sulphuric acid	1	,,
,, water	2	,,

"The water and acid to be mixed together, and then poured over the ingredients, in a delf basin, which should be placed in a pipkin of hot sand.

"With nitrous acid gas,

2. Take copper shavings	½	ounce.
,, nitric acid	1½	,,
,, water	1½	,,

"Pour the acid and water upon the copper, in a small jar.

"With sulphurous acid gas,

Burn two ounces of sulphur in a pipkin."

The complete disinfection of a room tainted with the poison of contagious disease can only be accomplished by the most thorough cleansing. The paper should be removed from the walls, and the latter scraped. The ceiling should be washed and whitewashed, the woodwork and floors should be scoured; all these detergent processes remove—probably without utterly destroying them —the contagious particles. The old-fashioned plan of simply whitewashing the walls and ceiling of a room, and washing the woodwork has much to commend it, and it is infinitely more efficacious than gaseous disinfection without liquid applications. If the whitewash does not kill the bacteria, it certainly imprisons them securely. The disinfection of the air of the room is best accomplished by a solution of chloride of lime, carbolic acid, chromic acid, chloralum, etc., applied in the form of spray; but this process is not likely to be generally adopted. A little chlorine may be generated in the room, and if it do no more than remove a bad odour, it will prove useful. As people cannot comfortably breathe in a room which has just been disinfected by sulphurous acid, or chlorine, they are obliged to open doors and windows, in order to admit the fresh air. In this way the use of disinfectants is to be commended, because it obliges people to ventilate their apartments. If solutions of disinfectants be applied to the walls and woodwork, they should be strong ones—say half a pound of chloride of lime to an imperial gallon of water. With respect to clothing and furniture, unless they can be treated with strong disinfecting solutions, or exposed to a temperature of 320° Fahr. for eight hours, it were better to destroy them by fire.

In the discussion that followed the reading of this paper—

Dr. Malachi Burke said he thought Dr. Cameron's paper one of great importance. He wished to refer to what had been recently stated by a distinguished member of the Public Health Committee of the Corporation, that a house or a room could be disinfected in two or three hours. If the work of disinfection could be done so rapidly, what were they to say to Dr. Cameron's paper? He wished to ask Dr. Cameron what time he would consider necessary for the disinfection of a house?

Dr. Grimshaw said the gentleman referred to by Dr. Burke stated that the Corporation disinfected clothing by heat in two hours, but Dr. Cameron said it would take at least eight to do it effectually. The process of disinfection was carried out by the officers of the Public Health Committee after this fashion. A man comes with a pint of chloride of lime in an old battered tin; he dilutes it with sulphuric acid, places it in a vessel in the middle of the room, shuts it up and leaves it there until the next morning. The usual course when he turned his back was for the owner of the room to throw the disinfectant out of the window. There were but two men at present employed by the Public Health Committee disinfecting the whole of Dublin, so that chemical disinfection, or disinfection by gas, was not fairly tested in that city; and it appeared that only one in thirty-five of all the houses reported as being infected by small-pox had been disinfected. The whole question that Dr. Cameron had discussed depended on a point which was by no means sufficiently determined; he did not believe it was proved that bacteria were the essential accompaniments of contagious disease, so that the killing or non-killing of those organisms could not be taken as a proof that disinfection had been effectually accomplished or not. So far as they knew at present, the only effective disinfectant was a high heat, and even more important were detergent measures. It was only recently it had been announced in Dublin that gas was a disinfectant. Formerly such a thing was never attempted as trying to purify a house by fumigation. The houses in which there had been contagious disease were all cleaned, scraped, and swept out. This was the plan pursued until the matter was taken up by the city authorities, and they seemed to have assumed that a small quantity of chlorine spread in a room would effect its purification.

Dr. Darby said that in the process of disinfection now employed they were using chemical agents to destroy they did not know what. He believed that plenty of soap and water and pure air were the best disinfectants. When small-pox appeared in the hospital under his care, he placed over the doors of the ward a curtain steeped in a solution of chloride of lime. He did not know that it did any harm, and he doubted whether it did any good; but he had great faith in fresh air and in cleanliness. The fact that these epidemics come suddenly, rise gradually to a maximum, and then decline was an argument against the germ theory. If that theory were true would not the epidemic continue to spread more extensively the greater the number of people suffering from the disease, and, therefore, the greater the likelihood of its being communicated to others?

Dr. Lyons rose to say a few words, rather to avoid being taken as concurring with many of the statements that had fallen from Dr. Cameron than as thinking they could enter profitably on the present occasion into a discussion of the many points he had raised. The basis of his paper seemed to be an assumption that the germs for the introduction of disease were different for different diseases, and that in the next place, those germs or microzymes had some close affinity, or relation to, if they were not identical with bacteria, vibriones, etc. He (Dr. Lyons) could not be taken as concurring in the idea that minute microscopic animalcules or vegetations were the germs or origin of any but a few and well-defined forms of cutaneous disease. He thought they were travelling in an entirely wrong direction in looking for the origin of epidemic disease in that quarter. He had himself an idea that diseased processes, however variable in their superficial manifestations, were, when viewed from a profound pathological point of view, more nearly allied, and much more closely similar in their essential conditions, than would be supposed from a superficial view of them. He had in his own mind the elements of a theory of disease, of which he was not yet prepared to produce the proofs in all their details, the principle of which was the unity of all diseased action in the body: that whereas, for instance, in cases of cerebro-spinal meningitis there was an especial manifestation of nervous power of one kind, there were other forms of disease, in which the activity of the nervous system was brought into play in a different manner, causing one class of eruption on the skin in one epidemic, and another kind of eruption in another epidemic. But that was a subject of too wide a range to be followed upon that occasion. He did not think Dr. Cameron had undertaken to say that the use of gaseous disinfectants would not to some extent destroy the supposed germ of disease, admitting, for argument's sake, that such germs did exist. What his paper had shown, as far as it had shown anything, was that by the use of very large quantities, and especially by potent solutions, of certain powerful agents, we could destroy the vitality of bacteria, or prevent their development. He (Dr. Lyons) for one was not prepared to admit that all diseases were propagated by contagion, that like generated like in disease, or that contagion would explain the development of all epidemic diseases. He doubted if, in the present condition of knowledge, any two persons in that room would agree as to what was, and what was not contagion, or what was to be accepted as the element of contagion in any given case, or, if admitted, how its action was to be explained. He might observe that he thought they were all too hard on the corporation of Dublin. How could that body undertake for the disinfection of a large city, to employ the thousands of tons of disinfecting agents which would be necessary on the basis of Dr. Cameron's calculation? In his opinion they were a long way off yet from having ascertained the true origin of any of the principal forms of epidemic diseases. His view was that they followed a certain course of development in cycles, and were to be explained by the destruction of a certain portion of nervous energy in the individual and in the population, and not so much as was ordinarily supposed by any form of contagion, in the sense in which that word had been hitherto employed so vaguely and so unscientifically.

The Chairman (Dr. Aquila Smith) thought Dr. Cameron had, to a great extent, established the object he had in view with respect to the action of disinfectants. He had shown that it required a much higher degree of concentration to destroy animalcules than had been heretofore considered necessary. He thought until they had something more tangible than they had as yet, they were not able to say that disease was propagated by germs, and that the study of the natural history of epidemics would throw more light on the subject The Metropolitan Sanitary Board of London requested returns to be made from all the vestries who employed people in cleaning the sewers, of the number of persons employed in that way, the age of those persons, the duration of their employment, and the cases of fever amongst them. 234 individuals were included in the returns. A great many of them had been engaged 17 years in that occupation, and the whole sum of the cases of fever amongst them was six. That struck him as a very remarkable event.

Dr. Cameron, in reply, said that all he could find in Dr. Grimshaw's remarks was that there was a something in contagion which heat destroyed. If that something were any of those abnormal conditions of the air, or loss of nervous energy, of which they had heard, he did not see how an increase of temperature or whitewashing could destroy it. There was a something which was capable of communicating disease from one individual to another; for there could be no doubt there was contagious matter in small-pox pustules, in farcy in the horse, in pleuro-pneumonia in the ox, and in vaccine, and we could produce any of those diseases by introducing a certain kind of morbid matter into the blood of an animal. This palpable matter could be reduced in an almost infinitesimal degree, and yet be capable of conveying disease. Any one who read Chauveau's experiments would see he clearly proved there were living particles in vaccine, and in the matter from sheep and ox pustules; if they were taken out of the fluid, it became non-contagious; but if left in it, it remained contagious. What could be a greater proof of the germ theory? Dr. Darby stated that lice assumed an epidemic form. Did not that go far to prove the germ theory? Surely Dr. Darby did not mean to say that where lice and itch became epidemic diseases, there was an actual creation of lice and acari? If he did not go to that extent, he must admit that those diseases could only be propagated from individual to individual. With regard to these diseases, they might be spread in a great many ways which appeared to be extraordinary and unaccountable; but when they carefully inquired into the mode by which the contagion was communicated, they were often able to penetrate the mystery. For example, the recent report of the Board of Health, in Victoria, gave an extraordinary instance of the spread of small-pox contagion by myriads of flies in a place where there was little or no communication with the districts in which the disease first appeared. It was found that the disease spread in the direction of the flight of myriads of flies that had previously tormented small-pox patients, and which carried from them the contagious matter, whatever it might be. Dr. Lyons, he knew, was not a strong contagionist, but he misunderstood one or two of his (Dr. Cameron's) experiments. He did not mean to say chlorine would not do some service. All he wanted to say was that unless used in very large quantities it did not destroy the lowest forms of life, and then he asked why did they use chlorine at all? Every physician who used chlorine must have had some foregone conclusion as to its effect? Surely it was not to produce a change in nervous energy; it must be to do some specific thing—that is to destroy contagion—

and could anything be more reasonable if contagion was to be found in the floating objects in a room? The germs of disease, or, at all events, bacteria, did not float in the room, and they were not destroyed by the quantities of the disinfectants ordinarily used. To destroy them larger quantities must be employed, and they should be, in great part, used in solution. He had dipped a brush in a strong solution of chloride of lime, and passed it over a glass on which there were bacteria, He then passed over this water, which had been previously heated to a high degree, and he found the bacteria were destroyed. As to what Dr. Smith had said about sewers, it establishes the theory of contagion. There was no other theory that afforded a satisfactory solution to immunity from epidemic diseases in certain cases. The immunity of the persons employed in cleaning the sewers merely showed that decomposing ordinary animal and vegetable matter, *per se*, would not produce zymotic disease. He knew a family in the country who persistently drank water that contained 20 grains of organic matter per gallon; it had even a bad odour, and it came from a well so situated that the drainage from the stable-yard and out-offices flowed into the shaft of the well. The family, as he had said, drank it continuously, and yet no contagious disease had ever broken out amongst them. Why? The water was impure, it had a bad smell, but the germs of disease were not there. Time was a great factor in disinfection. He found that the quantity of disinfectant matter applied in gaseous form which would not kill bacteria in a short time, would do so after a prolonged contact. They could not properly disinfect a house in less than twenty-four hours. No house in which a small-pox patient had died could be considered free from contagion until the walls were scraped and white-washed, and the place thoroughly swept out.

Parliamentary and Law Proceedings.

Alleged Adulteration of Butter.

At the Liverpool Police Court, on Wednesday, Dec. 18th, before Mr. Raffles, Edward Kelly and Co., provision dealers, Dawson Street, were summoned for selling "as unadulterated an article of food, to wit, butter," which was adulterated, contrary to the recent Adulteration of Food Act. The information was supported by Mr. Atkinson, deputy borough solicitor, and Mr. Segar, barrister (instructed by Mr. Yates), appeared for the defendant.

G. H. Robinson, an inspector of nuisances, stated that he went to defendants' premises on the 28th ult., and asked an assistant who was behind the counter to let him have a pound of 7*d*. butter. The assistant supplied him with the article, and received the money for it, after which witness told him that he was going to take it to the public analyst. He also informed Mr. Kelly of his intention, telling him that he could send somebody with him if he liked, but he did not do so. Witness then took the butter to Dr. Brown, the public analyst.

Inspector Fitzpatrick produced a certificate that he had received from Dr. Brown, and which referred to the butter bought by Robinson, at the defendants' shop. The document was as follows:—"This (the sample of butter) contains a quantity of stearin and palmatin; it is, therefore, largely adulterated by the admixture of fats containing these substances, the most common of which are lard, tallow, dripping, palm oil, and the fat from certain seeds. This adulteration is not necessarily injurious to health."

Dr. Brown was then called, and justified, in scientific terms, the conclusions at which he had arrived and stated in the certificate. He was of opinion that the fats mentioned had never passed through the udder of the cow or other animal, and that they were not the constituent parts of milk or butter.

Cross-examined by Mr. Segar: He said he could not deny that there was not naturally a certain kind of palmatin in butter, but he was quite confident that in the pure article there should be no stearin.

Mr. Raffles said he did not think that he ought to be called upon to judge of the scientific evidence. The question for him to decide was, whether there was a foreign substance in it which was not butter. Could Dr. Brown say that there was?

Dr. Brown: Certainly.

Mr. Segar subjected Dr. Brown to a long cross-examination, and elicited from the witness that he had not the slightest doubt that there were other fats in the butter analysed than those which passed through the udder. There were fats apparent which were largely used in the adulteration of butter.

Mr. Raffles: Does the admixture increase the bulk or weight of the butter?

Witness: It increases the bulk and weight.

By Mr. Segar: Would not assert that there was lard in the butter, but there was fat from the melting of the flesh of animals—pigs, sheep, or cows. There was a substance similar to palmatin in butter. It was, however, different from that which he found by his analysis. A scientific man could find the difference between stearin and palmatin in fats from butter and fats from the flesh of animals.

Mr. Raffles said it was necessary for Mr. Atkinson to show that the seller had a knowledge that the butter had been adulterated with intent fraudulently to increase its weight or bulk. The third section of the Act said, "Any person who shall sell any article of food, or drink, or any drug, knowing the same to have been mixed with any other substance, with intent fraudulently to increase its weight or bulk, and who shall not declare such admixture to any purchaser thereof, before delivering the same, shall be deemed to have sold an adulterated article under this Act."

Mr. Segar submitted there was no evidence at all with regard to the bulk or weight.

Mr. Atkinson said he did not propose to show that. He had shown by the second section, under which the proceedings were taken, that the article sold was adulterated, and that therefore an offence had been committed. The second section provided that "any person who shall sell any article of food or drink with which, to the knowledge of such person, any ingredient or material injurious to the health of persons eating or drinking such article has been mixed, and every person who shall sell as unadulterated any article of food or drink, or any drug which is adulterated shall, etc., pay a penalty of £20." He contended that the present information could be sustained, though it was not proved that the person selling the butter knew it to be adulterated.

Mr. Raffles felt that before he could convict, it must be proved that the person selling knew of the adulteration. No penalty was attached to the third section. He was, therefore, of opinion that the third section was intended as an interpretation of the other sections.

Mr. Atkinson submitted that it would be most unfortunate if his Worship's ruling was a correct one, as it would have the effect of repealing an Act passed for the protection of the public.

Mr. Raffles repeated that it must be shown that the seller knew of the adulteration. In the milk cases lately decided the adulteration was so apparent that the fact of adulteration must have been known to the sellers.

Mr. Atkinson thought that the onus of proof that there was no adulteration should rest with the seller. When a person sold an article, such as butter, he ought to know of what it was composed.

Mr. Segar said that the butter was Canadian butter, and Mr. Kelly could not therefore know what it contained. Moreover, they had an eminent analyst in court who would be able to demonstrate that the butter was beyond question pure.

Mr. Raffles said he must hold it necessary to prove that the seller had a knowledge of the adulteration. As this had not been shown the summons would be dismissed.

Mr. Atkinson said that under the circumstances he should withdraw seven other summonses.

Mr. Raffles, on the application of Mr. Atkinson, granted a case.

Mr. Segar applied for costs, but they were refused.

It will be seen that the defendant's version of the case was not heard, in consequence of the summons having been dismissed from want of evidence that the defendant was aware of the presence of an adulterant. The *Liverpool Courier* states that it has been supplied with the following list of quotations as to the component parts of butter, by Mr. Martin Murphy, analytical chemist, who would have given evidence as to the purity of the butter had the case gone on:—

Fownes' 'Handbook of Chemistry,' new edition, 1872, page 733, says, speaking of stearin and stearic acid, "It is found in the softer fats, such as butter of cows' milk, etc." Gmelin's 'Chemistry,' published by the Cavendish Society, vol. x., page 387, organic section, says, "Summer butter contains relatively larger proportions of olein; winter butter of stearin." Miller's 'Elements of Chemistry,' 4th edition, 1869, vol. iii. page 294, says, "Butter consists of a mixture of olein with several fats, amongst which palmatin is the principal solid constituent."

And Watts's 'Dictionary of Chemistry,' vol. i. 1863, article "Butter," says, "Ordinary butter, from cows' milk, is composed, according to Chevreul, of stearin, margarin, and olein, with small quantities of butyrin caproin and caprin, to which its odour is due. According to Heintz, it contains olein, a large quantity of palmatin, and a small quantity of stearin, etc."

From these statements, he says, it would appear that the components of butter are also those of lards and tallows, but in variable proportions. He doubts if the learned analyst could extract stearin from seed oils.

Alleged Adulteration of Milk.

At Worship Street, on Monday last, Mr. Job Mansfield, a cowkeeper, of Bethnal Green, attended, in answer to a summons charging him, under the Act lately passed, with selling adulterated milk. Mr. Fenton represented the defendant.

Edward Hutton, a dairyman, carrying on business in Mostyn Road, Old Ford, said that he had been in the habit of dealing with the defendant for milk, which he subsequently retailed to his customers. They had complained of the quality of the milk, and witness, in consequence, sent a sample, in the condition in which he received it from the defendant, to Dr. Sarvis, and another to Dr. Woodford, of Bethnal Green. He also saw the defendant upon the matter and showed him the milk, which he admitted to be "not very good." He then threatened to proceed against the defendant, who replied that he could not be fined £50, as clean water was not anything bad. Corroborative evidence was given. The wife and the son of the complainant said that on one occasion when his father spoke to the defendant about the milk, his reply was that there was nothing but clean water in it.

Dr. Sarvis deposed to testing the milk brought to him, which he found to contain one-fifth of water.

In defence the foreman to Mr. Mansfield was called. He said that on the day in question he was with the milk from the time it came from the barn till delivered to the defendant, and up to that time not a drain of water was put to it. His master supplied wholesale dealers, who, he believed, watered it. That was called "Simpson." In cross-examination he said that the milk was delivered to Mrs. Johnson in the dairy. He could not, of course, say if she watered it or not. There were seventy-five cows on the premises and several pumps. This witness subsequently contradicted his previous statement as to having noticed the milk on the morning in question.

James Horsley, a dairyman, said that he dealt with the defendant for milk, and served his customers, who, so far from complaining, generally praised the milk. Witness "generally" milked the cows for himself, and then added "Simpson" at discretion.

Dr. William Woodford, called by direction of the magistrate, said that he was one of the inspectors appointed by the parish of Bethnal Green under the Adulteration Act. The milk in question as brought to him had only water added to it—15 to 20 per cent. The average specific gravity of milk was 1030.

The magistrate said that there was not, in his opinion, sufficiently independent corroboration of the complainant's evidence to support this case, and therefore he dismissed the summons.—*Times*.

Action against a Chemist.

Liverpool Winter Assizes, December 20th.

(Before Mr. Justice Lush and a Special Jury.)

POWELL *v.* HINGSTON.

The plaintiff is a perfumer and hairdresser, and the defendant a chemist and druggist in Bold Street, Liverpool, and this action was brought for injuries suffered by the plaintiff in consequence of the defendant supplying him, as was alleged, negligently, with a bottle of nitric instead of sulphurous acid. It appeared that in April last the plaintiff had been ill, and was using, by the orders of his medical attendant, for a relaxed throat, an application of sulphurous acid, which was administered by means of a "spray." He was in the habit of getting the acid for the purpose at the defendant's shop, the prescription having been first sent to the defendant some time previously, and the bottle, having the label upon it, containing the words "poison" in print and "sulphurous acid" in the defendant's handwriting, having subsequently been refilled on several occasions. The bottle was a 2-oz. bottle. The plaintiff had also been in the habit of obtaining other substances at the defendant's shop both as medicines and for the purposes of his business, and, among others, nitric acid, used either as an ingredient of the ladies' hair dye called "auricomous," or for bleaching the hair before applying the dye. The plaintiff and his witnesses stated, however, that this description of acid was always obtained in a larger and wider bottle than a 2-oz. bottle—viz., a 6-oz. bottle, having the same description of label printed "poison," as the other, but with "nitric acid" written in the defendant's handwriting instead of "sulphurous acid." The plaintiff's case was, that on the 4th of April, a little girl took the smaller bottle used for the sulphurous acid, and having that label upon it, to the defendant's shop, and asked for "Sixpennyworth of this stuff; the name is on the label." The bottle was filled by the defendant himself, but with nitric, and not sulphurous, acid. When the nurse uncorked the bottle she was struck with the fumes that came from the acid, but reading "sulphurous acid" on the label, she was re-assured, and used it on the plaintiff's throat. He immediately shut his mouth, but the acid had gone into the throat and also on to the chin and face. The consequence was that the plaintiff was very much burnt, and he bears now permanent scars upon the mouth and chin, and suffers still acute pains when in a hot room or temperature. It appears that he is an amateur musician, and plays upon most wind instruments, and these injuries have considerably interfered with his ability to do so. The day after the accident Miss Edwards, the plaintiff's assistant, went to the defendant's shop for some magnesia for her master, and the defendant went back to the plaintiff's shop with her, where she showed him the bottle. He carried it away with him, and it has never been seen since. A chemist had been sent for, however, immediately on the happening of the accident, and he said that he looked at the label on the bottle, and, reading there "sulph." on that part of it which the acid had left unburnt, exclaimed, "Why this is nitric, and not sulphurous acid!" The defendant afterwards stated that he was very sorry for what had happened, and gave the plaintiff a £5 note in consideration of the injury.

The defendant's case was, not only that there was negligence on the plaintiff's own part sufficient to disentitle him to recover, but also that there was no negligence at all on the part of the defendant. He and his assistant and porter brought from his shop stated that the little girl brought a bottle with a label almost obliterated, and asked for "three or four pennyworth of the acid," and that the defendant ordered the porter to wash out the bottle and the assistant to fill it with nitric acid. He then wrote out a new label with "Nitric acid" upon it, and put it on the bottle, and giving the girl a caution about taking care of the acid, which would burn her, sent her off with it. When the defendant got the bottle from Miss Edwards the next day it still had the "nitric acid" label upon it, and the defendant produced it in court as having been in his possession ever since. This case was further supported by the evidence of the plaintiff's own medical attendant, Mr. Taylor, who was called in in the confusion immediately after the accident, and he stated that he then saw the bottle, and that it was labelled "nitric acid." On this point his evidence was in direct contradiction of that of the chemist, who also saw the label, and spoke to its containing "sulph." and Mr. Taylor was closely cross-examined as to a part he was accused of taking in attempting to compromise the case, and also as to his complaining that his bill had not been paid by the plaintiff, and threatening that he would not be able to give the same evidence in the case as if it were. He entirely denied these suggestions, however. With reference to the nurse's declaring that she had read "sulphurous acid" on the label, it was said that she was unable to read, and she certainly appeared unable to read letters put into her hand in the witness-box.

In consequence of the contradictory evidence on the two sides in this case it became invested with more than an ordinary amount of interest, and the learned counsel on both sides made most able and forcible speeches. In the result the jury found their verdict for the defendant. —*Times.*

Charge of Fraud against a Herbalist.

At the Hull Police-court, on Friday, December 20th, Henry Jackson was charged on remand with obtaining money under false pretences from John Richardson. The particulars of the former hearing were reported last week at p. 494. In his evidence the prosecutor stated that on his first visit the prisoner gave him a glass containing a liquid, and told him to blow through a tube into it. The liquid turned white, which prisoner said was a sign of bad health. This was repeated on subsequent visits, when the mixture did not turn so white, and the prisoner said it was a sign his blood was clearer. Prosecutor then described various other articles for which he had paid money on the representations of the prisoner, such as a box made of cedar of Lebanon, containing "Indian balsam" (for which he paid £27), "bread of life," Indian myrrh, spikenard ointment, two "Indian pulse glasses" (eight guineas per pair), galvanic fluid, elixir of life (eight guineas a bottle), sediment of gums 30*s.* a box), and a box (£50), containing, among other things, gold and silver pills, "extracted from the roots of trees in gold and silver mines."

The prisoner was again remanded.

Correspondence.

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

The Adulteration Act.

Sir,—It is only for the purpose of eliciting the sentiments of others interested in questions connected with the working of this Act that I venture to trespass on your kindness again, by giving insertion to this letter in your next issue.

I see in an article in Saturday's Journal you enumerate the appointments of analysts made under this Act in the different metropolitan districts, and that some of these have accepted the office with the fees for their sole remuneration. This fact, Sir, strikes me, as being so singular, that I am anxious to know what sort of an analysis is to be made for half-a-crown. As an example, take milk as one of the simplest that can come before an analyst. How far is the analysis to be carried? It cannot stop at the specific gravity. It must go to the proof of the adulteration or otherwise. And supposing a prosecution follows, who pays the attendance at Court of the poor recipient of a half-crown fee? Will he be expected to do that extra duty for the same exorbitant fee? Again, there is a strongly latent suspicion in the public mind that beer and wine are almost universally adulterated, therefore it is probable these may often be submitted for analysis. I shall be glad to know the chemist that could make such an analysis for half-a-guinea. Cheap labour cannot be good, more especially the highly skilled labour such as is required in making these examinations. The probability is, serious mistakes will be made, as was the case at Liverpool last week, and the office of analyst brought into contempt. It is one thing to know a subject by reading, and another to really know it by experience.

F. M. Rimmington.

Bradford, December 23rd, 1872.

Chemists as Analysts.

Sir,—Every one will agree with Mr. Rimmington that Mr. Haselden took a step in the right direction when he asserted the right of duly qualified chemists to be eligible candidates for the office of public analyst.

Up to the present time the chemist's efforts to raise his social position by means of a higher educational qualification has received no recognition; it ought not to be forgotten that the first steps taken were voluntary, and long before public opinion had made itself heard upon the subject. With regard to the office of analyst, I feel sure that there are few large towns but contain at least one man equal to the duties of the office; as to the future, let it once be known that the course is clear, and few students would neglect the requisite studies. I still adhere to my formerly expressed opinion, that the present state of the business does not justify the high standard of qualification now demanded unless those in authority have made up their minds to strain every nerve to render it more remunerative; that they can only do by securing dispensing for the legitimate dispenser, and in every way asserting the rights of those who have always shown themselves willing to meet the requirements of public opinion and make themselves worthy of the just reward they ask for.

Henry Lawrence.

Kensington, December 23rd, 1872.

Lady Students.

Sir,—I was much surprised to see by the report of the Council Meeting which appeared in your issue of December 7th, that Mr. Hampson's motion respecting the eligibility of lady students to compete for the sessional prizes was even made the subject of a discussion, and I do not at all understand on what grounds it can be contested after they have once been admitted to the lectures.

On page 169 of the Calendar for 1872, which, being published by the Council, I take to be a trustworthy authority on the regulations of the prizes, etc., we are informed that "At the expiration of the session a competitive examination of the students in each class is held, and the Council award medals and certificates of honour and merit to the successful candidates." Evidently all students attending the respective classes are equally eligible to compete for, and one would naturally suppose equally eligible to take, the prizes to which their answers may entitle them. The letter which appeared in the Journal of December 14th shows that the ladies now attending the lectures have their time quite as fully occupied as a large proportion of the other students; and (should the opposition of part of the Council continue) it would be only an act of courtesy on the part of the gentlemen to petition the Council to grant the ladies equal privileges with themselves—a step which would show that they are not afraid to meet them in competition, on what I believe to be all the ladies desire, viz., even terms. Hoping soon to see both sexes in possession of the same facilities for study in laboratory as well as lecture work.

EDWARD H. STOREY.

42, *Castle Street East, W.*

SALE OF DRUGS, ETC., BY GROCERS.

Sir,—In reply to your correspondent 'W. Metcalfe,' I would suggest that when he is prepared to set up branch shops with duly qualified managers in every village, then will be soon enough for shopkeepers to give up selling the drugs usually kept by them; such a law as he proposes would inflict great inconvenience upon the poor of agricultural districts, who are not able to drive ten or twelve miles to the nearest town, or keep supplies in the house. In most villages it is looked upon as a public convenience if the shopkeeper will hold a stock of medicines in common use, so that the people can get when they need them such things as aperient pills, tinct. rhubarb, etc. With an extensive acquaintance amongst country shopkeepers, I am quite sure that I am right in saying that they are wishful to avoid the sale of dangerous medicines, and that serious accidents at their hands are as rare as amongst surgeons and chemists. It would be wise to advocate to shopkeepers the sale of drugs ready put up in packets and bottles, duly labelled by the chemist. Let us carry out the Pharmacy Act thoroughly, but at the same time not be too ready to find fault with those who are outside the trade, remembering that accidents do take place with us as with outsiders, *e.g.*, see the letter preceding Mr. M.'s., where particulars are given of the use of liq. morphia instead of aqua pura. Speaking of poisons, it seems very desirable that there should be more uniformity about registering vermin killers. Some of us have done it for years, but are sometimes told by customers that they can get it at other chemists "without any bother." It is a good deal of trouble to all parties, but if unfortunately an accident should occur, the seller who had observed the law would be in a much better position before the public and the jury.

J. F.

November 30th, 1872.

UNUSUAL DOSES.

Sir,—As an amendment to the suggestion at page 473 I would propose that whenever an unusual dose is intended, the prescriber shall show that he knows the Pharmacopœia maximum dose, by placing that first and the excess after, both included in brackets under the ingredient referred to.

All doubt would then be removed. For example, take the following well-known prescription to hand this day:—

℞. Potass. Iodid. . . ʒ iv.
Ammon. Carb. . . ʒ j.
T. Cinchon. . . ʒ xij.
Julep. Camph. ad ℥ vj.

M. ft. mist. A tablespoonful for a dose in water as before.

We know that this dose may be far exceeded, but many an inexperienced though examined man might hesitate to give the full quantity of potassii iodidum. Then for the future let the top line be written as below. It would look neater (though not necessary) to convert it into an equation by placing the number of doses before the brackets to balance the total ordered. Thus:—

Potass. Iodid. . . . ʒ iv.
12 (gr. x + gr. x)

Another example which is more interesting in its way (the prescriber having intended to give two grain doses but ordered ten) was thus written:—

℞. Pulv. Opii . . . gr. xxx
Sapo Cast. . . . q.s.
M. ft. pil. vj. Capt. ij. p. r. n.

Now, no accident in this case need happen if the dose were interlined as I have proposed.

I would further suggest that a committee of physicians and pharmacists be appointed to consider this subject, a subject which affects their reputation as well as their patients' welfare.

Their attention should also be directed to the following:—

That the dispenser shall be justified in reducing to the Pharmacopœia maximum dose when that ordered is excessive and not interlined.

If the above suggestions were laid down as rules emanating from a properly constituted commission, the prescriber would secure the accurate dispensing of his unusual doses, the patient would gain a great safeguard, and the dispenser would have removed a serious responsibility.

H. SIMPSON.

Regent's Park, December 17th, 1872.

REMUNERATION OF ASSISTANTS.

Sir,—The suggestion thrown out by Mr. Lindley in your Journal of November 23rd would, if adopted, receive the earnest support of the great mass of assistants. Something must be done, for an assistant's life, as at present constituted, is one continuous round of slavery.

A more badly paid, harder worked set of men do not exist. If employers be not wise in time, they will have difficulty in obtaining assistants at all. Everybody leaves the business who can, and they do not fail to give advice to would-be future apprentices. I do not condemn employers wholesale, for I believe the majority would be favourably disposed to ameliorate the present state of things, and I agree with Mr. Courtenay, that many who give high salaries can barely afford it.

The proper remedy would be for employers to take the initiative, by coming to some common agreement to close their establishments at a given time, and,—if not advancing the price of medicines,—to charge one uniform price, thereby gaining the respect, instead of, as at present, the distrust of the community.

There unfortunately exists such an utter want of "understanding" between man and man—each jealous of his neighbour—as does not exist in any other trade going. That being the case, the only course I see open is for assistants to combine, form some such a society as Mr. Lindley suggests; and I have no doubt that it would not only result in benefit to themselves, but to employers, who, having one line of action to pursue, would establish a better feeling, resulting in one uniform scale of prices (or an advance), and a much greater reduction in the hours of labour.

EXCELSIOR.

December 2nd, 1872.

THE PUNGENCY OF WATERCRESS.

Sir,—I shall be glad if some of your botanical readers will give me some information as to the difference in flavour between two specimens of *Nasturtium officinale* which I recently collected. The first was gathered in a mountain stream, and in this I observed that the peculiar pungent flavour was particularly strong; the other grew in stagnant water on a plain, and in this the pungency was extremely delicate, in fact, hardly perceptible. This plain is several miles in extent, and the cress grows in the ditches which separate the fields; it is in close proximity to the sea, and in former years the tides overflowed a considerable portion of it.

It is well known that the flavour of watercress is much stronger during the winter months, but how are we to account for the difference in degree of pungency between these two specimens collected at the same time?

AN ASSOCIATE.

"*Spes.*"—(1) The books mentioned should be of great assistance to a beginner. (2) The British Pharmacopœia. (3) The certificate required will be to the effect that the person has been employed in the trade three years, but not necessarily to one person.

F. Parsons.—Suppository moulds may be made of many less expensive substances than gun-metal. See an article in PHARM. JOURN., vol. II. [1871] p. 26.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Broad, Bell, Smith, A. H. Mason, Gurnell, Benger, Dunn and Co., Sturton, Southwell, Shaw, Hutchinson, Macintosh, Reade, T. W. P., D. V. S. "Studens," *Liverpool Courier*, from Messrs. Clay and Abraham; *Liverpool Daily Post.*

THE EFFECT OF MANURES ON THE ALKALOIDAL YIELD OF CINCHONAS.

At the suggestion of Mr. Broughton, the Government Quinologist at the Ootacamund Plantation, the Government of India sanctioned some experiments being made with certain artificial manures, to ascertain if their application to cinchona-trees would increase the alkaloidal yield, and the results have recently been made the subject of a letter from the Revenue Department of Madras.*

For this purpose 12 cwt. of ammonic sulphate and 9 cwt. of Peruvian guano, both of good quality, were ordered from England. These manures were applied to trees of *Cinchona succirubra* and *C. officinalis* in quantities of 4 oz. to 1 lb.

Some fine three-year-old plants of *C. succirubra* were treated in November, 1869, in plots of fifty each, with 1 lb. of ammonic sulphate and the same quantity of guano, but no perceptible increase in luxuriance or rapidity of growth was noticed up to the month of January, 1872. At that time bark from manured and non-manured *succirubra* plants was submitted o analysis with the following percentage results:—

	Manured.	Unmanured.
Total alkaloids	7·25	4·89
Quinine	2·45	1·78
Cinchonidine and Cinchonine	4·80	3·11

This showing a gain by manuring of 2·36 of alkaloids, 0·67 consisting of quinine.

Trunk bark of trees manured with 1 lb. of guano gave the following results as against trees not so treated:—

	Manured.	Unmanured.
Total alkaloids	5·29	4·76
Quinine	0·91	1·04
Cinchonidine	4·38	3·72

This showed but an increase of 0·53 of total alkaloids, and the manured bark contained 0·13 less of quinine, owing possibly to the exciting action of the guano hastening the change through which, as *C. succirubra* grows older, it loses its alkaloidal yield.

From the results of these experiments Mr. Broughton does not recommend that *C. succirubra* should be manured, as the cost of manure would outweigh the small increased richness in the bark.

The *C. officinalis* has always been noted for its extreme sensitiveness to situation, sun-light and character of soil, and therefore Mr. Broughton was the more anxious to test the effect of manures on this species. Trees were therefore placed under the same conditions with regard to time of manuring; and the bark of trees treated with 1 lb. of guano, though differing in no respect while growing, gave the following results compared with the bark of unmanured trees—

	Manured.	Unmanured.
Total alkaloids	6·51	3·98
Pure quinine	4·41	2·40
Cinchonidine and cinchonine	2·10	1·58

Thus by this treatment showing a gain of 2·53, of which increase 2·01 was quinine. With other trees of the same species, treated with ¾ lb. ammonic sulphate, the results were as follows—

	Manured.	Unmanured.
Total alkaloids	5·76	4·54
Pure quinine	3·11	2·54
Cinchonidine and cinchonine	2·65	2·00

Thus showing an increase of 1·22, of which 0·57 was quinine.

During the period between 1867 and 1872, trees of *C. officinalis* were treated with about four barrowloads of farmyard manure each. In February, 1872, bark from trees so manured was analysed—

	Manured.	Unmanured.
Total alkaloids	7·49	4·68
Pure quinine	7·15	2·40
Cinchonidine and cinchonine	0·34	2·28

This analysis gives in favour of manuring 2·81 of total alkaloids; but the most remarkable fact is that it has favoured the production of quinine over cinchonidine and cinchonine, the total increase of quinine being no less than 4·75.

On these results Mr. Broughton remarks that stable or farmyard manure has somewhat of an advantage over the more artificial manures. The effect of these manures is only seen in analysis, as, during growth, no greater luxuriance is noticed in manured trees than in trees not so treated. These results appear to bear out Mr. Broughton's hypothesis, "that the alkaloids in the bark of the trees are not specially active constituents in the processes connected with the life and growth of the plant; and this supposition is supported by the circumstance that the increased amount of alkaloid produced by the manure caused no change in the appearance and rate of growth of the tree."

Mr. Broughton thinks these experiments to be so important that he has made application for further supplies of manure, and proposes that, if stable manure cannot be obtained in sufficient quantity, guano should be the manure used.

* Proceedings of the Madras Government Revenue Department, April 10th, 1872, No. 93.

STRIATED IPECACUANHAS.*

BY M. PLANCHON.

It is known that writers on materia medica designate under the name of "striated ipecacuanha" emetic roots which are distinguished from other sorts of ipecacuanha by the longitudinal striæ that mark their surface. This kind appeared to be perfectly characterized and its history cleared up, when some years since there appeared a memoir by M. Vogl† upon the ipecacuanhas in the pharmacological collection at Vienna. While comparing the species described in that memoir with those in the collection of M. Guibourt, it appeared to me that the same name had been attributed to different species. A striated ipecacuanha which I met with about the same time at the Pharmacie Centrale of M. Dorvault confirmed me in the opinion that this question was worthy of investigation, and I engaged several of our students successively to deal with it in their inaugural theses. M. Georges Durand,‡ in examining the structure of various kinds of ipecacuanhas, pointed out that the striated ipecacuanha of Vogl did not correspond in its anatomical characters to those of the sort so named in the Guibourt collection. M.

* Translated from the Journ. de Pharm. et de Chimie [4] xvi. p. 404.

† Vogl, 'Zeitschrift des oesterr. Apothekervereins;' Wiggers and Hüsemann, 'Jahresb. d. Pharmacognosie,' 1867, p. 64.

‡ 'Etude des différentes racines d'Ipécacuanha du Commerce' (Thèses de l'Ecole de Pharmacie de Paris, 1870).

Thénot*, *préparateur* of natural history in the School of Pharmacy, went further, and showed that in the collection of the school there existed in reality two species of striated ipecacuanha differing considerably in their anatomical characters. This result was afterwards confirmed by M. Charles Menier†, who passing in review all the true and false species of ipecacuanhas submitted them to a microscopical examination.

It thus appeared from these researches that under the name of striated ipecacuanha, writers have generally confounded two very distinct roots. It is to these species I therefore would wish to refer, in order to indicate their characters, investigate their botanical origin, and establish exactly their synonymy.

The two sorts are so different in their dimensions that they may be designated respectively the major and the minor striated ipecacuanha.

1. *The Major Striated Ipecacuanha.*—This ipecacuanha is met with in moderately long fragments, sometimes attaining a length of nine or ten centimetres. The diameter varies between five and nine millimetres. The fragments are sometimes rectilinear, sometimes sinuous, more rarely tortuous. At rather distant intervals they are marked by contractions or simply circular interstices. The whole of the surface is rather coarsely striated longitudinally. On the upper side the roots often bear the base of several stems, distinguishable by their much smoother surface. The colour of this ipecacuanha is a tawny grey, tending sometimes towards a reddish brown.

As in the other species of ipecacuanha, a section of this root reveals a cortical portion and a ligneous meditullium. The cortical portion is soft enough to allow of its being marked by the finger nail. It has a horny appearance, and is rather variable in colour, being sometimes whitish, and passing by shades of rose and violet to a violet black. Its thickness is relatively considerable, at least two-thirds of the radius, and it becomes still more so when the root is placed in water, which causes it to swell freely. The meditullium is of a yellowish white colour. The odour of the root is not very marked. The taste is scarcely nauseous, being sometimes insipid and frequently sweetish.

A microscopical examination of the cortical portion shows beneath five or six layers of tubular cells, with brownish walls, a parenchyma formed of large polygonal cells. These cells become smaller as they approach the ligneous meditullium; they become pretty regularly hexagonal, and form series radiating almost rectilinearly. They are entirely free from starch; a certain number of them contain bundles of raphides, and all are filled with an amorphous substance soluble in water, and capable of reducing cupropotassic solution. The ligneous meditullium consists of fibres with incrusted sides arranged in radiating series, between which are interposed vessels with very narrow openings, not exceeding the diameter of the ligneous fibres. It contains no trace of starch.

The salient characters resulting from this examination, and which may be regarded as distinctive from those of the second species of striated ipecacuanha, are (1) the complete absence of starch; (2) the relatively small diameter of the vessels of the meditullium; (3) the presence of a principle capable of reducing the cupro-potassic reagent. This matter exists in very great quantity in the cortical portion; a simple digestion in water giving a liquid with strongly reducing power, but which does not exercise a deviating influence on a ray of polarized light. This substance merits a closer study.*

The major striated ipecacuanha comes from New Granada. It contains but very little emetine; at least so it would appear from the analyses made by M. Dorvault, which confirmed those made by Professor Attfield,† who attributed to it two and a half per cent. of active principle.

2. *Minor Striated Ipecacuanha.* — This sort is distinguished from the former by its much smaller dimensions. It is in very short fragments, two or three centimetres or more. Some nearly cylindrical, scarcely constricted, are only two or three millimetres in diameter; others are narrowly fusiform; others again are formed of cylindrical or pyriform segments placed end to end; these are generally thicker and attain a diameter of five or six millimetres. The general colour is a grey brown, darker than that of the first sort. The longitudinal striæ are fine and regular. In a transverse section the cortical portion is as horny and the consistence closer than in the major kind. The meditullium is yellowish, marked with a great number of pores, visible with a glass.

The microscope shows in the cortical portion—(1) a first zone, formed of from seven to nine layers of very narrow tubular cells; (2) a thick parenchyma formed of cells with irregularly sinuous walls, filled with starch, and containing here and there bundles of raphides; (3) a liber zone, in a transverse section of which are seen narrow polygonal fibres and cells ranged in radiating series. The ligneous meditullium is distinguished immediately by the dimensions of the vessels, which give a porous appearance to this part, and which stand out distinctly by their size from the woody cells surrounding them.

The salient microscopic characters of this species are (1) the presence of starch; (2) the relative development of the liber zone; (3) the size of the vessels in the middle of the woody layer.

This sort of striated ipecacuanha contains a much larger proportion of emetine than the preceding: nine per cent., according to the analysis of Pelletier;‡ six and a half per cent. of pure emetine according to Attfield.§

It will be seen that the two preceding species are perfectly distinct in some of their anatomical characters. Let us try and complete their history, profiting by the data above given.

First, what is their botanical origin? It is known that writers on materia medica have referred the striated ipecacuanha to a New Granada plant, sent by Mutis to Linnæus, and described by him under the name of *Psychotria emetica.* Which of the two commercial kinds of striated ipecacuanha are obtained from this species? An examination of the roots ought to clear up this question. M. Triana, on the one hand, and M. Posada, on the other, have kindly furnished me with specimens of these roots,

* 'De la Cellule Végétale; de son importance au point de vue de la matière médicale' (Ibid. 1870).

† 'Des Ipécacuanhas' (Ibid. 1871).

* Professor Attfield has noticed the presence in this root of 5·39 per cent. of grape sugar, and 34 per cent. cane sugar, or of substances soluble in water and capable of being converted into sugar by boiling with an acid (PHARM. JOURN., second series, vol. XI. p. 141).

† *Loc. cit.*

‡ Journ. de Pharm., vol. vi. p. 261.

§ PHARM. JOURN. [2] vol. XI. p. 141.

taking from the living plant. These specimens, coming from different sources, have both the outward appearance and anatomical structure of the major striated ipecacuanha. So that in this respect the question is completely settled.

As to the origin of the second sort, I am obliged to remain in doubt. Its structure appears to differ too much from that of the roots of *Psychotria* to allow of its being referred to a species of the same genus. It presents anatomical characters approaching to those of the white or undulated ipecacuanha, which is referred to *Richardsonia scabra*, St. Hil.; and I should not be surprised if it were to a plant of this genus, or at least of a very near genus, that this commercial sort owes its origin. I incline the more to this opinion, since some specimens appear, as it were, intermediate between the minor striated ipecacuanha and the undulated ipecacuanha. I have in my possession some fragments sent to me by Mr. Hanbury, labelled "Spurious Ipecacuanha.—*Richardsonia scabra*." Now, the smallest of these fragments recall the minor striated ipecacuanha, whilst the larger approach more nearly undulated ipecacuanha. But, I will not dwell further upon a point which at present can only be matter for conjecture.

INDIAN OPIUM.

The eight monthly sales of Bengal opium for the past year and the seven months' duty on Madras opium have given to the Indian Government an actual revenue of 762,374 rs. more than the estimate of the budget. 25,500 chests of Behar and 16,500 chests of Benares opium are to be brought forward for sale by public auction in 1873. The sales will take place in the first week of every month, commencing with 6th January, and terminating the 4th December, At each sale 2125 chests of Behar opium will be offered, and 1375 chests of Benares opium—altogether 3500 chests at each sale. The opium will be ordinarily offered at an upset price of 800 rupees (£80 per chest), and sold to the highest bidder above that price.

THE DECOMPOSITION OF HYDRATE OF CHLORAL.*

BY M. BYASSON.

Former investigations of the author have led him to the conclusion that the physiological action of hydrate of chloral is not the same as that of chloroform introduced slowly into the system, but that it is the joint result of the chloroform and the formic acid produced under the influence of the alkalinity of the blood.† He has also shown that sulphuretted hydrogen combines with anhydrous chloral to form a sulphydrate analogous to the hydrate, and like it having soporific properties.‡

In the decomposition of oxalic acid by glycerine M. Byasson, by replacing the water by alcohol, has etherified directly the formic acid, and thus obtained formic ether by a new process. He was also induced to experiment whether hydrate of chloral, which contains the elements of chloroform and formic acid,

$$C_2HCl_3O, H_2O = CHCl_3 + CH_2O_2$$

could be decomposed into those two bodies without the intervention of alkalies. The following experiment, repeated several times, always yielded concordant results:—If hydrate of chloral be dissolved in five times its weight of syrupy glycerine, and the mixture heated in a retort furnished with a receiver, at about 110° C., a regular action is established which continues up to about 230°; at this temperature the glycerine is strongly coloured, and becomes thick, and it is advisable to stop the operation so as not to complicate the results. The product condensed in the receiver is liquid, and separates into two layers; the underneath layer consists of chloroform, the upper one contains formic acid, hydrochloric acid, formate of allyl, and hydrate of chloral dissolved in water. The proportion of chloroform produced as the mean of three operations, was 31 per cent. of the hydrate of chloral. The formation of the formate of allyl is secondary, as also that of the hydrochloric acid. These two bodies are relatively in small quantity, and proceed, the first from the decomposition of glycerine under the influence of heat and nascent formic acid; the second from the decomposition of chloroform. In order to obtain the above results it is important to use syrupy glycerine; if water be added, the greater part of the hydrate of chloral distils over without being decomposed.

* Abstracted from 'Comptes Rendus,' vol. lxxv. p. 1628.
† Pharm. Journ. [3] II. p. 484.
‡ Ibid. p. 1045.

THE KOMBÉ ARROW POISON (STROPHANTHUS) OF AFRICA.*

BY DR. THOMAS R. FRASER.

In nearly every narrative of exploration in uncivilized tropical regions, accounts are given, often no doubt somewhat fanciful, of poisonous substances which are said to possess the most remarkable properties. Usually these poisons are of vegetable origin; and the great majority may be included in the two divisions of ordeal and of arrow poisons, according as they are applied to one or other of these purposes. Among the most remarkable of the ordeal-poisons are the *Tanghinia venifera* of Madagascar, the *Physostigma venenosum* of Old Calabar, and the Akazga poison of the Gaboon; and of the arrow-poisons, the famous Curara or Wourali of South America, and the *Antiaris toxicaria* of Java.

The examination of these substances has not only proved of great value to physiology, but practical medicine has likewise been benefited—one of them, at least, being now an important medicinal agent.

In bringing before the Royal Society of Edinburgh a few of the results of a recent examination of a new arrow-poison, the author expressed his gratitude to the President to whom he was indebted for the specimens with which the experiments had been made. These specimens, consisting of a number of ripe follicles, were sent to Dr. Christison by Mr. Walker, and were collected in the expedition of the late Bishop Mackenzie.

Several specimens of the poison have likewise been sent to Professor Sharpey by Dr. Kirk, her Majesty's consul at Zanzibar. Dr. Kirk states "that the plant is a woody climber, growing in the forest, both of the valley and hills, and found at various places between the coast and the centre of the continent, above the Victoria Falls of the Zambesi. The stem is several inches in diameter, and rough outside. The plant climbs up the highest trees, and hangs from one to the other like a bush-vine. The flowers are of a pale yellow, and last for but a short

* Abstracted from an article in the 'Journal of Anatomy and Physiology,' vol. vii.

time during the months preceding the first rains of the season (October and November). The fruit is ripe in June, and collected by the natives, who separate the rough outer coat before drying it, preserving the more leathery inner covering and the seeds."*

Dr. Livingstone gives some interesting information regarding the poison in his 'Narrative of an Expedition to the Zambesi and its Tributaries.' He mentions that arrows poisoned with it are used for killing wild animals only; arrows destined for the more noble object of killing men being poisoned with the entrails of a small caterpillar. Dr. Livingstone says that in hunting, the natives follow the game with great perseverance and cunning: "The arrow, making no noise, the herd is followed until the poison takes effect, and the wounded animal falls out; it is then patiently watched till it drops; a portion of meat round the wound is cut away, and all the rest eaten" (p. 465).

Dr. Livingstone also says that the poisoned arrows are made in two pieces. "An iron barb is firmly fastened to one end of a small wand of wood, ten inches or a foot long, the other end of which, fined down to a long point, is nicely fitted, though not otherwise secured, in the hollow of the reed which forms the arrow-shaft. The wood immediately below the iron head is smeared with the poison. When the arrow is shot into an animal, the reed either falls to the ground at once, or is very soon brushed off by the bushes; but the iron barb and poisoned upper part of the wood remain in the wound. If made in one piece, the arrow would often be torn out, head and all, by the long shaft catching in the underwood, and striking against trees" (p. 466).†

It would appear that this arrow-poison is widely distributed over Africa, for it has been found not only at Kombé, on the west coast near the equator, and in the Manganja country, near the Zambesi at the south-east of Africa, but also in the Gaboon district,‡ in Guinea,§ and in Senegambia.|| In the Gaboon district it seems to be called Inée, Onaye, or Onage.**

The follicles examined by the author vary in length from about nine and three-fourths to about twelve and one-fourth inches, and in greatest thickness from about one inch to three-fourths of an inch, and they vary in weight from about 130 to 330 grains. They contain from 100 to 200 seeds, each of which weighs about half-a-grain, and has attached to it a beautiful comose appendix, placed on an extremely brittle stalk. At first, Professor Oliver, of Kew, to whom the plant was submitted for identification, referred it to *Strophanthus hispidus*, DC., natural order *Apocynaceæ*, but he was led, by a further examination of the botanical characters of the Kombé-poison plant, to doubt its identity with *S. hispidus;* and, accordingly, he has described it in the 'Icones Plantarum,' No. 4. 1870, under the name of *S. Kombé*.

When the seeds contained in the follicles are bruised and treated in a percolator with rectified spirit, a greenish-yellow tincture is obtained. By distilling off the greater part of the spirit, and drying the residue on a water-bath and in the exhausted receiver of an air-pump, an extract is procured which weighs about 25 per cent. of the seeds employed, has an intensely bitter taste, and contains about one-half of its weight of an inert fixed oil.* From this extract Dr. Fraser succeeded in separating a very powerful active principle, which he proposes should be named strophanthin.

The physiological action of this active principle is of the same character as that of the extract.

When a small dose (one-twentieth of a grain) of this extract is mixed with a few minims of water, and injected under the skin of a frog, no distinct symptom is seen until about half an hour, when the animal's movements become somewhat sluggish. Soon afterwards the respirations cease, some stiffness occurs in the thoracic extremities, reflex sensibility diminishes, some stiffness appears in the pelvic extremities, and in about two hours after the administration voluntary movements entirely cease, and strong galvanic irritation produces no effect, even when applied to exposed muscles and nerves. An examination of the heart shows that it is completely paralysed, the ventricle being pale and contracted, while the auricles are dark and distended.

As the result of many experiments under varying conditions, Dr. Fraser is of opinion that (1) Strophanthus acts primarily upon the heart, and produces, as the final result of this action, paralysis of that organ with permanence of the ventricular systole; (2) Pulmonary respiration continues in cold-blooded animals for several minutes after the heart is paralysed; (3) The striped muscles of the body are acted upon: twitches occur in them; their tonicity is exaggerated; and, finally, their functional activity is destroyed, the muscles being then hard, and, soon afterwards, acid in reaction; (4) The reflex function of the spinal-cord is suspended soon after the heart is paralysed; but the motor conductivity of the spinal-cord and of the nerve-trunks continues after the striped muscles of the body are paralysed; (5) The lymph-hearts of the frog continue to contract for many minutes after the blood-heart has been paralysed.

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* Extract from letter to Professor Sharpey, dated January 1st, 1864.

† Specimens of these arrows, which had been presented to Professor Maclagan by Dr. Kirk, were exhibited to the society.

‡ Pélikan, 'Archives Générales de Médecine,' Juillet, 1865, p. 115.

§ Van Hasselt, 'Archives Néerlandaises des Sciences,' vol. vii. 1872, p. 161.

|| Baillon, quoted by Polaillon and Carville, 'Archives de Physiologie,' No. 5, 1872, p. 526.

** Baillon, *loc. cit.*

* Microscopic examination shows that this extract contains a large number of acicular crystals; and when the fatty matters are removed from it by ether, a hygroscopic substance is obtained, which consist in great part of crystals.

THE HISTORY OF OZONE.†

BY PROFESSOR ODLING, F.R.S.

The most important points in the history of ozone are the following:—I. Its recognition as a distinct variety of matter or substance, by Schönbein in 1840. II. An inquiry into its nature, made by Marignac in 1845, whereby it was established that the action of ozone on various substances results simply in their oxidation. III. The evidence of different kinds, accumulated by many observers during a period extending from 1845 to 1863, that the matter of ozone is identical with the matter of oxygen. IV. The demonstration by Andrews and Tait in 1860, that ozone is a condensed form of oxygen. V. The recognition by Andrews and Tait in 1860, and interpretation by Odling in 1861, of the singular fact that, in certain cases, the removal of its constituent ozone from a mixture of ozone and oxygen is unattended by any alteration in the volume of the gas, notwithstanding the considerable oxidation effected by it. VI. The study of the quantitative reactions of ozone by Brodie in 1872; and his establishment of the relationship of ozone to ordinary oxygen, in corroboration of some less exact results obtained by Soret in 1865, as also of a suggestion made by the speaker in 1861.

I. Ozone was discovered by Schönbein, in 1840, when experimenting with the then newly-invented battery of Sir Wm. Grove,—an instrument still recognized as yielding a current superior, in respect of joint quantity and intensity, to the current yielded by any other electromotor available for general use. Ozone was recognized

† Paper read at the Royal Institution, Friday, June 7, 1872

by Schönbein successively, as a minute constituent of the oxygen gas resulting from the electrolysis of water effected by a current of high tension; as a minute constituent of air or oxygen through which electric discharges have taken place; and as a minute constituent of air in which moist phosphorus has been undergoing slow oxidation. To Schönbein then is due the great merit of recognizing ozone as a distinct form of matter, having an identity of its own by whatsoever means prepared—as also the merit of discovering the most important means for the production of ozone, and of establishing its principal properties and reactions.

The general properties of ozone are those of an active oxygenant. Thus, like chlorine and peroxide of nitrogen, it bleaches colouring matters, corrodes fabrics, tarnishes or otherwise attacks metals, and liberates iodine from iodide of potassium. Its special properties are its characteristic pungent odour, its destructibility by a moderate heat, and its non-manifestation of any aciduious reaction.

II. The nature of ozone was at first the subject of much speculation, Schönbein inclining to the view that it was a new elementary body, and a component of nitrogen. But in 1845, Marignac, in a series of most exact experiments, made partly in association with De la Rive, brought the question as to the nature of ozone within a very narrow compass. The experiments of these investigators, in which they established, among other points, that by exposure to the action of ozone, moist silver was converted simply into oxide of silver, and iodide of potassium into its oxidized form of iodate of potash, were susceptible only of one or other of two interpretations—either the interpretation which they themselves put on their results, that the matter of ozone is identical with the matter of oxygen—or, else the interpretation put on their results by Schönbein, that ozone is constituted of oxygen plus the elements of water, or in other words, that it is a peroxide of hydrogen. For a long time, experiment seemed quite incompetent to decide between these two views—opposite conclusions being arrived at almost alternately by the different investigators engaged on the inquiry. Corroboration, however, if any were needed, of the fact that ozone is really formed from oxygen itself with or without water, and not from any trace of nitrogen or other foreign matter that might possibly be present, was afforded by a remarkable experiment conducted by Fremy and Becquerel in 1853, being, indeed, the first recorded quantitative experiment made with ozone. By passing a long series of electric discharges through a given volume of oxygen standing over an aqueous solution of iodide of potassium, Messrs. Fremy and Becquerel succeeded in causing the whole of this oxygen to assume the form of ozone; as was shown by its ultimate complete absorption by the solution, with correlative liberation of iodine from the dissolved iodide of potassium.

The difficulty experienced in those early days of making out the real nature of ozone—of ascertaining whether it is a form of oxygen or a peroxide of hydrogen—depended mainly on the very small degree to which it was then possible to charge air or oxygen with the ozone to be examined, and on the necessity for the exclusive employment in the investigation of apparatus in which neither metal nor organic matter was present for the ozone to react with. The apparatus had consequently to be constructed entirely of glass, and all the junctions to be made before the blow-pipe or by grinding. Now-a-days, by improvements in the methods of conducting the processes of electrization and electrolysis, it is possible to charge oxygen with ozone in very considerable proportion; while by means of paraffin, a substance on which ozone is without recognizable action, junctions of the glass apparatus employed may be made and unmade with the greatest facility.

III. Assuming the ozone furnished by the three principal processes for its production to be one and the same substance, it was not until the year 1863 that the absolute freedom of ozone from any proportion of hydrogen was so definitely established as not to allow of any further question. In this year, Soret showed that although ozonized oxygen obtained by electrolysis, after having been desiccated as thoroughly as possible, frequently yielded some water as a product of its decomposition by heat, yet that when certain precautions were taken, and certain sources of error in the production and collection of the electrolytic oxygen were recognized and avoided, a uniformly negative result was obtained, and not a trace of moisture or other compound of hydrogen resulted from the decomposition by heat of the ozone present in the oxygen.

This conclusion of Soret's was confirmatory both of the previous result of Andrews with regard also to electrolytically obtained ozone, and of the yet earlier result of Schönbein himself with regard to the ozone obtained by the slow oxidation of moist phosphorus. For in opposition to the view enunciated first by himself, and in seeming discrepancy with the undoubted fact that for the production of ozone by means of phosphorus the presence of moisture is essential, Schönbein, in 1849, showed by repeated experiment, that when ordinary air in quantities of several hundred litres, ozonized as strongly as possible by its passage over moist phosphorus, was transmitted first through a desiccating tube, then through a tube heated to 400°, so as to effect the destruction of the ozone present, and finally through another desiccating tube to absorb any moisture that might result from the destruction of the ozone, this last desiccating tube did not show, by an increase of weight or other change, any absorption of moisture whatever, notwithstanding the largeness of the absolute quantity of ozone destroyed in the experiment. From this time forth, Schönbein abandoned the notion of hydrogen being a constituent of ozone; and while making a valid distinction between his own view and that of Marignac and De la Rive, admitted with them that the matter of ozone is identical with the matter of oxygen. These last-named investigators, in their research already referred to (1845), showed that perfectly dry oxygen, submitted to the influence of electric discharges, experienced an alteration of character, whereby it acquired the property of liberating iodine from moist iodide of potassium,—a result afterwards confirmed by Fremy and Becquerel. But they did not regard this alteration of character as due to the formation in small proportion of a new substance within the mass of oxygen, but rather to the assumption by the mass of oxygen of a peculiar electric condition. Moreover, the fact of dry oxygen being capable of some modification by the action of electric discharges, coupled with the fact of the inability of the so modified oxygen to act upon iodide of potassium save in the presence of water, was not inconsistent with the notion of this modified oxygen having to unite with water in order to produce a compound identical with the ozone obtained immediately from moist or watery reagents. That the effect of electrical discharges, and more particularly of the silent discharge, on perfectly dry oxygen, is really to convert a small proportion of this oxygen into ozone identical with that furnished by electrolysis, and capable of acting upon certain substances, as mercury and iodine, when in the dry state, and on certain other substances, as iodide of potassium and metallic silver, only when in the moist state, was first put beyond question by Andrews and Tait, in a research next to be considered.

IV. In the spring of 1860, Dr. Andrews and Prof. Tait made a joint communication to the Royal Society on the volumetric relations of ozone. The primary object of this research was to ascertain whether any, and if so what, alteration of volume took place in the conversion of a given quantity of oxygen into ozone. They thus attacked the problem from an entirely new point of view, and, with admirably direct pains and skill, succeeded in making probably the most important contribution hitherto made to an exact knowledge of the nature of the ozone. In their experiments, a quantity of perfectly pure and dry oxygen, contained in a straight glass tube with a pressure-gauge appendix, was ozonized by means of the silent electric discharge passed through the gas for some time. Coincidently with the passage of the silent discharge through it, the quantity of gas contained in the glass tube was observed to undergo a marked contraction in volume. This contraction proceeded at first rapidly, but afterwards more slowly, till it attained a limit which, in one of their experiments, was estimated at one-twelfth the original volume of the gas. And as whenever the gas, contracted in this manner, was examined, it was found to be proportionately ozonic, the general fact was established that the production of ozone from ordinary oxygen is attended with a contraction in volume. The converse result was also obtained. It was found that when oxygen, contracted by the passage of the electric discharge, was exposed for a short time to the temperature of 270°–300°, it was restored to its original volume. And as whenever the gas, re-expanded in this manner, was examined, it was found to be free from ozone, the general fact was established that the conversion of ozone into ordinary oxygen is attended with an expansion in volume. And this alternate contraction of a given quantity of oxygen by exposure to prolonged electrization, with production of ozone, and re-expansion of the gas to its original volume by exposure to a temporary heat, with destruction of ozone, could be repeated an indefinite number of times. Now the only possible conclusion to be drawn from these experiments would appear to be that, the matter of ozone being identical with the matter of oxygen, ozone is oxygen in a denser form,—that is to say, in the form of a more complex unit. Some years afterwards, this conclusion was confirmed in a very interesting manner by Professor Tyndall, in the case of ozone obtained electrolytically. He found that the absorptivity for radiant heat of electrolytically obtained oxygen, when rich in ozone, was upwards of a hundred times greater than that of ordinary oxygen—a result indicating ozone to have a more complex molecular constitution, and consequently a greater density, than ordinary oxygen. Moreover, after this same electrolytically obtained and richly ozonic oxygen had been subjected to the action of heat, so as to have its ozonic character destroyed, it then exhibited merely the absorptivity for heat of ordinary oxygen,—the observed absorptivity not going at all beyond that of ordinary oxygen, as would have been the case if the ozone originally present in the electrolytic gas had been decomposed into ordinary oxygen and aqueous vapour.

Referring to the statement already made, that in Messrs. Andrews and Tait's experiments, the oxygen gas, more or less contracted by the electric discharge, was found to be proportionately ozonic, this point was ascertained in the following way:—A small thin glass bulb, containing a solution of iodide of potassium, was introduced into the oxygen-holding tube, prior to its being filled with the gas, which, after having been more or less contracted by the process of electrization, was next submitted to the action of the solution, released on the breaking, effected by concussion, of the small bulb wherein it was contained. And on estimating the quantity of iodine set free from the iodide of potassium solution by its reaction with the contracted gas, it was found to be the exact chemical equivalent of a weight of oxygen equal in volume to the amount of contraction which the original gas had experienced during the process of electrization; so that if in the process of electrization, there had been one, two, or three cubic centimetres of contraction, the quantity of iodine liberated was chemically equivalent to the weight of one, two, or three cubic centimetres of oxygen; whence it results that to ascertain the iodine-titre of the ozonized gas is to learn the contraction of the original gas effected by its electrization, or the correlative expansion of the electrized gas effected by its exposure to heat. In the case also of electrolytically obtained ozonized oxygen, it was shown firstly by Andrews and Tait, and subsequently by Soret, that the iodine-titre of the gas is the measure of its expansion by heat, consequent on the conversion of its constituent ozone into ordinary oxygen.

V. It has just been remarked that in the action of the contracted gas on iodide of potassium solution, there is absorbed by the reagent, with equivalent liberation of iodine, a weight of oxygen corresponding to a volume equal to that of the original contraction; but very curiously, the absorption by the reagent of this weight of oxygen from the contracted gas was found by Messrs. Andrews and Tait not to produce any further contraction or alteration of its volume; or the weight of oxygen which acted on the iodide of potassium solution appeared to occupy no part of the volume of the contracted gas, its removal from the contracted gas by means of the reagent not affecting any alteration in that volume. Since this remarkable result was first announced by Messrs. Andrews and Tait in 1860, it has been abundantly confirmed by Von Babo and Claus, by Soret, and by Sir Benjamin Brodie—the modes of experimenting adopted in the original investigation of Andrews and Tait and in the three subsequent investigations, being all different from one another. And moreover, not only has the fact been established by the four several investigations with regard to iodide of potassium, but by one or other of the investigations with regard also to iodine, to mercurous salts, to ferrous salts, to arsenites, and to ferrocyanides. So that, when a given volume of ozonized oxygen is allowed to act upon these different oxidizable bodies, the oxidation effected by the ozone present in the gas is found to be unattended by any diminution in the volume of gas. An interpretation of this singular result was put forward by the speaker soon after the publication of Messrs. Andrews and Tait's experiments, to the following effect: Ozone being proved to be a condensed form of oxygen, it is clear that any volume of ozone will contain a greater weight of the matter of oxygen than is contained in the same volume of ordinary oxygen. And since in the action of ozone upon iodide of potassium, the volume of the reacting gas does not undergo any alteration, it is obvious that the oxidation effected must be effected by only so much of the matter of oxygen contained in the volume of ozone, as is in excess of the matter of oxygen contained in the same volume of ordinary oxygen. This interpretation, so far as it went, was considered to be demanded by Messrs. Andrews and Tait's experiments, as the only satisfactory explanation of them. With regard to the weight of the matter of oxygen contained in a given volume of ozone, in excess of the weight of the matter of oxygen contained in the same volume of ordinary oxygen, no data whatever existed to show what this weight really is. But relying upon the fact that the weight of oxygen contained in a standard volume of free oxygen is composed of two simple weights of the matter of oxygen, it was conjectured that the weight of oxygen contained in a standard volume of ozone might not improbably be constituted by an introduction into the standard volume of ordinary oxygen of another simple weight of oxygen—equal volumes of ozone, free oxygen, and nitric oxide, for example, being expressible by the comparable formulæ O_3, O_2, and NO respectively. In accordance with this supposition, the action of ozonized gas upon iodide of potassium, etc., is explicable as follows:—The ozone which acts is decomposed into a weight of free oxygen equal in volume to the volume of the ozone, and into another weight of absorbed oxygen, assumed to be one-half of the former weight. The suggestion as to the standard volume of ozone being constituted thus of three simple weights of the matter of oxygen, was admittedly not a necessary deduction from the then known facts, which were indeed equally consistent with its being constituted of four, five, or six such weights; it was only the suggestion of the simplest possible constitution for ozone that was consistent with the facts.

A few years afterwards, in 1865–66, the probability of this being the real constitution of ozone was much strengthened by the results of some experiments conducted by Soret. Operating by a process very simple and ingenious, but scarcely calculated to afford precise results, Soret found that when electrolytically-obtained ozonized oxygen was allowed to act upon oil of turpentine, the absorption of the ozone by the turpentine was attended by a diminution in the volume of the gas equal approximatively to twice the initial contraction,—as inferred, of course, from the iodine-titre of the ozonized gas, or from its permanent expansion after exposure to a temporary heat. Supposing the final diminution effected by the turpentine to have been exactly twice the initial contraction, inferred from the iodine-titre, it is clear that, while the original gas would have suffered altogether a diminution of three volumes, the ozonized gas would have suffered a diminution of only two volumes. Or there would have been ultimately abstracted from the original uncontracted gas three volumes of the matter of oxygen, occupying in the contracted or ozonized gas, submitted to the action of the turpentine, only the bulk of two volumes. But as a mean result of Soret's first set of five experiments, the final diminution effected by the turpentine was 2·40 times the original contraction; while, as a mean result of his second set of seven experiments, the final diminution was 1·81 times the original contraction. Assuming, however, ozone to have the constitution expressed by the symbol O_3, its specific gravity, and consequently its diffusion-velocity, would approximate closely to the specific gravity and diffusion-velocity of carbonic acid gas, CO_2; and in 1867, Soret, in corroboration of his previous absorption results, satisfied himself that the diffusion-velocity of ozone really does approximate very closely to that of carbonic acid.

VI. During the last few years, the quantitative reactions of ozone have been made the subject of an elaborate study by Sir Benjamin Brodie, whose results constitute indeed "a body of exact information as to the chemical properties of ozone, through which it may be hoped that this important question will be finally removed from the domain of arbitrary speculation and brought within the precincts of science." In Brodie's experiments, a quantity of pure perfectly dry oxygen, after having been submitted to electrization by its passage through a modified form of Siemens' induction tube, carefully maintained at a low temperature, was collected in an oil of vitriol gas-holder, to the amount of four or five thousand cubic centimetres. From the store of ozonized gas thus collected, which was found to maintain its proportion of ozone without appreciable deterioration for some hours, portion after portion was allowed to pass into a pipette of about 250 c. c. capacity, by displacement of the oil of vitriol originally filling it; and successive equal volumes of the store of ozonized gas so measured off, were submitted one after another to the action of the same or of different reagents, by the passage of each pipetteful of gas through a small bulb-tube containing the reagent in solution. The gas, freed from all ozone by its passage through the reagent, was next received into a mercurial measuring cylinder, in which it was expanded to a definite volume; and then, by reading off the pressure at which it occupied this volume, its proper volume was ascertained. Finally, the difference between the capacity of the pipette and the volume obtained in the mercurial cylinder showed the volume of the gas absorbed by the reagent,—the weight of this gas being determined directly or indirectly by titrations of the reagent. Of course, very many points of detail in the construction and use of the apparatus had to be attended to, in order to ensure trustworthy results; but, both in its principle and general working, the process is exceedingly simple. One essential novelty consists in the application of that very useful instrument, the pipette, to the purposes of gas analysis: and by its aid, results having a degree of accuracy far greater than those furnished by any previous method of ozone investigation, were found to be obtainable with both speed and facility.

Operating, then, with the apparatus just described, Brodie has succeeded in establishing three perfectly definite classes of ozone-reactions,—the first of them including the instances previously made known by Andrews and Tait. In this first class of reactions, of which there are several distinct varieties, the absorption or decomposition of the ozone present in a mixture of ozone and oxygen, is unattended by any diminution in the volume of the gas; or a volume of ozone O^2+x, is resolved into an equal volume of free oxygen, and an indefinite weight of other oxygen, either absorbed or set free. This class of reactions accordingly does not afford any information as to the value of x, or, in other words, as to the relationship of the formula O^2+x to the formula O^2.

$$\overbrace{O^2 + x = O^2}^{\text{Unit-Volumes.}} + x\,O \text{ absorbed.}$$

In a second class of reactions, the absorption or decomposition of the ozone present in a mixture of ozone and oxygen, is attended with a diminution in the volume of the gas, equal to half the volume that the weight of oxygen absorbed would occupy in the free state. In this class of reactions, then, one of but two occurrences must happen: either the ozone present in the mixture of gases, is absorbed wholly without decomposition, in which case the density of ozone must be twice that of ordinary oxygen, and the formula $O^2 + x$ become O^4; or the ozone present in the mixture is decomposed into half its volume of oxygen liberated, and into a quantity of oxygen, corresponding to its entire volume, absorbed; in which case the density of ozone must be one-and-a-half that of ordinary oxygen, and the formula $O^2 + x$ become O^3.

$$\overbrace{\begin{array}{r} O^2 + x = \text{nil} \\ 2\,(O^2 + x = O^2 \end{array}}^{\text{Unit-volumes}} \begin{array}{l} +\ 4\,O \\ +\ 4\,O \end{array}\Big\}\text{ absorbed.}$$

In a third class of reactions, the absorption or decomposition of the ozone present in a mixture of ozone and oxygen, is attended with a diminution in volume of the gas, equal to two-thirds the volume that the weight of oxygen absorbed would occupy in the free state; or the weight of the gas absorbed is to the weight of an equal volume of oxygen as 3 to 2. But consistently with this class of reactions, the density of ozone must necessarily be one-and-a-half times that of ordinary oxygen, and the formula $O^2 + x$ must become O^3.

$$\overbrace{(O^2 + x) = \text{nil}}^{\text{Unit-volumes.}} + 3\,O.$$

This last and most important class of reactions, by which the formula of ozone as O^3, is put beyond question, was established by a long series of experiments, made chiefly with a neutral or but slightly alkaline solution of hyposulphite of soda, and in a few cases with oil of turpentine. As a result, the ratio of the entire diminution in volume suffered by the original oxygen, to the diminution in volume of the electrized or contracted oxygen effected by the reagent, was found to be, as a mean of twenty-seven concordant experiments made with the hyposulphite, 3·02 to 2·02; and as a mean of eight concordant experiments made with the turpentine, also as 3·02 to 2·02. But neither with the hyposulphate nor with the turpentine, could the weight of oxygen absorbed by the reagent be determined, otherwise than by a calculation from the alteration in volume of the gas. A direct determination, however, was effected in the case of a few experiments made with protochloride of tin, under conditions carefully considered and regulated so as to ensure a trustworthy result. And it was found in these few experiments that the weight of the matter of oxygen absorbed from the ozonized gas by the tin-salt was almost exactly three times the weight of the matter of oxygen absorbed from the same gas by iodide of potassium,—the volume occupied by the weight of oxygen absorbed by the tin-salt being almost exactly twice the volume proper to the weight of oxygen absorbed by the iodide of potassium.

Independently of the importance attaching to the actual determination of the density of ozone, Sir B. Brodie's result has a further interest for chemists, which it would be difficult to exaggerate. The principal of the elementary bodies known to chemists in the gaseous or vaporous state, are hydrogen, chlorine and its congeners, oxygen, sulphur, nitrogen, phosphorus, arsenic, mercury, and cadmium. Now it is a fact that the weight of phosphorus or arsenic contained in any volume of phosphorus or arsenic vapour is four times the weight of phosphorus or arsenic contained in the same volume of phosphoretted or arsenetted hydrogen, and of a host of other phosphoretted or arsenetted gases or vapours. It is also a fact that the weight of hydrogen, chlorine, oxygen, or nitrogen contained in any volume of each of these elementary gases is twice the weight of hydrogen, chlorine, oxygen, or nitrogen contained in the same volume of a variety of hydrogenous, chlorinous, oxygenous, or nitrogenous compound gases. It is also a fact that the weight of mercury or cadmium contained in any volume of the vapour of either element, is identical with the weight of the element contained in the same volume of the vapour of all its hitherto examined volatile compounds. But now a variety of oxygen is shown to exist, the weight of any given volume of which is three times the weight of oxygen contained in the same volume of the simplest of oxygenous compounds respectively, thus:—

	Unit-volumes.		
P_4	O_3	O_2	Hg
PCl_3	CO	NO	$HgCl_2$.

The question, then, naturally arises, how long will it be before another variety of oxygen is recognized, the weight of any given volume of which, like that of a given volume of phosphorus vapour, shall furnish the weight of the element contained in four such volumes of its several simplest compounds? And again, how long will it be before yet another variety of oxygen is recognized, the weight of any given volume of which, like that of any given volume of mercury vapour, shall furnish but the weight of the element contained in the same volume of its several simplest compounds? There is the strongest indirect reason for believing in the existence of such a unitary oxygen. For in its reactions, oxygen behaves as a sort of more active electro-negative counterpart of electro-positive mercury Hg; and like mercury Hg, and unlike hydrogen H_2 and chlorine Cl_2, it enjoys the property of adding itself to a pre-formed unit of substance by an indivisible proportion.

THE ESTIMATION OF NITROGEN.*

BY L. KESSLER.

Experience has convinced the author that the soda-lime process for the estimation of nitrogen does not, with certain organic substances, give nearly the quantity which they contain, the error with cutaneous matters dissolved in sulphuric acid being sometimes more than fifty per cent. Even when operating volumetrically upon not more than one or two decigrams, carbides of hydrogen and volatile nitrogenous bodies are produced, which by their coloration, insolubility, and more or less feeble basicity, interfere with the ascertainment of the exact point of saturation. When calcination of the platinum salt, after washing with alcohol and ether, is adopted, the washings are nearly always turbid, and deposit incessantly platinum compounds which escape weighing. If it be considered, also, how easily gaseous ammonia is decomposed at a high temperature into its elements, it is surprising that in a process where the ammoniacal gases issuing from the reaction have to filter slowly through a long row of substances brought to a red heat, a greater loss does not take place. Such a want of exactness, the author considers, renders this method, nearly the only one at present adopted by commercial analysts, unsuited to be the basis upon which the manure trade should be carried on; since being founded upon the ultimate production of a compound (ammonia), itself decomposible under the conditions of the experiment, it does not present the characters of exactness usually found in elementary analysis.

With this conviction he has sought to simplify the processes for the measurement of nitrogen disengaged in a free state, employing by preference that of Dumas, by oxide of copper, except that instead of collecting the gases yielded by the combustion over mercury, he receives them in an india-rubber bag. This bag is formed of two disks of supple india-rubber, free from sulphur, one millimetre thick and from twelve to fifteen centimetres in diameter, joined together at the edges, and having issuing from one side an india-rubber tube of the same size as the delivery tube of the combustion apparatus, and from the other a glass tube graduated in cubic centimetres. The india-rubber tube is made to close with a small stop-cock or compresser.

For the examination of the carbonic acid gas used to sweep out the combustion tube, bags similarly made may be used, but without the graduated tube. The bag is filled with water, then emptied and closed under water. The delivery tube of the combustion apparatus is then introduced into the end of the india-rubber tube beyond the stop-cock, without lifting it out of the water. The stop-cock is opened quickly and the gas introduced. When the bag is full, the india-rubber tube is closed and the delivery tube removed; then, without bringing the opening of the tubing above the water, the end of a pipette filled with a solution of soda is thrust into it. The carbonic acid is absorbed, and by the volume of the residue it may be judged whether the air has been sufficiently removed from the combustion apparatus. In order to estimate this residue more conveniently, it may be transferred under water to a test tube.

When the air is considered to be sufficiently removed, the first-mentioned bag is attached in the same manner, first introducing into it fifteen to twenty grams of concentrated solution of caustic soda. If the bag be too much inflated, it should be agitated. M. Kessler prefers to keep the absorption apparatus under water to prevent the unnoticed escape of any gas. When no more gas is disengaged, the combustion tube is again swept out with carbonic acid gas, and the bag is removed, the india-rubber tubing being pinched progressively so as to drive into the bag any nitrogen present. After the removal the carbonic acid gas may be examined as before.

In measuring the nitrogen the bag should be shaken until the gas in the graduated tube no longer diminishes in volume. Then pinch the end of the flexible tube with the fingers, open the stop-cock, place the bag under water, keeping the graduated tube above the surface, and the caustic soda will run away. Lastly, bring the surfaces of the liquids, inside and outside, to the same level, and note the volume of nitrogen, the temperature of the water and pressure of the atmosphere.

If the quantity of nitrogen should exceed the capacity of the tube, or if it be desired to obtain a more exact measurement in a narrower tube, the gas should be transferred to another vessel before running off the soda. In this case the delivery tube should be carried to the top of the fresh graduated tube to prevent loss by absorption while passing through the water.

* 'Moniteur Scientifique Quesneville,' xiv. 343.

The Pharmaceutical Journal.

SATURDAY, JANUARY 4, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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1872.

THOUGH it is the business of a journal like this to have regard only to the more immediate present, it is allowable, in passing from one year to another, to deviate from ordinary routine by taking a review of the past, counting our gains and losses, and summarizing the events, the achievements, and the efforts that have marked the last page of our pharmaceutical history.

Another turn of the glass of time! Another convenient standpoint for a retrospect at the beaten paths, for taking stock of what has been accomplished, and determining whether it affords ground for congratulation, or gives reason for regret! Such a review of the pharmaceutical year just closed is here laid before our readers; and notwithstanding that outside "inversum contristat Aquarius annum," and inside there are still subjects of difficulty to be dealt with, we think that, on the whole, the body of pharmacists may take heart and go forward.

To speak first of matters concerning the Pharmaceutical Society. After the termination of the poison regulation contest, towards the end of 1871, attention was turned to the subject of education, and early in 1872 this became the principal topic of the year. Mr. SCHACHT having, in 1870, started a discussion as to the duty of the Pharmaceutical Society in relation to education, with a declaration that the scheme previously adopted by the Society for carrying out pharmaceutical education had "failed largely," and having afterwards followed up this subject in his address at the opening of the Session 1870–71, and at the Annual Meeting in 1871, it has since been dealt with by Messrs. REYNOLDS, BAYNES, RADLEY, PICKERING, and others, and the claims of the country members of the trade upon the Society's funds for the purpose of education have been fully as well as ably urged. But notwithstanding the statement that the country was fully roused upon the subject, Mr. MACKAY was able at the Annual Meeting of last year to illustrate the care requisite in dealing with this question, by pointing to numerous localities where means of education had been provided and where students were not forthcoming. Our pages have unfortunately afforded repeated evidences of this fact, and a signal instance of the kind was quoted only a fortnight since.

So long as this state of things prevails little reason can be shown for distributing the surplus funds of the Society among provincial associations to support the mere semblance of schools. The attention of pharmacists should rather be turned to that advancement *from within* which the President of the Pharmaceutical Conference did not hesitate to say might now be fairly expected of them. And—quoting from the same authority—lest the accumulation of surplus income might, contrary to the spirit of the Society's founder, represent "good left undone," there seems ample scope for its useful investment in science and intellectual wealth, by affording facilities for original investigation, or by establishing scholarships as suggested by Mr. EKIN.

As might have been expected, the general subject of pharmaceutical education in the provinces has been repeatedly under the consideration of the Council. In July, the Provincial Education Committee presented a Report recommending that the scheme drawn up by Mr. SCHACHT, and based upon the Government "Science and Art" system of "payment for results," should be, in principle, adopted. That scheme was referred back to the Committee for further consideration, and it was hoped that by its publication, suggestions from members throughout the country might be brought under the notice of the Committee. Though amongst the many who have responded to this appeal it might appear invidious to mention individuals, exception may be made concerning the paper of Professor REDWOOD—in justice to his experience—and the communication of Mr. RICHARD REYNOLDS as the exponent of a former scheme. We believe, however, the idea that it is the duty of the Pharmaceutical Society to originate or provide means for the Pharmaceutical education of the mass of the trade is now pretty well exploded; and the present outcome of the discussion may be summed up in the recent words of Mr. SCHACHT at Bristol, that "it would be unwise in the executive of the Pharmaceutical Society to adopt, at the present moment, any scheme whatever." From all that has been said and written on this subject there may, however, be gathered the recognition, more or less involuntary, of the fact that, although we are still destitute of any adequate educational system, the work of organizing such a system must be done by the pharmacists of the future rather than by the Society of the present day. The School of Pharmacy in Bloomsbury Square, though quite inadequate to meet the requirements even of those who are seeking education, may serve as a model and a guide in the attempt to carry out the idea of establishing centres of education throughout the country, and on that ground alone it should receive the most liberal support, rather than the almost envious appreciation we have lately seen conferred upon it.

Before it will be possible, however, to organize any thorough system of education, it will be necessary that there should be a more intimate connection between the Pharmaceutical Society and the trade generally. It is essential that the Society should become more strictly speaking representative than has been the case. This idea is embodied in the wish recently expressed at Glasgow by Mr. Betty, that the numbers of the Society would so increase that ere long at the Council election the last elected should receive more votes than those who stood highest at the late election.

But although this representative character of the Society is consistent with the spirit of the age, and eminently to be desired now that the Council is the executive in whom is vested the control of matters relating to all chemists and druggists, whether members or not, still the attainment of this character must be a work of time since the necessity for keeping in view the advancement of pharmacy must not be overlooked. We trust that the growth of the Society will never be merely in numbers, but that every accession to its ranks will be accompanied by a corresponding development of that earnest desire for improvement which led to the foundation of the Society when it was good for pharmacy that the few should rule rather than the many. We have indeed more than once expressed surprise that so many should still remain "outsiders;" but while we hear it seriously asked what a member of the Society can have for his subscription besides a Journal that might be borrowed, it is scarcely possible to avoid either the thought that representation might at present involve "levelling-down," or the hope that the selection of the Society's Executive may never be determined by a mob under the guidance of a few active demagogues.

As closely connected with the important subject of pharmaceutical education, we must also refer to the discussion on the examinations conducted by the Society for the purpose of ascertaining whether persons are qualified to perform the functions of a chemist and druggist, and fit to be registered as such. Early in the year, Mr. Siebold, in a lecture delivered before the Manchester Chemists and Druggists' Association, criticized somewhat severely the system adopted in carrying on these examinations, and his assertion that competent men were rejected attracted considerable notice. It seemed to be the general opinion that Mr. Siebold had been too sweeping in his statements, and likewise that some of the alterations suggested by him would not be improvements. The subsequent report of Dr. Greenhow, the Government visitor, did not bear out Mr. Siebold's views; and as regards the Minor examination, it was then stated that the failures—amounting to about one-third of the candidates—were obviously due either to defective early education, or to ignorance of the elements of chemistry, and inability to recognize the commonest drugs. Moreover it was suggested that, since three years had elapsed from the passing of the Pharmacy Act, it was time to commence a gradual raising of the standard of competence.

The large proportion of failures at the Preliminary examination in this, as in former years, still continues to furnish evidence of the low standard of education in the class from which apprentices have hitherto been drawn. At the commencement of the year we were able to illustrate the truth of this by showing that, in 1870, 220 out of 741 candidates failed; but that by the end of 1871, 120 out of the 220 had succeeded in passing upon presenting themselves a second time. It is satisfactory to note that there has been a great development of opinion in favour of the rule that a lad must pass this examination before he is received as an apprentice. This is a very promising feature, and we trust that ere long it may be generally recognized as indispensable. It is to be hoped, too, that with a superior class of apprentices, the kind of service to be required from them will be more generally consistent with the requirements of subsequent steps in their career than is sometimes the case, so that the disputes which we must refer to as certainly an unpleasant feature in our year's history will disappear from our legal reports, and that consistently with the suggestions of the President in his paper on "Pharmacy in the Laboratory," and of Professor Redwood in his speech at the Crystal Palace, there may be some gradual progress towards every druggist's shop being a fit school for apprentices to acquire a sound practical knowledge of the subjects essential for them.

At the Brighton meeting of the Pharmaceutical Conference attention was again directed to the examinations by Professor Attfield, who strongly urged the adoption of more stringent measures to meet the evils of "cram," and to prevent unqualified persons from passing the ordeal of examination, while Mr. Schweitzer advocated the plan of making the Minor examination compulsory for assistants, and the Major compulsory for all those in business for themselves or as managers.

Meanwhile, the Board of Examiners had not been unmindful of the necessity for progress, or of the propriety of gradually advancing the standard of competence originally adopted on the passing of the Pharmacy Act as barely sufficient to guarantee the safety of the public. As the result of its deliberations, a statement of amended regulations was submitted to the Council at the December meeting. These regulations were then discussed and adopted, October, 1874, being fixed as the time for their coming into force. The chief object they aim at is to ensure more thoroughly the practical skill of candidates in accordance with the opinion put forward in the reports of the Government

Pharmaceutical Society of Great Britain.

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JOHNSTON (J. F. W.), Chemistry and Geology.

Aide-Mémoire de Pharmacie. See FERRAND (E.).

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Analysis.
See FRESENIUS (C. R.), Qualitative Chemical.
SCHELLEN (H.), Spectrum.
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Arithmetic, Technical. See MERRIFIELD (C. W.).

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(*A.*), Annual; (*F.*), Fortnightly; (*H.*), Half-yearly; (*I.*), Irregularly; (*M.*), Monthly; (*Q.*), Quarterly; (*W.*), Weekly.

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Botanical Exchange Club. Report, etc. (*A.*)
Botanical Society of Edinburgh. Transactions. (*I.*)
British and Foreign Medico-Chirurgical Review. (*Q.*)
British Association for the Advancement of Science. Report. (*A.*)
British Journal of Dental Science. (*M.*)
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Calendars. (*A.*)
  Durham University.
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  Glasgow University.
  London University.
  University College, London.
  Pharmaceutical Society of Great Britain.
  Royal College of Surgeons of England.
Chemical News. (*W.*)
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Chemists' and Druggists' Diary and Pharmaceutical Text-book. (*A.*)
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Half-yearly Abstract of the Medical Sciences. (*H.*)
Hardwicke's Science Gossip. (*M.*)
Hospital Reports, etc. (*A.*)
  Guy's.
  St. Bartholomew's.
  St. Thomas's.
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Journal de Pharmacie d'Anvers. (*M.*)
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Pharmaceutical Society of Great Britain:—
  Calendar. (*A.*)
  Pharmaceutical Journal and Transactions. (*W.*)
  Registers of Pharmaceutical Chemists and Chemists and Druggists. (*A.*)
Philosophical Society of Glasgow. Proceedings. (*I.*)
Photographic Journal, Containing the Transactions of the Photographic Society. (*I.*)
Popular Science Review. (*Q.*)
Quarterly Journal of Microscopical Science. (*Q.*)
Royal Institution of Great Britain. Proceedings. (*I.*)
Royal Medical and Chirurgical Society of London:—
  Medico-Chirurgical Transactions. (*A.*)
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Société Botanique de France. Bulletin. (*I.*)
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Zoologist. (*M.*)

visitor, that "inasmuch as the increase of pharmaceutical skill is what will most conduce to the service of the public," a profounder acquaintance with practical chemistry should be required not only for the Major but also for the Minor examinations.

The wholesome and very reasonable provisions that candidates must have attained the age of twenty-one, and have been, as suggested by Mr. Barnard Proctor, practically engaged in pharmacy for three years before they can present themselves for the Minor examination, obviously lead in the same direction. To those who think this is demanding too much before admitting a person to be placed on the Register, and giving him the right to conduct business as a chemist and druggist on his own account, we would remark that it is a requirement by no means singular; for in a Pharmacy Act for New York, passed at the commencement of the year, it was provided that even "practising assistants" should be over eighteen years of age, and have had two years' experience, while in the Philadelphia Act, passed a little later, it was provided that no person who has not been apprenticed two years and attended one full course of lectures on chemistry, materia medica and pharmacy, is to dispense prescriptions—except as an aid under the immediate supervision of his employer or of a qualified assistant,—and that no proprietor is to leave his store in charge of any but a qualified assistant. This change will doubtless be distasteful to some of our "young friends" who have not contemplated the possibility that the standard of the examinations will be raised; but we hope and believe that as they grow older they will grow wiser upon this as well as other points, and will then confess that it has resulted in their permanent good.

Another matter of interest with respect to examinations has been the alteration in the regulations under which the Bell Memorial Scholarships are to be competed for after the award in 1873. With a view to make these scholarships an assistance to young men desirous of improving themselves in knowledge of their business rather than a reward for superior attainments, the Senior Scholarship is to be abolished, and both scholarships are to be equal. They are to be open only to "registered students or apprentices" who have been engaged for not less than three years in the pharmacy of a registered pharmaceutical chemist or chemist and druggist.

The examination fees have also furnished subject matter for discussion. On the one hand Messrs. Vizer and Carteighe have discussed the influence they exercise upon the numbers of persons passing on to the Major examination, and of those who ally themselves with the Pharmaceutical Society; while, on the other hand, Mr. Frazer and others have urged that the present examination fees are too high, and are therefore causing many young men to leave the trade. Certainly, the prospect of all the efforts on behalf of pharmaceutical education culminating in master pharmacists having to take down their own shutters is sufficiently terrible!

But we entertain no apprehension of such a result being caused by the Board of Examiners increasing its requirements; and as regards those who abandon the business rather than face the examinations and pay the fees connected with them, it is reasonable to believe that in the main the effect thus produced will be for the general benefit eventually, although for a while there may be among the number some few good men.

The attractions of other forms of business will hardly be resisted by the followers of pharmacy, unless the conditions under which it is practised are rendered much better than they have been and kept abreast of improvement in other pursuits. There is, perhaps, no way in which the Pharmaceutical Society can more effectually aid in this direction than by making the "compulsory" need for thorough education more generally appreciated and felt. With those who comprehend the problem of Pharmaceutical progress, it is natural to find that this principle is acted upon in preparing their sons for the business, as in Mr. Frazer's case, and that he should thus in practice offer the most cogent argument against the policy he has advocated at the Council table and in the pages of this Journal.

It has also been asked, with some force, on the part of assistants, whether it is expected that they will incur the expense of qualifying themselves and undergoing examination, unless there be something more tangible to look forward to in the way of remuneration than the mere raising of their status? To this question we believe the best answer will be a satisfactory reply to another one put by ourselves last March—"Shall not every dispenser of a prescription, and every person entrusted with the sale of poisons used as medicinal agents, whether master or servant, be bound to pass some examination before being allowed to do either of these acts?" As bearing on this point we may refer to the question raised as to whether the practice of pharmacy is a trade or a profession, for the purpose of repeating Mr. Brady's remark that until the pharmacist—like the lawyer or the physician—spends money and time upon his technical education as so much capital invested in business he will not have established his title to professional status or remuneration.

Place aux dames! If an additional spur be required by the aspiring pharmacist of the sterner sex, it will be found in the necessity for straining every nerve to run a level race with these new competitors under the championship of Mr. Hampson, who are entering upon the practice of Pharmacy.

In compliance with a request expressed in this Journal, the Council decided in January last that the library and reading-room should be opened on

Tuesday and Friday evenings from eight to ten o'clock. We believe that this privilege has been freely taken advantage of.

In Scotland, the North British Branch of the Pharmaceutical Society has acquired a definite recognition of its position in respect to the Parent Society, and a grant of money was made towards providing premises and a museum for the more convenient carrying out of the examinations. This step has been satisfactory to members north of the Tweed, and it will doubtless stimulate them to increased activity, not only in educational work, but also in the cultivation of pharmacy and the general improvement of the business.

The periodical meetings in connection with the Society have been held as usual. The Annual Meeting in May, was occupied at great length mainly with the subject of education; the Conversazione at South Kensington presented the now customary features of attraction, and at the meeting in October, to inaugurate the session of the School of Pharmacy and distribute prizes to the students of the previous session, a very instructive address to the students was delivered by Mr. W. W. Stoddart, of Bristol. The Evening Meetings have been, in regard to attendance and interest, fairly up to the average, though there is still much room for improvement. The Chemists' Ball was as successful as ever; and there was also the novel feature—connected with the visit of provincial members to the metropolis in May—of the first Annual Dinner of the Society at the Crystal Palace, when upwards of two hundred gentlemen connected with pharmacy met together with a mutual satisfaction which we hope will characterize many similar gatherings in the future. The meeting of the British Pharmaceutical Conference at Brighton, in August, was one of great interest to the trade, by reason of the important discussion which took place upon the education question. Several valuable papers on pharmaceutical subjects were also read there.

In deference to the expressed wish of a majority of the Society's members, the present Council decided at one of its earliest meetings that in view of the representative character of its deliberations, full reports of the proceedings at their meetings should be published in this Journal, and at present there does not appear to be any reason to regret that decision. While on the subject of the Journal, we take the opportunity of thanking those who have been kind enough to furnish us from time to time with papers containing reports of local occurrences; and at the same time of urging upon our readers, especially local secretaries, that they should immediately forward to us information respecting anything happening in their localities which is likely to be of general interest. We would go further, and say that were each pharmacist to contribute an account of such fresh experiences in practical pharmacy as came under his notice, our columns would be enriched with much valuable information.

The contributions to the Benevolent Fund have increased during the year, the last week of the year having been marked by the receipt of a legacy of £500, clear of duty, from the executors of the late Mrs. Lyon. The disbursements in annuities and grants during the year have amounted to £525 10s.

In order to carry out efficiently that important provision of the Pharmacy Act relating to the publication of a Register of Pharmaceutical Chemists and Chemists and Druggists, the section providing for the sending out of registered letters was acted upon; the result being that in October the Registrar published a list of upwards of one thousand names of persons who had failed to reply and a notice that they would be struck off the Register unless they communicated their proper addresses before the 31st December. Of this number, we understand that 660 have failed to comply with the requirements of the Act, and that their names will consequently be omitted from the Register now in the press for this year.

In respect to infringments of the Act relating to the sale of poisons, some complaints have been made, apparently upon the assumption that only the Pharmaceutical Society could prosecute for the sale of poisons by unqualified persons, and that the Executive was in this particular indifferent to its duties. Both these assumptions are incorrect, for any person is competent to prosecute who can prove a breach in the provisions of the Act; moreover, we are informed that while every case which has been brought under the notice of the executive of the Society has been attended to, it has, in several instances, been found, after considerable trouble and expense, that they would not bear the test of a prosecution. The position of widows under the Act has also been discussed and illustrated by what was claimed to be a particularly hard case. It was felt, however, that as the law had to be dealt with as it stood, the best way to meet the difficulty was for chemists and druggists to consider and act upon the actual terms of the Act; and with the object of securing that end several articles in this Journal were devoted to the subject. It may be remarked that the duties of Local Secretaries in respect to carrying out the Pharmacy Act, as well as in other matters, appear in some places to be imperfectly understood, and it would be well if some clear definition of them could be promulgated.

In May last, statistics were published in this Journal of the cases of accidental poisoning that had occurred since the passing of the Pharmacy Act in 1868. These statistics afford the best answer to, and take away all excuse for, the sensationalism and vague generalities upon the subject previously indulged in to some extent by the newspapers, and more especially by the medical press, which ought to have been better informed as to the real facts of the case. Since the publication of the statement referred to, we have reported 41 cases of poisoning by accident, suicide, or with intent, and among these two only were referrible to mistakes made by druggists either in the sale or dispensing of poisons, one of these being in part due to the want of precision in the terms of a prescription. We may, perhaps, be permitted therefore to congratulate our readers that there is still no evidence to establish the necessity for hanging a Chemist and Druggist believed in by the *Pall Mall Gazette*, nor any justification for the flagrant accusations of some of our medical contemporaries.

The numerous cases of death, accidental and otherwise, from poisoning by vermin killers, have directed attention to the conditions under which these are to be sold, and many communications have been published, showing that great and wide-spread uncertainty exists upon this point. The matter has recently been under the consideration of the Council, and, on the recommendation of the Parliamentary Committee, it was decided to add some explanatory words to the regulations, and to issue a revised copy of them, defining more clearly the manner in which poisonous vermin killers are to be dealt with.

We took occasion, some time since, to point out the inconsistency of the present rates charged upon the patent medicine licence, and to suggest that the equalization of all the rates to the higher sum of £2, or some approximation thereto, would be conducive to the interests of chemists and druggists. In the correspondence that followed the balance of opinion seemed to incline towards some such alteration.

It is a matter for congratulation that the persistent and energetic efforts of the advocates for the adoption of fewer hours of business have met with considerable recognition, and that this year more has been accomplished towards earlier closing and the avoidance of Sunday business by chemists and druggists than in any previous year. Still much more remains to be done, and it is to be hoped that the custom will become each year less exceptional.

The relations between medical men and chemists and druggists are so intimate, that it is extremely desirable every cause of misunderstanding between them should be removed. The practice adopted by some prescribers of using a peculiar nomenclature in order to secure to a particular chemist and druggist the dispensing of their prescripions has again been referred to, and the conduct of both parties to such an agreement denounced. But still more serious grievances result, on the one hand, from the practice of medical men keeping "open surgeries," and on the other hand from the cultivation of "counter prescribing" by some chemists and druggists. It was therefore satisfactory to find the *Lancet* recently declaring that it would "gladly see the entire surrender of medical dispensing as a practice, and would like to abandon the ordinary supply of medicines to the druggist, at the same time restraining him from prescribing." The confusion to which the present custom leads is amusingly illustrated by our contemporary, who, in sarcastically defining a "chemist" as a person who sells Epsom salts and has a shop window containing blue and green bottles, unconsciously propounded a definition that would include many persons on the Medical Register. Evidently the popular idea of the "doctor's" shop was for the moment lost sight of.

Amongst other matters connected with the trade which have been brought forward during the year may be mentioned the desirability of some improvement in the method of supplying medicines to seagoing vessels, and the claims of various deodorizers and disinfectants. Serious evasions of the law in reference to the sale of spirit have occurred, and extensive seizures were made in consequence. It is matter for regret that the subscriptions to the Betts' Suits Defence Fund have not yet amounted to sufficient to clear off the balance due for legal expenses.

The good feeling existing between the pharmacists of England and the United States was illustrated by courtesies interchanged at the meeting of the American Pharmaceutical Association, at Cleveland, Ohio, and no doubt the bond will be strengthened by the hearty response which was made in this country to the appeal on behalf of the Chicago College.

The Parliamentary measures affecting pharmacists have been few. Among these the Juries Bill and the Petroleum Bill stand over. This is also the case with greater part of the Public Health Bill. The Adulteration Act presents at least so much interest that it has raised an important question as to the office of public analyst, the discussion of which is too recent to need recapitulation.

Although original communications of chemical researches or on subjects of pharmaceutical interest have not been so numerous as might have been wished, some of great value have appeared in this Journal during the year. Messrs. Stoddart and Tucker's paper on the Tinctures and Wines of the Pharmacopœia has been followed by Mr. Umney's on the Specific Gravities of the Liquids of the B.P. Mr. C. H. Wood has dealt with the subject of metric weights and measures. Mr. Daniel Hanbury has thrown light on the origin of Calabrian Manna. Mr. Morson has described a new test for Creasote, and Mr. Williams has investigated Guaiacol. Mr. Ekin has found silver in preparations of bismuth. Mr. Moss has contributed a valuable paper on Antimonium Sulphuratum. Dr. Tilden has continued his researches upon Aloes. Mr. Treves has contributed an original note on the Odour of Gases. Mr. Schweitzer has given some useful instructions respecting Percolation. And last, but not least, there has been a valuable series of papers by Mr. Pocklington, on the Microscope. From America we have had valuable papers by Professor Parrish on Pharmaceutical Processes; Mr. Rother, on Emulsions; and Mr. Scheffer, on Pepsin and some of its compound preparations. From France we have had the Memoirs of Messrs. Duquesnel and Nativelle on Crystallized Aconitine and Digitaline respectively; and M. Lefort's exhaustive investigation into the distribution of Atropine in the Belladonna Plant.

"New remedies" must always be a phrase of interest to the pharmacist. Cundurango has rapidly declined in favour, and a recent report is very unfavourable as to its value in cancerous affections. Eucalyptus, Samadera Bark and Kokoon Bark, Koegoed, Boldo, Vandellia diffusa, Guarana, and Japanese Wax; Dugong Oil and Bullock's Blood; Xylol, Sulphydrate of Chloral, Sulphovinate of Soda, Monobromide of Camphor, Picrate of Ammonia, and Aconitine and Digitaline in a crystalline form, may be all classed under this category. Antiseptic pharmacy has also had its place in our pages. Phosphorus has recently received an unusual share of attention. Combinations of Oleic Acid with metals have also been recommended. Interesting and favourable reports have been published of the Cultivation of Cinchona in India, Jamaica and Java, and of Ipecacuanha in India; while another Indian-grown drug, Opium, has now to compete with that grown in China, Persia, Australia and the United States.

The death-roll of 1872 contains the names of many who were held in honour by pharmacists. Amongst these may be mentioned:—Edward Arnold of Norwich, H. Argles of Maidstone, Professor Blyth of Cork, John Cargill Brough, Dr. Day, Ernest T. Chapman, F. R. Garden, Dr. Gray, W. Huskisson, Joseph Kernot of Naples, Professor Le Canu of Paris, Sir J. Murray, Professor Parrish of Philadelphia, Reuben Payne, Mrs. Somerville, Dr. Welwitsch, and Dr. Wight.

Having now referred to all the more important incidents of the past twelve months, we must conclude by wishing our readers a prosperous new year, and expressing our hope that it may be marked by many indications of pharmaceutical progress,

MUSEUM, LIBRARY AND READING ROOM REGULATIONS OF THE NORTH BRITISH BRANCH.

The following regulations, which have been issued by the Council of the North British Branch of the Pharmaceutical Society, for the museum, library and reading-room in St. Giles Street, Edinburgh, may be of assistance in drawing up rules for similar institutions, projected or established, in other localities:—

1. The rooms are to be open every lawful day from 10 till 4, and from 6 till 10, excepting on Saturdays when the hours will be from 10 till 3.
2. No smoking to be allowed under any pretence whatever.
3. Season tickets for the removal of books to be had on personal application to the Secretary, 119, George Street.
4. In the meantime, and until further arrangements now in contemplation are carried out, no specimens are to be removed from the cases.
5. No publication lying on the reading-room table to be removed at any time, until such periodical be four weeks old, and then under the same conditions as if it were a book.
6. All books damaged or lost while on loan must be made good at the expense of the party responsible therefor.
7. Every volume to be returned to the library within a month, and in the event of no inquiry having been made, the party returning the book may retain possession of the volume on again entering it in the library book.
8. Any parties desiring books not in the library, will require to make application by entering the same in the want-book, which will be found on the library table.
9. All entering the rooms are requested to write their names in the visitors' book, and those receiving books must show their library ticket; and on getting the volume or volumes they wish, enter their own name, as well as that of the publication in the library book, which will be found in charge of the keeper of the rooms.

WOMEN AS PHARMACISTS.

The following notice concerning the employment of women in pharmacy is in the *Gazette Médicale de Paris*, for December 28th, 1872:—"After female doctors we shall have female pharmacists; the one necessitates the other, though we should have thought that the mistress of pharmacy would have preceded the doctoress. However that may be, the School of Industry for Women, established in Amsterdam in 1869, by the Society of Public Usefulness (*Société d'Utilitie Publique*), has already qualified five young women for the pharmaceutical profession, and is now engaged in educating seven others for the same vocation. Doubtless others will not be slow to follow this example. Already German societies, instituted to obtain means of existence for women, think of uniting to present to the Federal Council of the Empire a petition, praying that women should be authorized to follow the profession of pharmacist, or, at least, that of a dispenser. It seems that there is a complete dearth of dispensers in the little German towns, especially in the country. The new measure which is demanded should have the effect of obviating this state of things."

Dr. Corner, Medical Officer of Health for Mile End, has been appointed analyst for the district. Dr. Thorpe has been appointed analyst to the city of Glasgow. There is also a vacancy for an analyst for the Wandsworth district announced.

NOTICE.

In consequence of the adjournment of the Meeting of Council until January 8, the publication of the next Number of this Journal will be deferred until Saturday.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

January 1st, 1873.

MR. A. F. HASELDEN, F.L.S., PRESIDENT, IN THE CHAIR.

Present—Messrs. Betty, Hampson, Hills, Owen, Sandford, Urwick and Williams.

The minutes of the previous meeting were read and confirmed.

ADULTERATION OF FOOD, ETC., ACT.

The PRESIDENT reported that the Deputation had waited on Mr. Stansfeld, as requested at the last meeting of the Council. It was promised that the matter should be fully considered by the Local Government Board, but no answer had yet been received. An account of the interview appeared in the Journal of the 14th December.

The following letter from the Privy Council Office was read:—

"Medical Department of the Privy Council Office,
"4th December, 1872.

"Sir,—

"In answer to your letter of the 9th ultimo., submitting, on the part of the Council of the Pharmaceutical Society of Great Britian, for the approval of the Lords of Her Majesty's Council, the name of Mr. William Martindale, a Pharmaceutical Chemist in London, proposed to be appointed Examiner for the Society in the room of Mr. Augustus Bird, resigned, my Lords direct me to inform you that they approve of the appointment submitted to them.

"I am, Sir, your obedient servant,
"JOHN SIMON.

"The Secretary,
"Pharmaceutical Society of Great Britain,
"17, Bloomsbury Square."

The names of former members, associates and an apprentice who had paid their arrears and subscriptions for the current year, together with the fines, were respectively restored to their former status.

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

Collishaw, John ....Nottingham.
Edwards, David ....London.
Hanbury, Frederick Janson ..London.
Houghton, Robert William ..Bermuda.
Jones, David ....Rhyl.
Nuthall, Edwin ....Norwich.
Trist, Richard ....Plymouth.

ELECTIONS.

MEMBERS.

The following Pharmaceutical Chemists were elected Members of the Society:—

Daniel, Silas ....Ramsgate.
Dunkley, Edward...........Tunbridge Wells.
Forbes, William Thomas ....Reigate.
Johnson, Robert Allen ......Bayswater.
Metcalfe, Wilson ....Chelmsford.
Whitfield, Henry ....Worcester.

The following "Associate of the Society, before July, 1842," was elected a Member:—

Lawrence, Henry Job ......London.

ASSOCIATES.

The following having passed their respective examinations, and being in business, were elected "Associates in Business" of the Society:—

Minor.

Baker, William Ritchie ......Sidcup.
Betts, Samuel ....Oadby.
Gorrie, John P. ....Perth.
Graham, Alexander ....Lochgelly.
Lester, Henry ....Nuneaton.
Richards, James Griffiths ....Hastings.

Modified.

Bogle, Robert ....Heywood.
Calvert, Edwin Archer........London.
Done, Henry Thomas ....Birmingham.
Donston, William............Tottenham.
Hilton, William ....Whitefield.
Kermath, William Ramsay....St. Andrew's.
Wilson, Clement Fisher ......Stoke-on-Trent.

The following, having passed their respective examinations, were elected "Associates" of the Society, not in business:—

Minor.

Allen, Charles Bowen.........Penzance.
Almgill, John.................Bedale.
Cooper, Frederick Richard....Manchester.
Gordon, John ....Aberdeen.
Markham, William Charles....Bristol.
Mathie, William ....Edinburgh.
Nicholls, Theophilus..........Lower Mitcham.
Norweb, Arthur..............Nottingham.
Pickard, William ....Yeovil.
Rees, Joseph Henry Williams..Clutton.
Richardson, Edward..........Dresden.
Robertson, George...........London.
Samson, Ernest..............Bristol.
Shirley, Stephen Shillito......London.
Smith, Tenison ....Cambridge.
Sumner, John Joshua.........London.
Taylor, John James..........London.
Tully, John..................Brighton.
Weaver, Edwin Thomas......London.

Modified.

Clarkson, Thomas............Hartlepool.
Hughes, John Henry.........Holywell.
Jones, Owen ....Litherland.
Markham, John, jun. ....Reigate.
Stubbs, Thomas Shaw.........Bristol.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary Examination were admitted Apprentices or Students of the Society:—

Beringer, John Jacob ....Redruth.
Bond, Henry Greensill ......Portishead.
Cairns, John ....Kelso.
Clark, William Coltart ......Dalbeattie.
Daniel, John ....Ceibach.
Evans, John ....London.
Gardner, William............Barnard Castle.
Gibson James ....North Shields.
Graham, William Woodrow..Dalbeattie.
Hardwick, Stewart ....Sleaford.
Jeanes, George ....Alverthorpe
King, William ....Southend.
Knight, Alfred George ......Swansea.
Robertson, John ....Inverness.
Shepherd, John William......Settle.
Turner, William Spencer ....Hingham.
Umpleby, Samuel Sayer......Harrogate.
Weatherley, Richard John....Teignmouth.
White, Osmar Alfred ....Woolwich.
Whitwell, Ewen ....Peterborough.
Wilks, Maurice..............Leeds.
Williams, James Edward ....Louth.

Wills, George Sampson Valentine . . Hay.
Wolstenholme, John, jun. . . . . Bury.
Woodall, John Leigh . . . . Manchester.
Worringham, Edward . . . . Ipswich.

Benevolent Fund.

The Treasurer reported that he had received of the executors under the will of Mrs. Jane Lyon, late of 17A, Albert Terrace, Knightsbridge, the legacy of £500, bequeathed to the Benevolent Fund of the Society, free from duty.

Resolved—"That the Treasurer be requested to invest the said £500 in Consols to the account of the Benevolent Fund."

In reply to an inquiry the Secretary said that each of the executors of the testatrix would be entitled to five votes for life at each election of annuitants.

The Treasurer was also requested to pay the fourteen annuitants on the Benevolent Fund their quarter's annuities to Lady Day next.

Finance Committee.

The usual monthly report of the Finance Committee was read and received, and payments for rents, salaries, etc., ordered.

Adjournment of the Council.

It was moved by the President, seconded by the Treasurer, and resolved—

"That the Council do adjourn until Wednesday, January 8th, at 11 o'clock."

BENEVOLENT FUND.

Subscriptions, Donations, and Legacy Received During October, November and December, 1872.

SUBSCRIPTIONS.

London.

	£	s.	d.
Davenport, J. T., 33, Great Russell Street	2	2	0
Fowler, Stanley, 36, Elgin Crescent, W.	1	1	0
Hickman, William, Archer Street, Notting Hill, W.	0	10	6
Johnson, Robert, D., 59, Camberwell New Road	0	10	6
Pattison, George, 139, St. John Street Road, E.C.	1	1	0
Tippett, Benjamin, M., 3, Sloane Street	0	10	6
Turner, C. E., 63, Great Russell Street	0	10	6
Wood, Edward, 20, Sussex Street, S.W.	0	10	6
Wylde, George, 53, King's Road, Chelsea	0	10	6

Country.

	£	s.	d.
Bradford, Faull, John	1	1	0
Cheltenham, Fletcher, Francis	0	10	6
Forest Hill, Furze, Mrs. H.	0	10	6
,, Simpson, Thomas	0	5	0
Fowey, Wellington, J.	0	3	0
Glasgow, Jaap, John	0	10	6
Gloucester, Berry, Edward	0	5	0
Grantham, Welborn, George	0	2	6
Hull, Hudson, John	2	2	0
,, Grindall, William	0	5	0
Ipswich, Cornall, William	1	1	0
Liverpool, Coupland, Henry	1	1	0
Lydney, Smith, J. (representatives of)	0	10	6
Manchester, W. G. B.	1	1	0
,, Beard, James	1	1	0
Mansfield, Patterson, D. J.	0	5	0
Newcastle-on-Tyne, Wilson, J. H.	0	5	0
,, Watson, T. E.	0	10	0
Northampton, Negus, S.	0	10	0
Pensarn, near Abergele, J. H.	0	5	0
Portsmouth, Pasmore, George	0	10	6
Romford, Lasham, John W.	0	10	6
Rothesay, Macintosh, A.	0	5	0
Sunbury, Leare, J.	0	10	0
Tweedmouth, Mac Intyre, P. S.	0	5	0
Waltham Abbey, Marshall, James A.	1	1	0
Wandsworth, Bolton, H. N.	1	1	0
Wavertree, Hay, Thomas A.	0	10	6

Donation.

	£	s.	d.
Mumbray, R. G., Richmond, S.W.	0	10	6

Legacy.

	£	s.	d.
From the Executors under the Will of the late Mrs. Jane Lyon, of 17A, Albert Terrace, Knightsbridge	500	0	0

Provincial Transactions.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION.

An ordinary meeting was held in the class-room, 37, Blackfriars Street, on Thursday evening, December 12th; Mr. W. S. Brown, President, in the chair.

The following gentlemen were elected associates:—Messrs. Halliwell, Unsworth, Orton, Crowther, Lupton, Clegg, Drew, Hudson, Pollett, Chatwood, Lister, Bennett, Baynor, Mason and Walters.

Mr. J. T. Slugg, F.R.A.S., delivered a most interesting lecture on "Our Planet, its size, shape, weight, past history, and present condition."

A cordial vote of thanks to the lecturer, proposed by Mr. Hampson, of London, and seconded by Mr. Mumbray, was passed.

The Chairman then briefly explained the amended regulations of the Board of Examiners, and considerable discussion followed, Mr. Hampson and some others expressing their disapproval of the alterations.

Mr. Siebold thought that an attempt had been made to render the examinations more practical; the slight extension of chemical knowledge required was most desirable. He believed that to be any use to the pharmaceutical student, chemistry should be carried far enough to enable him to apply ordinary tests, and he had met with many young men who had passed the Major utterly unable to perform such operations. He hoped that this increase of science would be balanced by a corresponding decrease of mere "cram" subjects. He had before expressed his strong disapproval of what appeared to him objectionable in the examinations, and his opinions remained unchanged as to the utter uselessness of such knowledge as could be only crammed up for the occasion. He did not believe there was a pharmacist present, even of forty years' experience, who could remember the exact composition of all the compound powders, etc. of the Pharmacopœia. If such knowledge was not found necessary by heads of large establishments, why should it be required of students? He had observed for some time past, however, a growing inclination on the part of the examiners to ask candidates more difficult questions than formerly, often with a view of testing the soundness of their knowledge, and he believed that every effort was now made to exclude the unqualified man.

The next meeting will be held on Friday evening, January 17th, at 7.30, when a lecture will be delivered by Mr. Louis Siebold.

Proceedings of Scientific Societies.

PARIS SOCIÉTÉ DE PHARMACIE.

A meeting of this society was held on Wednesday, November 6th, under the presidency of M. Stanislas Martin. After some preliminary business, M. Roucher brought forward his proposition as to the collection of the materials necessary for an universal pharmacopœia. M. Roucher has been promised the assistance of many competent persons, and he asked that he might be charged with the labour requisite for carrying out this important project. It was decided to remit the consideration of his request to the committee previously nominated upon this question.

M. Poggiale presented a note from M. Dubois, pharmacien militaire, upon two new processes for the preparation of sulphovinate of soda. After the sulphovinic acid has been prepared by the ordinary process and allowed to cool, it is diluted with strong alcohol and saturated directly with purified carbonate of soda in powder. When this method is adopted no special precautions are necessary, since if too much carbonate of soda be added that salt is insoluble in the alcohol, and remains upon the filter with the sulphate of soda. As there is no elevation of temperature, the chance of loss is avoided. The whole is thrown upon a filter and the sulphate of soda is washed with a little alcohol. The liquid is then distilled and evaporated in a water-bath to crystallization. Should the crystals retain any of the colour of the mother-liquor, it is only necessary to redissolve them in water and evaporate to a density of 36° to 38° to obtain perfectly white crystals.

In a footnote the editors of the *Journal de Pharmacie et de Chimie* state that when sulphovinate of soda is prepared by saturating sulphovinic acid with carbonate of baryta, and decomposing the sulphovinate of baryta thus formed either by sulphate or carbonate of soda, it might happen that the whole of the sulphovinate of baryta was not decomposed, and then that dangerous salt would remain mixed with the sulphovinate of soda. M. Duquesnel has recently recommended that sulphovinate of soda should be carefully tested with dilute sulphuric acid for baryta; and with chloride of barium for carbonate of soda.

At the introductory meeting of the session of the School of Pharmacy, M. Bussy delivered an address to the students. He illustrated his advice to them to make the best use of their opportunities by referring to two illustrious men, Vauquelin and Parmentier, whose busts have recently been placed in the entrance hall.

Vauquelin, starting from the lowest position, as a laboratory boy in a provincial pharmacy, became by persevering labour one of the most distinguished chemists of his time; to him we are indebted for many discoveries important to science and industry, among which may be mentioned those of chromium and glucina. As a colleague of Fourcroy, professor at the School of Mines, at the Museum of Natural History, and the Faculty of Medicine, he formed part of the glorious constellation who, under the impulse of Lavoisier, laid the foundation of modern scientific chemistry. Named director of the School of Pharmacy at the time of its institution, he then became connected with the establishment in which he had left such pleasant memories. Many of those present, amongst them the speaker, could remember the inexhaustible kindness which was the principal trait and particular charm of his character.

Parmentier, like Vauquelin, commenced his career under the most unfavourable conditions; like him, too, starting from the modest laboratory of a provincial pharmacy, he attained by labour the highest positions and considerable fame. He is honoured particularly for the benefits he conferred upon France by his successful efforts to introduce the potato as an article of diet; efforts which have been recognized by the public in conferring upon it the name of *parmentière*. Parmentier occupied for a long time the highest post in the corps of military pharmaciens; but neither personal abnegation nor devotion to his duties prevented him from the cultivation of science, and by his merits he placed himself in the front ranks among such men as Bayen, Laubert, Boudet, Serullas, and Millon.

M. Bussy concluded with a reference to the death of M. le Canu, who was long a professor in the school.

Parliamentary and Law Proceedings.

The Charge of Fraud against a Herbalist.

On Saturday, Dec. 21, the hearing of this case was resumed. Dr. Munroe, who, with Dr. Walton, had made an analysis of a great part of the articles supplied to the prosecutor, said the glass into which Richardson was to blow through a tube contained a solution of lime. One of the glasses called by the prisoner "pulse glasses" was merely an air thermometer toy. The other tubes were of a similar character, and were not of Indian manufacture. The box stated by prisoner to be of cedar wood was merely stained deal. The bottles labelled for the "heart," "appetite," "rheumatism," "kidneys," "lungs," and "blood," contained a simple saline solution. There were about eight grains of chlorate of potash in each bottle. The "spikenard ointment" was cocoa-nut oil mixed with lard.

Cross-examined: Chlorate of potash was not a stimulant. It was a refrigerant, and was formerly thought to be a diuretic. It was thought that it gave oxygen to the blood, but that was a fallacy. Chiretta, which some of the "medicines" contained, was a nice tonic for a person who had a weak stomach.

Dr. Walton said that the eight-guinea bottle called "restorer of life" contained water with a little sulphuric acid. The contents of the bottle would not be worth 6*d*. The bottle itself would be worth about 2*d*. It was a tonic and astringent. The "sediment of gums" was only bay salt, and would be worth about 2*d*.

Cross-examined: Thought the solution of sulphuric acid might excite the appetite and promote digestion, and would be a proper thing to give to a man in a similar condition to that in which prosecutor said he was. In his analysis he found no trace of any tincture of buchu. The bottle said to contain myrrh no doubt did contain it. Myrrh had the reputation of being a stimulant-tonic.

Examination resumed: The "bread of life" was granulated effervescent magnesia. A smaller bottle labelled "The Indian Remedy" also contained water acidulated with sulphuric acid. The guinea bottle said to contain chiretta did contain diluted tincture. It would be worth about 3*d*.

Prisoner, who said it was very hard that he should have to neglect his business through other people's false statements, was further remanded.—*Eastern Morning News*.

Accidental Poisoning by Arsenic.

On Thursday, December 12th, an inquest was held at Kilgananagh, in the neighbourhood of Antrim, on the body of a woman named Margaret Carlisle, thirty-five years of age, wife of a respectable farmer of that place, whose death was caused under the following circumstances:—On the previous Tuesday deceased's husband had gone to the market at Antrim, where he was to have been joined by his wife, who shortly afterwards left home for that purpose. Previous to leaving, however, feeling not very well, she went to a drawer to get a little cream of tartar, which she occasionally took when she felt unwell, but in mistake she took half a teaspoonful of arsenic (a small quantity of which was in a paper in the same drawer), instead of the cream of tartar, and on reaching Antrim she became so ill that Dr. Taggart was sent for, but death put an end to her sufferings next morning. The jury returned a verdict "That the deceased died from the effects of poisoning by arsenic, which she had taken in mistake for cream of tartar."—*Belfast News Letter*.

VACANCIES AND APPOINTMENTS IN CONNECTION WITH PHARMACY.

The Editor will be glad to receive early notice of any vacancies of pharmaceutical offices connected with public institutions, and likewise of appointments that are made,—in order that they may be published regularly in the Journal.

APPOINTMENT.

Mr. Oswald A. Reade, pharmaceutical chemist, of Belfast, has been appointed Dispenser to Her Majesty's Naval Hospital at Ascension, with charge of stores.

VACANCIES.

Dispensers possessing the Major qualification of the Pharmaceutical Society are required for service in Her Majesty's hospitals. Particulars may be obtained at the Medical Department of the Navy, Admiralty, Somerset House.

Correspondence.

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

Local Secretaries.

Sir,—No decision has yet been arrived at by the Council on the notice of motion proposed by me a few months ago, and in the slight correspondence which has taken place on the subject my meaning seems to have been misunderstood.

The Preliminary examination cannot be carried on without some out-of-pocket expenses for stamps, blotting-paper, pens, ink, etc., a detailed account of which many would not trouble themselves to keep; and it occurred to me that without considering it at all in the light of a professional fee, a small sum per head might be allowed by the Society to cover these miscellaneous expenses.

I have not the slightest wish to press this particular form of compensation upon the local secretaries, but I feel sure that Mr. Hills, who proposed another way of doing it, wishes with myself that we could arrive at something satisfactory to those whose interests are concerned. Trusting that these few words may lead to a more general expression of opinion on the matter, I am, Sir, yours, etc.,

Francis Sutton.

Chemists as Analysts.

Sir,—We are admonished in the book which is recommended to us for the guidance of our lives not to "Render evil for evil or railing for railing, but contrariwise blessing." The rule is, perhaps, a hard one to practise at all times, but if we cannot always bless them that despitefully use us, we may pity the ignorance which dictates such conduct. These thoughts were forced upon my mind on reading the unreasonable and unfair article in the *Lancet* of the 21st ult., on the subject at the head of this letter. I am only surprised the writer restrained himself from calling us some other ugly names. He exercised no virtue by refraining, as he contemplated what he only from policy left undone. His own profession, of course, he assumes to be immaculate. The line of argument adopted by the writer is as absurd as if it had been proposed to recognize the eligibility of tailors and shoemakers. No one has ever suggested that all druggists (as he disparagingly chooses to designate us) were either qualified for such duties, or deserved such an appointment; and although "the dense and hopeless ignorance of Gwydyr House" may be impenetrable to the discernment of the *Lancet*, let us hope the higher qualities of justice, impartiality and reason, still hold sway in the councils of the Local Government Board, and that Mr. Stansfeld will have the moral courage to despise the senseless railing and meditated insults of such articles as have disgraced that publication.

An Analytical Chemist and Pharmacist.

December 30th, 1872.

The Adulteration of Food Act.

Sir,—It is satisfactory to learn that in the choice of persons desirous of filling the office of public analyst, the appointors are not pledged to favour the ranks of any particular profession.

I am ignorant as to the value of the appointment, but unless it be of sufficient importance to form an independent source of income, I venture to anticipate a weighty objection to the fitness of a pharmacist, in his quality of tradesman, sitting in judgment on the wares of his fellow-shopkeepers.

The man who undertakes the delicate and responsible task of analyst under the new Adulteration Act ought to be far removed from the petty influences and prejudices of ordinary commercial life.

The argument is, I think, so evident that I need not follow the subject.

Walter A. Powell.

Castle Street, Swansea.

Sir,—The columns of the Journal have been for some time past pretty fully occupied in discussing the claims of rival parties—medical and pharmaceutical—for the appointment of public analysts under the recent Adulteration Act. I have no intention of entering upon the subject at any length, but I cannot, in passing, refrain from expressing my sympathy with the pharmaceutical body in this somewhat vexed question. There is, however, a difficulty in their way which I have never yet seen provided for. Drugs come as much under the Act as food. Let us suppose that any of my brethren in business succeeded in getting this *very lucrative* analytical appointment, and that it should so happen that the medicine which he himself dispensed or sold was suspected. What is to be done? I fear the community would hardly be content with his analysis—however accurate—in such a case.

If proper remuneration were held out, the appointment might become a valuable one; for besides food, drink and drugs, in many agricultural districts in Scotland and England vast quantities of mineral manures are now used every year. These, and others which might be named, would properly enough come within the province of the public analyst, and would, I believe, form the most lucrative source of revenue under the appointment. We have among us not a few men highly competent for the situation; but in order to secure thorough confidence, the party holding such an appointment should not, in my humble opinion, have connection with any branch of trade coming under the operation of the Act.

The same remarks, of course, would apply to medical men who hold a direct or indirect interest in drug shops.

Wm. Robertson.

Clydesdale Buildings, Elgin,
December 30th, 1872.

Sir,—In reference to the question that was raised in this Journal whether ph rmaceutical chemists are eligible as analysts under this Act, it seems to have been settled that, if otherwise qualified, they are thus eligible.

Some have thought that members of our body might probably become candidates for the appointment, but I think a very little consideration would show that such a course is by no means desirable for the following reasons:—

1st. The very wide qualification required under the Act, viz., competent medical, microscopical, and chemical knowledge would exclude with very rare exceptions the whole of our body from the field.

2nd. It seems most improper that any person engaged in trade should be empowered to set in motion a prosecution against his compeers, perhaps rivals in business; how impartial soever such an analyst might be, his reports would on this ground be always open to suspicion and dispute.

3rd. The Act, as I understand it, imposes an indefinite amount of work for a fixed annual remuneration, and it is quite possible that in large towns the whole time of the analyst might be required for his official duties, thus compelling him, if a pharmaceutical chemist, to give up his ordinary business. In the district where I reside, the authorities propose to remunerate the analyst by the munificent salary of £100 per annum. I need hardly say that not many pharmacists, competent or otherwise, will be taken with this bait.

Seeing that the Act requires medical, microscopical and chemical knowledge embodied in the same individual, I will venture to say that very few of the medical profession could fairly and conscientiously undertake the duties. It must be remembered that questions of a difficult character may frequently arise which cannot be conclusively solved by such a smattering of chemistry or medicine as may be picked up by a six months' attendance on lectures on the respective sciences, and herein lies a great danger to the public—really able and competent men will hold aloof, and pretentious sciolists get the appointments. Now, of all the impostors who have deceived the public, perhaps the worst are some of these pseudo-scientific men who have puffed themselves into a cheap notoriety by playing on the credulity and the fears of the ignorant with respect to the adulteration of food, etc., and some other sanitary questions.

The Act, although it imposes severe penalties for selling adulterated food or drugs, provides none for selling adulterated science; and as it is not to be expected that the local authorities can fairly estimate the qualifications of candidates for the office, I tremble to think of the danger to property and reputation to which the trading community will be liable in the hands of some "scientific" analysts who are sure to come to the surface. I would suggest that pharmacists might, with great advantage to the public, occupy a little time in testing the analysts who may be appointed. Every chemist knows that an accurate separation of vegetable and animal products as found in commerce into their proximate constituents is tedious, difficult, and in many cases impossible, but there are men who profess to be able to analyse anything and everything; let some organic substance, either known to be genuine, or mixed in known proportions, be submitted to some of the analysts for their examination and report, and they may thus be made to appear in their true colours.

Evidence internal and external might be adduced to show that the Act, if not originated, was yet greatly coloured by an interested and noisy clique operating on the credulity and practical ignorance of the legislature. I will venture to predict that it will become a dead letter, a fate which has already befallen the Arsenic Act, and will at no very distant period overtake Clause 17 of the Pharmacy Act.

A Pharmaceutical Chemist.

[*⁎* In publishing the foregoing letters, we must remark that some of the opinions expressed are based upon erroneous reading of the Act, and that some of the arguments they contain have already been dealt with in last week's Journal.—Ed. Pharm. Journ.]

Milk Testing.

In the article on "Cows' Milk and the Best Methods of Detecting its Adulteration," by Mr. Charles Ekin, in last week's issue of the Pharm. Journ., it is stated that cows' milk is a slightly alkaline liquid. I have examined several samples of cows' milk and have always found a slightly acid reaction. According to Dr. Parkes, an alkaline reaction indicates either that the cow is diseased, that there is much colostrum, or that carbonate of soda has been added.

The system of estimating the richness of genuine milk by the amount of solids may be of value, but in cases of adulteration with chalk, starch, etc., the result would be far from satisfactory.

The estimation of fat by ether is a very delicate process, and I think the lactoscope of Vogel is preferable, a description of which may be found in Parkes' 'Manual of Hygiene.'

The cream may be estimated by allowing the milk to stand 24 hours in a glass tube graduated into 100 parts; the percentage can at once be read off. Any deposit should be examined with the microscope for starch or epithelium; chalk, etc. should be tested for in the usual way.

With regard to the estimation of water by specific gravity: on Saturday last I obtained a sample of pure milk, sp. gr. 1031, at 60° Fah., and when this was mixed with water, I obtained the following results:—

10	per cent. of water gave a sp. gr. of			1027	at 60° Fah.
20	„	„	„	1024	„
30	„	„	„	1022	„
40	„	„	„	1020	„
50	„	„	„	1018	„

Charles H. Southwell.

The Edinburgh Chemists' Assistants' Association.

Sir,—In the number for December 21st, there appeared from some one subscribing himself 'An Edinburgh Assistant,' what must be considered as an impotent attempt to throw discredit, and a want of sincerity upon the committee entrusted in following up and carrying out the "suggestion" made at a meeting last April, viz., the necessity of the Edinburgh chemists' assistants forming themselves into a literary, etc. association. The following, I trust, will be sufficient to remove such imputation, that the committee has either been unfaithful, or wanting in zeal towards their commission, in having allowed matters to drift to such a termination as stated by your correspondent."

At a meeting of committee held on the evening of Dec. 6th, in the rooms kindly furnished by the Council of the North British Branch of the Pharmaceutical Society, the majority at once agreed to act as office-bearers for the present unavoidably short session. Rules were drawn up, duly passed into the printer's hands (a copy of which is herewith enclosed), and it is now the pleasing duty of the committee to announce that the President will deliver the introductory address to the Edinburgh Chemists' Assistants' Association, on the evening of Friday, 3d January, 1873, regarding which due intimation will be given.

Further, I would remark that at the close of the present session office-bearers will be elected, in accordance with the rules, from the members of the association, so that all will be on an equal footing, in being eligible for honours; indeed such should and would have been the case at present, but it being only two or three weeks since possession of the rooms was obtained, it was thought the sooner we got set to work the better. It will be gratifying to find that the result of the deliberations of the committee shall have merited and met with general approval; should there have been the slightest appearance of "tardiness" in the matter, it should be remembered that "Rome was not built in a day."

All are earnestly invited to come forward, even to the number of the eighty, or ninety, or more, who evinced such unmistakable satisfaction over the "material." The call being made, it is desired that they will not be dilatory in coming forward to partake of the more exalted,—the "intellectual."

John Hutchinson, *Vice-President*,
Chairman at the April meeting.

Edinburgh,
December 23*d*, 1872.

Co-operative Stores.

Sir,—Many members of the trade having expressed their conviction to us, that the sale of goods at the co-operative stores could be prevented by the proprietors of specialities like patent medicines, if they put a pressure upon the wholesale houses by refusing to supply them, we beg to call the attention of your readers and the trade in general to the few following facts. Ever since the origination of the co-operative system, we have publicly announced our intention to stand by the trade, and have resolutely refused all orders offered by the Civil Service Stores and every other co-operative association. Having even (not two months back) closed an account by refusing to supply goods, on the mere suspicion that they were intended for the Stores, we were, therefore, considerably surprised at receiving a letter from the proprietor of an article of very limited sale, to the effect that goods supplied to us had reached the Civil Service Stores in the Haymarket. We called on him, and were told the date and quantity of goods. We traced the goods as having been supplied to a customer who had dealt with us for years. We wrote to him on the subject, and received a reply to the effect that he felt at liberty to sell in any market and at any price. We closed the account with a remonstrance, and regret that he should support so iniquitous a system. We communicated the details to the proprietor by a first letter, asking him to call and see the order; by a second inviting him to read the correspondence. He acknowledged these and said he was satisfied. Possibly he is, but what advantage has been gained by the transaction? Our customer has opened with another house, and is, doubtless, selling to the Stores as before. If proprietors were in earnest in the matter and the retail trade were so too, doubtless the supply might be stopped; but as it rests in this case, the Stores will get their supplies with the same facilities as before. Suppose this proprietor traces his next lot of goods to another wholesale house. He will stop supplying them. Supposing they take no notice of his letter, but simply buy through another wholesale house. Why it would go on before it was stopped until we had all passed into another world, and had forgotten the difficulties of this. However, if this proprietor really is in earnest, he will, ere this, have advised all the wholesale trade who the man is. Then, after that even, some other retailer might yet be found to take the place of the one in question. We only write this letter in the feeling that it will throw a light on the way the Stores are supplied, and to show how impossible it is to prevent goods reaching the Stores, unless you can bind the retail trade to be unanimous in defending themselves.

John Sanger and Sons.

Chemists' Profits!

Sir,—A short time ago I received for preparation a prescription as follows:—

R.	Ext. Cinchon. Flav. Liq.	ʒ vj
	Potass. Iodidi	ʒ ij
	Potass. Bromid.	ʒ vj
	Aq. ad	ʒ xij
	M. etc.	

for which with bottle I considered 4s. a fair price.

My customer, a lady on whose word I can thoroughly rely, and who offered to show me the bills, states that at the first establishments in two large towns near she only paid 2s. 6d. and 2s. 8d. respectively. Now, ext. cinchon. flav. liq. costs 26s. per lb., and has (or ought to have) a specific gravity of 1·200 f ʒvj. would weigh ʒ vij. and would cost . 1s. 5d.

ʒ ij Potass. Iodid., over ¼ oz. at 2s. 3d. per oz.	0s. 7d.
ʒ vj Potass. Bromid. at 6s. per oz.	0s. 4d.
Bottle	0s. 1½d.
Aq. Dest.	0s. 0½d.
Total cost of materials	2s. 6d.

I am puzzled as to whether my worthy confrères of the larger towns keep shop for the fun of the thing, or to live by the losses, or whether (can it be possible) they forget that f ʒ vj of a liquid having a specific gravity of 1·200 will weigh much more than ¾ oz. Whatever may be the explanation, such practices cause great inconvenience and annoyance to those tradesmen (by all means let us sink the idea of profession) who look for a fair profit on each transaction.

I trust that calling attention to this occurrence will tend to prevent the repetition of such a scale of charge.

Pharmaceutical Chemist.

November 22nd, 1872.

Commercial Morality.

Sir,—Having just unpacked an "original" case of "Honeycomb Sponges" from a well-known London firm, I beg to send you another version of "Commercial Morality."

Although the sponge was large and forty-eight pieces in the case, after well beating, 2½ lb. of sand was all that could be got out; the sponge was all that could be desired, and in this instance will leave a wider margin for profit than, as hitherto, buying ready cleaned. Apologizing for troubling you on this subject again.

J. Colenutt.

Sandown, Isle of Wight,
December 12th, 1872.

[*** It may fairly be inferred that this case, as well as that mentioned by Messrs. Newham, were exceptional in opposite directions, but the two extremes indicate that there is always a considerable amount of uncertainty in purchasing original packages of sponge.—Ed. Pharm. Journ.]

Earlier Closing.

Sir,—Seeing that the examinations in 1874 will be somewhat more difficult than they are now, I think we, the present assistants and apprentices, would do well to make some endeavour to curtail the long hours that now exist. What studying can a youth do after a hard day's work and ten p.m. before that ceases? Perhaps existing masters may say "We have had to do it;" but that is no reason why circumstances which are bad should not be altered. Give the young student a chance to improve himself, and then it is his own fault if he does not make good use of that time. There is no profession or trade, as far as I am aware, that suffers so much from indoor confinement as a chemist, and I do not see any reason why such cannot be amended. There is no doubt many objections will be raised against the short-hours' movement; but let assistants and apprentices join in a body and go the right way to work. I think the task would be found comparatively easy. Drapers close at seven p.m., and so might pharmacists if they would. I think some one should always be in readiness to dispense urgent medicines, but I do not think it requisite to accommodate any person with a ha'porth of hair oil or a pen'orth of pills at ten p.m., when it is only for the customer's convenience to come for them at that hour; but they know they can get them just as well then as at 5 p.m. How can a young man's health be what it should be when he is confined in a shop or laboratory all day, and then four or five hours in the evening breathing certainly not pure oxygen and nitrogen, but an atmosphere vitiated with the noxious products of the combustion of London gas. Hoping some abler pen than mine may take further steps in the matter, I remain etc.

17, *Bloomsbury Square.* W. S. Stables.

Chloral Hydrate.

Sir,—Referring to "Dispensing Note on Chloral Hydrate," *vide* Pharmaceutical Journal, last issue, I forward the following prescriptions ordering chloral hydrate, etc., prescribed by a medical gentleman of extensive practice, for a gentleman of ample means (but unfortunately of most intemperate habits) and dispensed by myself and assistant:—

R.	Chloral Hydrat	ʒ ij.
	Syr. Simple.	ʒ iv.
	Aquæ ad	℥ iv.

Take one 3rd part every 2nd hour.
6. 12. 72. Signed.

R. Rept. Mist.
Chloral Hydrat.

Signat. One half to be taken for a dose.
6. 12. 72. Signed.

R.	Chloral Hydrat	ʒ iij.
	Tinct. Aurant.	ʒ iv.
	Aquæ ad	℥ iv.

Take one half for a dose.
7. 12. 72. Signed.

R. Rept. Mist.
Chloral Hydrat.

Had this morning.
7. 12. 72. Signed.

R.	Chloral Hydrat	ʒ iij.
	Morph. Muri.	gr. iv.
	Aquæ ad	℥ iv.

Take one fourth part every second hour.
8. 12. 72. Signed.

R.	Magn. Sulph.	ʒ j.
	Conf. Sennæ	ʒ ij.
	Liq. Sennæ Dulc.	
	Tinct. Jalapæ ana	ʒ iij.
	Inf. Sennæ ad	℥ iij.
	M. ft. Haust. statim sumend.	

9. 12. 72. Signed.

Last Monday evening the medical man called to tell me his patient was "all right with the exception of considerable depression, and debility generally." The above prescriptions are given as written.

Thos. C. Morris.

W. and L.—You will find an answer to a question on the same subject at p. 540 of the last volume. Should you require more definite information it would be advisable to apply to the Inland Revenue authorities.

F. W. P.—It cannot be made clear without adding more acid than is ordered.

Pungency of Watercress.—J. Tully (East Grinstead) is of opinion that the difference of flavour in our correspondent's two specimens of watercress was due to the relative absorption of substances from the water in which they grew. Possibly the pungency was due to excessive manuring.

R. M. Gurnell.—We have received your letters referring to the nuisances which you describe as existing at Bethnal Green, and would advise you to communicate the facts to some of the medical journals.

G. T.—We believe the work you name is out of print.

"*Query.*"—A solution may be made as follows:—

Bimeconate of Morphia .	10 grains.
Rectified Spirit. . . .	1 fluid drachm.
Distilled Water . . .	13 fluid drachms.

"*Studens.*"—(1) It is evident that there was something faulty in the manner in which the experiment was conducted. (2) For the Major examination a knowledge of the Linnæan and De Candolle's systems is required.

Communications, Letters, etc., have been received from Messrs. J. Tully, J. F. Brown, J. Wilson, J. David on, Willmott, Ekin, Benger, J. R. Marrack. T. B. Groves, G. Turner Robertson, T. Farnsworth, and R. G. Maunbray.

EXAMINATION OF THE LEAVES OF CINCHONA SUCCIRUBRA.

(ESPECIALLY IN REFERENCE TO THE PRODUCTION OF ALKALOID.)

BY JOHN ELIOT HOWARD.

In a communication to the Pharmaceutical Journal (Nov. 4, 1871) in which I described various products of cinchona trees received from India, I gave expectation of some further information respecting the leaves.

As I have now had the opportunity of following out the investigation of these, I think that it may be well to place on record the result, especially as I have enjoyed the assistance of the chemical skill of my nephew, Mr. David Howard, and having a sufficient quantity of dried leaves (about 20lb.) at our disposal, it is not very probable that we should have missed the main object of our researches—the elimination of any alkaloid that might be contained.

This result may be stated as virtually *negative;* for though a few grains of precipitated alkaloid were obtained which yielded by further treatment crystallized cinchonidine, the quantity was so exceedingly minute as to suggest the probable explanation that the source from whence this product originated was rather some fragments of bark of small branches accidentally mingled with the leaves than any portion of the leaves themselves. If even the footstalks yielded alkaloid, it seems probable that more would have been present. The leaves, carefully reduced to powder, were divided into different parcels, and subjected to various modes of inquiry, in order to investigate the different component parts. Of these the chlorophyll must be first mentioned, but I do not think that our researches added any new features to those brought into notice by M. Fremy and others (including perhaps the purpurophylle of M. Harsten*); then followed the vegetable wax—the kinovic acid,—the resin, for the origin of which I am inclined to look rather to the stalks of the leaves, as I doubt its being a primary product of vegetation.

Altogether the examination quite precluded the expectation of the leaves being ever made use of to advantage in the treatment of fevers. In this point I find that the observations made by medical men in India accord with my own opinion.† Also I must mention that it is highly important and equally gratifying to me to know that the researches of Mr. Broughton on the leaves are not in disaccord with those here recorded. I cannot at present find any published report of Mr. Broughton's analysis, but in 1869 Mr. B. wrote me as follows:—"From 20 lb. of leaves I have obtained crystallized cinchonidine, cinchonine and quinine, but in minute quantities, a few grains merely." Apart from the medical question of the utility of the leaves in pharmacy, it is to me a satisfaction to be able to decide that the alkaloids do not even begin to be formed in the leaves, and that their existence is not (except indirectly) connected with the chlorophyllian respiration. This view of the matter entirely accords with the conclusions which I have elsewhere expressed as seeming to result from consideration of the manner in which the fresh bark filled with alkaloid begins to form on the surface of the uninjured cambium. When the bark has been stripped off, the fresh material appears almost like an exudation,* and this takes place with great rapidity, two or three days marking a decided commencement of renewal. I suppose that this results from a rapid multiplication of the vessels of the cambium, and that the alkaloids are elaborated in those cells of the lax cellular tissue which are figured in my 'Quinology.' But the *material* must come from *somewhere*, and the source cannot be the leaves, as the circulation from thence must be impeded by the rough treatment of the tree. I conclude that the *whole* plant, in a certain sense, contributes its supplies to any wounded part, and, therefore, it would seem to follow that the *whole plant must be injured by so great a tax upon its resources*—as will probably be found to be the case. But why should the reproduced bark present us with alkaloids in a purer state than in the original condition of things in the plant? If the supply were drawn by any channel from the leaves, it would partake of the quality of the leaf products, which is not the case. But in the *heart-wood* the material is abundant, and also ready to hand.

It is instructive to compare this state of things with that which is observed in the formation of the gall-apple on the oak. Here we find that the puncture and irritation caused by the insect (*Cynips*) induces the tree to form an abundant cellular tissue of a somewhat similar construction; and this becomes filled with specially astringent juice, to the detriment doubtless of the tree itself.

I am indebted to the good offices of M. Adolphe De Candolle in sending me for comparison a work by M. Casimir, the son of this eminent botanist, 'On the Natural and Artificial Production of Cork in the Cork Tree.' It would lead me too far from my present subject to follow out the comparative physiological changes in the two trees—the *Cinchona succirubra* and the *Quercus suber*, when submitted thus to partial decortication.

I may possibly return to this interesting question. In the meantime I may remark that I have described (in my 'Quinology') the mother-substance, which seems most probably the one to be modified into alkaloid; and I agree with Mr. Broughton in the view he has expressed that the first modification is into uncrystallizable quinine, or into the quinicine of Pasteur, which my nephew has recently afresh described. From one of these it is probable that the molecule or compound atom of quinine is built up in a complex manner; and that the difference between the first-formed alkaloid and actual quinine consists in the addition or subtraction of an atom of water; and that not as an hydrate, but peculiarly allocated in the intimate structure of the molecule itself. Researches with polarized light seem to lead to this view of the matter; and it is, if correct, hostile to the expectation of our being able

* Poggendorf's 'Annalen,' t. cxlvi. p. 158.

† Decoction of cinchona leaves (with acid sulph. dil.) "was found to be a good tonic, but quite useless as a febrifuge."—'Return (E. I. Cinchona Plant.),' p. 126. Ordered by the House to be printed, June 18th, 1866.

* Mr. Broughton wrote, "I have long remarked that the bark, when carefully removed without injury to the cambium, quickly renews itself from below, not from edge." March 16th, 1868. Mr. M'Ivor writes me, June 3rd, 1868,—"The new bark rises direct from the sap-wood; if the old bark is carefully removed, in three days the new bark is formed entirely over the whole surface, *i.e.* rising directly from the sap, and not formed by a current of cambium from under the remaining bark, and so far it is certain that the new bark does rise off the sap-wood, and apparently without any special action on the part of the leaves."

to imitate this artificially, so as to produce real quinine by chemical methods.

I am confirmed in the opinion expressed in my 'Quinology' that the alkaloids must be regarded as highly complex and, so to speak, animalized products of the *general* (or nocturnal) as opposed to the chlorophyllian respiration, being in this way fitted to act powerfully on the animal economy, the blood having an alkaline reaction; as, conversely, acid gases of simple constitution (sulphurous, nitrous, etc.) are deadly poison to vegetables whose juice has an acid reaction.

THE MICROSCOPE IN PHARMACY.

BY HENRY POCKLINGTON.

(*Continued from p.* 383.)

My notes on the structure of the woods of the Pharmacopœia are not sufficiently complete to enable me to proceed to describe them at present with comfort to myself or justice to my readers. I have, therefore, deemed it preferable to take the barks first. The woods that are chiefly remarkable for their colouring matters will be taken last of all, and will be discussed with especial reference to the optical qualities of these colouring matters, some, at least, being more complex than I believe is generally supposed. The structure of bark differs sufficiently from that of wood to require slightly different treatment in preparing it for the microscope. The great point is to avoid too prolonged maceration, hich is apt to render the more delicate portions so soft as to yield under the pressure necessary to push the razor through the other portions. Usually a few minutes, or half an hour, in warm water will make the softer barks quite soft enough to permit good sections to be cut. The harder and more dense barks will of course require longer maceration; in practice it will be found to be best to make frequent examinations of the portions in soak, that the right moment for removing them may be seized. Sections should always be mounted either in fluid or in glycerine jelly, and a specimen of each should be carefully stained with magenta, and a third one with a purple solution of logwood and alum, as the position, size, and shape of the liber are rendered easily visible by the use of these reagents.

Those who are interested in vegetable structure, are working up for an examination in structural botany, or desire to make themselves thoroughly familiar with the structure of bark, will find it of great value to begin their work upon young shoots, and to work by progressive stages from shoots of one, two, three, and four years' growth to the bark of full-grown trees. This is a very good period of the year in which to begin this work; and to keep steadily at it through the winter, till the spring brought into notice a new formation, would be to occupy oneself with an interesting as well as an instructive recreative pursuit. The use of carmine and magenta staining fluids, and in some cases of the logwood* and alum solution now much used in some histological laboratories, will permit of much useful work being done with but moderate manipulative skill and low powers of the microscope, and one or other of them should always be employed. The following brief biography of bark will perhaps be of service to the student as giving him some notion as to what to look for. It is at first composed of precisely similar tissues (irregularly shaped, more or less globular parenchyma cells) to that of the stem from which it has begun to be differentiated. The next stage appears to be the formation of elongated cells between the stem and itself, and these are presently developed into the "bast layer" liber or *Endophlœum*. It is at this stage that the use of staining fluids is especially of value, as they bring into notice changes that might otherwise escape observation. Contemporaneously with the bast, or liber, the outer cells become hardened or otherwise changed into the Epiphlœum or corky layer, the middle portion or Mesophlœum retaining its active vital powers longest, as evidenced by the action of carmine fluid, and yet more decisively by the presence of chlorophyll and other cell contents. The Epiphlœum may strictly be regarded as dead tissue, and is often thrown off at intervals. The middle layer alone can be regarded as actively long. It only retains active vitality so far as regards power of growth for a somewhat limited period; and all increase of the diameter of the bark circle takes place within the region commonly known as the cambium region, between the now woody portion of the stem and the earlier liber layers of the bark; and finally various modifications of the component tissues of the bark and of the bark as a whole take place in consequence of successive secondary deposits within the liber cells, and of pressure from the expanding stem within, and atmospheric influences without. The record of most of these may be found in sections prepared for the microscope.

Mezerei Cortex.—The barks of *Daphne Mezereum* and *D. Laureola* do not differ sufficiently widely to render it needful to describe them at great length. The latter is easily obtainable in a fresh state, and on this account is the one most likely to be selected for examination. Neither of them present any great difficulties, unles it be desired to obtain transverse sections showing the structure of the long fibrous and very tough liber common to all the plants of this genus. The only differences between the two species named consist in the development of the parenchymatous cortical substance and in the size of its cells and those of the outer cuticle. Sections should be cut in two directions, across the stem (transverse), and towards the centre of the stem longitudinally (vertical). Sections may be also cut longitudinally in a direction across the medullary rays of the stem (radial), but will not be of much service in this case. Logwood stained sections are the most useful. In such a section, if it be a transverse one, we see, beginning at the exterior, first the cells of the epidermal layers deeply stained; beneath this are the cells of the cork layer unstained; and beneath this are well-stained, large-sized parenchymatous cells and a largely developed fibrous liber, which does not stain. The liber is best seen in vertical sections. Apart from the liber there are no special features that need detain us. Before passing to a more important bark I will mention that the wood structure of the stem of *D. Laureola* (the spurge-laurel of the hedgerows in some parts) is specially interesting, on account of the peculiar spiral and dotted markings and pits on

* A convenient way of applying this reagent is to immerse the section of bark in infusion of logwood for a few minutes, remove, it to a slide and add a drop of ammonia. Wash in alcohol in water, and mount.

the well developed vessels. These vessels may be regarded as types of one class of vessels, but must not be more fully referred to here.

Cinnamomi Cortex.—The chief adulteration of cinnamon either in the form of powder or otherwise is by admixture of cassia with, in the case of powdered cinnamon, the addition of some form of starch. It is not difficult, as every one who deals with the two articles knows, to distinguish between "whole" cassia and cinnamon, but the case is very much otherwise when we have to distinguish between unadulterated cinnamon powder and either powdered cassia or an admixture. It is perhaps impossible to detect a small amount of admixture of cassia with cinnamon in the powdered state, but it is perfectly easy to detect any considerable admixture or to distinguish between the two powders. But to be able to do so requires prolonged and careful study of the special features of each of these barks. Their preparation for microscopical examination is more easy than is the case with most barks. A short maceration in warm water will render either of them sufficiently soft to permit very thin sections to be cut both transversely and longitudinally, the latter in a direction perpendicular to the surface. The only precaution to be taken is to take care that the piece of bark, especially if cinnamon, is well wedged in the section cutter with pieces of good cork. The best plan being to select a fine textured cork, the size of the tube of the section instrument, to halve it, take a thin slice from each half, and then place the piece of cinnamon between the halves, and put the whole into the section instrument. Very fine and perfect sections may thus be cut with great ease, and will show the whole of the tissues without solution of continuity, such as will result from careless cutting. The razor should be well wetted and the sections floated into water, whence they may be at once mounted in fluid or glycerine jelly, or removed to alcohol, boiled therein for a second, transferred to oil of anise and heated therein for half a minute, and finally mounted in dammar or balsam. This last plan is particularly applicable to sections of cassia, stained with magenta and intended to be viewed by polarized light, but in this last event the sections should be cut either from a piece of dry bark or from a piece that has been soaked in cold water only, this being necessitated by the ease with which cinnamon and cassia starch undergoes transformation.

It will perhaps be more useful if I describe the structure of cinnamon in comparison with that of cassia, omitting all reference to such minor points as they have quite in common. Its general structure is characteristic enough. Beginning at the outside, we have first a layer of flattened cork cells, somewhat brown in colour, and not otherwise of special interest. In cassia these are slightly larger than in cinnamon, but are otherwise similar. There are sometimes two or three layers of cells of this class present in both cinnamon and cassia; more frequently in the case of the latter. Beneath these, in the case of cinnamon as a tolerably complete and continuous layer, and less complete and continuous in the case of cassia, are, what Hassall calls, "stellate cells," that is, cells whose interiors are almost wholly filled up with deposits of secondary matter (sclerogen); very distinct pores traversing the deposits. These cells have, in cinnamon, seldom any contents, and their central cavity is but small. In cassia the cavity is larger, and sometimes ("frequently"—Hassall) contains starch. They are larger, and in proportion to the other tissues, less numerous in cassia than in cinnamon, and are best seen in longitudinal sections, and can be easily isolated if desired. These cells, carefully mounted in thick balsam without preliminary soaking in essential oils, show the successive deposition of secondary matter and the arrangement of their pores remarkably well, and on this account are deserving the attention of beginners in structural botany. Unless care be taken they may be confused with a very different structure, especially if studied in cross sections of the bark, the much thickened liber cells, very numerous in cassia, and almost wholly filled with sclerogenous matter. The absence of pores in cross sections of these liber cells, of course, at once distinguishes them from the "stellate cells," and dissection of the whole tissues confirms the diagnosis. If a section be stained with magenta, and carefully boiled in alcohol for a few minutes afterwards, these several features are easily demonstrated, and such a section is furthermore a very pretty object.

The parenchymatous tissues of cassia and cinnamon are very dissimilar. One very prominent feature is the presence of great quantities of large starch granules, eminently doubly refractive, and giving a black cross with polarized light in the case of cassia, and of very much smaller quantities of smaller-sized starch corpuscles in the case of cinnamon; excepting in size and number the starches are very similar. The cells of this tissue are larger in cassia, and much more thickened than in cinnamon. These differences are best seen in stained sections.

Small quantities only of starch should be present in good and pure ground cinnamon. The presence of foreign starches is, of course, a matter of easy detection, but is not, so far as my experience goes, of common occurrence. A proportion of the oil may sometimes be extracted before grinding the bark; but the microscope would only enable us to guess at this by the transformation of the starch granules under the action of heat and water, and by the absence of or alteration of certain small masses of brownish-yellow colouring matter, common to both cassia and cinnamon. As before said, careful study of the minute structure of the two barks is needful to enable us to tell "which is which;" but, granting this careful study, the difficulties in the way of so doing are not very serious.

THE RATE AT WHICH AMMONIA DISTILS OVER FROM WEAK SOLUTIONS.

BY J. ALFRED WANKLYN.

In the first number of the new series of the *Mechanics' Magazine* I am publishing a mathematical theory of "Fractional Distillation." Some of the material, however, which is contained in the paper has other bearings, and, in particular, some experiments on the distillation of ammonia appear to me to be of interest to all chemists who are working the ammonia process of water-analysis.

The following experiments on dilute solutions of ammonia will possibly afford acceptable data for laboratory use:—

Into a litre of water 1000 milligrams of ammonia were placed, and the liquid distilled. The first 50 c. c.

of distillate was found to contain 480 milligrams of ammonia.

Similarly 1·00 milligram, 0·50 milligrams and 0·20 milligrams of ammonia were dissolved in a litre of water, and the solutions distilled. The first 50 c. c. of distillate contained 0·50; 0·235, and 0·095 milligram of ammonia respectively.

Collecting the results in a tabular form we have—

Ammonia in litre of water before distillation. Milligram.	Ammonia in first 50 c. c. of distillate. Milligram.
I. . . 1000· . . .	. . . . 480·
II. . . 1·00 . .	. . . . 0·50
III. . . 0·50 . .	. . . . 0·235
IV. . . 0·20 . .	. . . . 0·095

Showing that the strength of the distillate is proportional to the strength of the original liquid, and that when $\frac{1}{20}$ of a dilute solution of ammonia is distilled off, that distillate will contain $\frac{48}{100}$ of the original quantity of ammonia.

It will be obvious, on reflection, that the second 50 c.c. of distillate (or the second $\frac{1}{20}$ of distillate) must contain about $\frac{25}{100}$ of the original quantity of ammonia, and the third 50 c. c. of distillate $\frac{13}{100}$ of the original ammonia, etc.; and this is borne out by actual experiment. An important use may be made of these data. We are now in a position to tell whether ammonia is originally present in a solution, or whether it is formed during the distillation; furthermore, we can tell whether it is rapidly formed or slowly formed, and thus are provided with new analytical data which may be used in distinguishing organic nitrogenous compounds.

KOUMISS, BLANDA, SYRE, SIGRE, OR AIREN.*

BY JAMES T. GEORGE, M.R.C.S.E., *Keith, Banffshire.*

For upwards of twenty years I have used as a restorative medicine the vinous liquor procured by the fermentation of cows' milk; and although a liquor has been for some ages employed by several tribes of Tartars, as procured from the fermentation of mare's milk, it was with difficulty I could learn the particulars of the mode of preparing it. The books which I consulted, which were various, gave me little satisfaction concerning it. All writers say it is a vinous liquor obtained by the fermentation of milk, but none describe the mode of preparing it, or the purposes in medicine to which it is applicable. M. Paulus Venetus, in a work published in the thirteenth century, only mentions it to be a common beverage among the Tartars. Another writer on the Russian Empire gives a formula which, if followed, could not be attended with success; for he mentions that the Kalmucks take off the thick substance, which, when sour, rises to the top of the milk, and employ this in food, and the remaining liquor is drank. But should any part of the milk be taken away, no fermentation will or can take place; all the parts of the milk must be left in their natural proportion. The method which I have adopted in my own practice with success, and which was communicated to me by a Russian gentleman, is as follows:—

"Take of newly-drawn milk any quantity; add to it a little water, and pour the mixture into any vessel. Use as a ferment an eighth part of the sourest cows' milk that can be got—but at any future preparation a small portion of old koumiss will better answer the purpose. Cover the vessel with a thick cloth, and set it in a place of moderate warmth. Leave it at rest twenty-four hours, at the end of which time the milk will have become sour, and a thick substance will gather on the top; then with a stick, made at the lower end like a churn staff, beat it until the thick substance be thoroughly blended with the subjacent fluid. Leave it again at rest for some time; repeat the beating, after which pour it into a narrow vessel like a churn, agitate the liquor until it be perfectly homogeneous. In this state it is called *airen.*"

Its taste, if properly prepared, ought to be a pleasant mixture of sweet and sour (agitation must be employed every time before use). When it is necessary to have it quickly made, heat the milk before applying the sour milk, and agitate every hour or half hour. By doing this it is obtained in twelve hours. If well secured in close vessels, and in a cool place, it can be kept a long time without injury to its qualities. There appear to be three things necessary to the vinous fermentation of milk; heat, souring, and agitation, the chief being agitation. In fermenting vegetable juices nature is sufficient to keep the parts of the fluid in mutual action, while milk is no sooner soured than a separation of its parts takes place; the cream rises to the top, while the cheese either falls to the bottom, or is suspended in the whey. When these parts are brought into close contact with one another by agitation, frequently repeated, a vinous liquor is produced, which, in my practice, I have found highly beneficial as a dietetic, and of considerable virtue as a medicine.

In cases of general debility I have given it largely, with essential service, as a nutritive. W. G., aged twenty-six, was sent to this place from Edinburgh for change of air. He had been under a mercurial course for a venereal affection, which left him in a very weak state. He was much emaciated; his face of a leaden hue; his eyes sunken; he had slight cough, with expectoration of toughish phlegm; his appetite was impared, and he was feverish toward night. On using the wine for about two months he got perfectly well and fat. He drank daily two quarts with a relish, and without any intoxicating effect. During the time he was under the medicine he required no purgative, and it seemed to act as a diuretic. I have found it of great use in typhoid fever, the patients using it for meat and drink. In a few cases no other remedy was used, young and old taking it. In nervous, dyspeptic, and hypochondriac subjects, its use for some time has a powerful restorative effect, giving flesh and strength. Invalids, not only without disgust, but with a sort of pleasure, drink it in large quantities, and, even when they do so, without headache or other unpleasant feelings, which the abuse of other fermented liquors produces. As stated, I have used it in various complaints with success above my most sanguine expectations; and, in pulmonary consumption, when cod-liver oil cannot be taken, I have found it (but at the same time using whisked cream) equally, if not more efficacious, in relieving cough and giving plumpness to the body. From its mild acid, its vinous spirit, and its oily qualities, I consider it to be a cooling antiseptic, a mild stimulant and tonic, and a valuable nutrient. In acute diseases, with marks of weakness and putridity, in cases of excessive irritability, in dyspepsia, in phthisis, and in hectic, from ulceration or suppuration.

I again repeat, that all that is necessary for its preparation is, after it is sour, frequent agitation. No spirit can be produced from any one of the constituent parts of milk taken separately, nor any two of them unless mixed with the third. The closer it is kept the more spirit is obtained. If made in a glass vessel, that is to say if it undergo fermentation in it, it must not be more than two-thirds filled in case the bottles burst. When it is bottled for keeping any time, the bottles must not be full, and the corks must be fastened as in lemonade bottles.

* Reprinted from the 'British Medical Journal.'

A NEW ANÆSTHETIC DERIVED FROM CHLORIDE OF CARBON.*

BY MM. HARDY AND DUMONTPALIER.

Chloride of carbon combines in definite proportions with alcohol, forming a liquid which has a fixed boiling-point, and possesses very decided anæsthetic properties. In its preparation, a mixture of 30·8 parts of chloride of carbon and 4·6 of alcohol are submitted to distillation, and the portion collected which passes over at 66° C.

The liquid thus obtained is colourless, transparent, mobile; has an agreeable odour and a density of 1·44, at 17° C., and under a pressure of 0·755. It boils regularly at 66° C., a boiling-point below that of either of the two bodies from which it is formed (chloride of carbon boiling at 77° C., and alcohol at 78·5° C. It burns difficultly with a green-bordered flame; undergoes no alteration in the air, and volatilizes slowly. It is decomposed by water into alcohol, which is dissolved, and chloride of carbon which is deposited. Sulphuric and hydrochloric acids also decompose it with deposit of chloride of carbon. Nitric acid, under the influence of slight heat, attacks it briskly with disengagement of nitrous vapour and separation of chloride of carbon; on concentrating the supernatant liquor a deposit of oxalic acid is obtained.

An analysis of this compound points to the formula $2\,(CCl_4), C_2H_6O$. The vapour density in one experiment was 4·2, in another 4·1, figures which do not correspond with the theoretical density according to the above formula. The question therefore arises whether there is a combination in the proper sense of the word, or a simple union of two substances remaining distinct, although presenting a fixed boiling-point and all the physical appearances of a distinctly defined body. Similar facts have already been indicated, but their interpretation has yet to be found.

This substance acts as an anæsthetic; its ethereal odour and low boiling-point facilitating its employment. In experiments made upon a dog of average size, 15 grams sufficed to produce insensibility to pricking or pinching. Comparative experiments made upon the same dog, at intervals of several days, with chloride of carbon and with chloroform, also in doses of 15 grams, have led the authors to conclude that chloride of carbon, and particularly chloroform, act with more intensity than the new substance, which, on the other hand, appears to cause less restlessness, especially at the commencement of the experiment. In any case the new anæsthetic should only be administered to man with the greatest care.

[*⁎* The preparation herein referred to, whatever its value as an anæsthetic, cannot be regarded as an individual chemical substance. Evidently the case is one of mere physical mixture. It is not uncommon for mixtures of organic liquids to boil at temperatures below the boiling-point of either, and it is the rule *not* to boil at the mean between the boiling-points of its components. See an article in Pharm. Journ. [3] vol. ii. p. 528.—ED. PHARM. JOURN.]

* Bulletin Thérapeutique and Journ. de Pharm. et de Chimie [4] vol. xvi. p. 428.

SPIRITUALISM AND SCIENCE.

It would be useless to ignore the fact that what is commonly known as "Spiritualism" has been gradually taking up more and more of the public attention, and that for good or for evil—unfortunately it has proved for evil in many cases—the number of those who placed faith in the asserted communications from the spirit world is steadily increasing. Whether the desire of furnishing its readers with a "Christmas Number," in the approved style of a ghost story, has influenced the *Times* we are unable to say, but certainly on the 26th of December an article appeared in its columns, giving a brief *résumé* of the controversy arising out of the appointment of a committee by the Dialectical Society to investigate the subject, and it also recorded the writer's experiences at four *séances* which he attended. It is probable that many persons, after reading the article, would impatiently throw down the paper as answering to the definition of Christmas literature recently given by the *Athenæum*, as rubbish that would have no chance of publication at other seasons. But the discussion has probably gone too far to be thus extinguished, and in order to keep our readers *au courant* with a topic which promises to assume a position in the scientific world, it is proposed to give an abstract of the article and the correspondence it has provoked.

Those who remember the prominence to which "table-turning" attained in the attention of the public some twenty years since, will also remember the relief with which Professor Faraday's explanation of it as arising from unconscious muscular action was received. Notwithstanding, however, the weight of the great philosopher's name, there are probably more believers in the supernatural origin of the phenomena now than there were then. It is not surprising, therefore, that a desire should have arisen that the whole subject should be thoroughly investigated by scientific men, so as to expose any fraud that might be present, and to attribute the phenomena to their proper place in the domain of science or conjuring. A society called the "London Dialectical Society," took the matter in hand, and appointed a committee, which, after eighteen months, published a report 400 pages long, that has been stigmatized as nothing more than a farrago of impotent conclusions, garnished by a mass of most monstrous rubbish. It is unfortunately this style of denunciation which has contributed to the present state of affairs. As a rule scientific men hold carefully aloof from any attempt to solve or expose the mystery, and when the attempt is made by others—who may possess every other requisite—the cry is that the work is unscientifically done. Professor Huxley wrote a note stating that the only good of a demonstration of the truth of spiritualism would be to furnish an additional argument against suicide, "for it would be better to live a crossing-sweeper than die and be made to talk twaddle by a medium, hired at a guinea a *séance*;" a remark which although at once witty and true was completely beside the question. Professor Tyndall was willing to pay "due respect to the invitations of such men as Mr. Wallace and Mr. Crookes," and to witness whatever new phenomena they were in a position to show him. Mr. G. H. Lewes sent them good advice, and Dr. Carpenter sent them an abstract from an article in the *Quarterly Review*.

As illustrating the extent to which the belief is spreading, it is said that a volume, consisting of 150 pages of reports of private *séances*, was privately printed by a noble earl recently deceased, and that the attestation of fifty respectable witnesses is placed before the title-page, among whom are a dowager duchess and other ladies of rank, a captain in the guards, a nobleman, a baronet, a member of Parliament, several of our scientific and other corps, a barrister, a merchant, and a doctor. Upper and upper middle-class society is represented in all its grades, and by persons, who to judge by the positions they hold and the callings they follow, ought to be possessed of intelligence and ability. Under these circumstances it is not too much to say that it is time that a thorough and practical investigation cleared this cloud out of the intellectual sky; and this task need not be scouted by professors or other learned men, by Royal or other societies.

And now for the experience of the *Times*' correspondent, which we suppose may be taken as a fair specimen of what is met with by those who attend these *séances*.

The first was at a private house, where machinery in the furniture or any similar deception was out of the question. Mr. Home was the medium, and the party sat round the table for two hours without anything unusual occurring.

The next day he went with a friend to a second *séance*, held in a small drawing-room, where arrangements had been made for excluding the light. The floor and walls were scrutinized and sounded, the felt for darkening the windows, the chairs and the small round table examined, but nothing was found. There were two mediums present, and the two friends sat in the dark, clasping a hand and pressing a foot and knee of a medium on each side. Presently one of them felt something hard pressing against the back of his head. Saying nothing, he leaned his head backwards, when the substance seemed to yield and slide softly over the hair. Suddenly grasping at it with his left hand, he still held the medium with the right, while the other visitor struck a lucifer; there was a sound of something falling, and one of the chairs was seen lying on the table, but nothing else. They again sat down together for some time, without any further surprise, although in spite of a warning that the spirits would drop anything they were holding, wherever they might be, a match was unexpectedly ignited by one of the visitors. Daylight was then admitted and the room searched and researched, nothing abnormal being found. But the furniture now became quite lively, and this in broad daylight. A chair jumped three or four yards across the carpet, and there were other similar occurrences, but nothing so satisfactory as the fall of the chair on the table, as in that case they had fast hold of the mediums, who now were moving about the room, while everything seemed to happen just as the visitors were not looking, and one of the mediums was somewhere behind them.

The third *séance* was held in the evening at the house of a celebrated professional medium, in this case a lady, who, having been left some money, has retired from public practice. Scarcely had the medium's fingers touched the small table round which they sat, when it began to play all manner of antics under the influence of "John King, her well-known familiar." But the lady's fingers were strong, and there was a difficulty and delicacy in clearing away the folds of her dress, which left the experiment unsatisfactory. What was sought was decided raps and motion, absolutely without contact, and this was not obtained, although several attempts were made. An alphabet of printed letters was now produced and the visitor desired to think of a name and pass a pencil along the line of letters. The raps came at the right letters, but it was thought that possibly there might unconsciously have been something in the manner in which the pencil was passed along sufficient to give the clue. Another name was thought of and a paper and pencil put under the table; presently afterwards the paper was picked up with some markings upon it, the beginning and end of which consisted of the first and last letters of the name thought of, but the remainder was illegible. The performance was concluded by the "spirit" intimating that they were taking all the magnetism out of him, and wishing them good night in a series of raps, beginning loudly and gradually dying away into an apparent distance.

At the fourth *séance* Mr. Home was present, and as it appears to have been the most remarkable of the series, we quote the words of the visitor:—"There were nine persons present, including Mr. D. Home and Miss Fox, the well-known American medium. We formally searched the room and examined the furniture before we sat down at the table, which measured 4 ft. 5 in. by 6 ft. 4 in. The room was at first well-lighted from a gas-burner overhead. On the table was an accordion, which we took to pieces and tried, and found to be in every respect an ordinary instrument; a light lath about two feet long, a small brass hand-bell, matches, paper (which we marked), pencils, and two spirit lamps. We sat down, and almost immediately loud raps appeared to come from the table and floor. Miss Fox then got up and went to the door of the room, inviting us to stand by her and to hold her hands, which we did, when loud thumps seemed to come from the panels as if done with the fist. These were repeated at our request a desired number of times. To give a detailed account of everything which occurred would need more space than we can now spare. Suffice it to say, that the table was made light and heavy at our wish, that it moved in every direction, that there were vibrations of the floor and of our chairs, that on Mr. Home holding the accordion under the table in his right hand and by the end furthest from the keys, it played a distinct tune, Mr. Home's left hand being on the table and his feet so raised as to be visible. All other hands were on the table. At the same time, and under the same conditions, a small hand-bell was wrung in different parts of the space beneath the table. The gas was now turned out and the two spirit-lamps lit; these gave a fair light. The raps became louder, and, in the usual method, directed us to take a leaf out of the table. This was done, when the table appeared to float up about eight inches off the floor, settling down again in a gentle swaying manner. The thin wooden lath lying on the cloth was seen by the whole party to be in motion. It tilted up sideways and endways, and then seemed to float backwards and forwards. Holding our hand three inches, as near as we could guess, above the cloth, the lath rose three times; the last time it touched our hand, and directly afterwards the table jumped and shook violently, and loud raps seemed to come from all parts of it and of the floor. The spirit-lamps were now put out, and what light there was from a low fire only just enabled us to see white paper on the table and each other's positions. Presently, Mr. Home's and Miss Fox's hands and feet being in strict custody, we felt the accordion pressing against our knees. We put our hand under the table, when the instrument appeared to be moving round, till its wooden base was placed between our fingers. In that position we held it with its keys downwards; it seemed to be pushed up towards our hand and played a few bars. It then stopped, and presently we felt the bell thrust between the fingers of the same hand. Almost immediately a flower or sprig was put into our fingers, but as we were already holding in one hand the accordion and the bell, the sprig was dropped. It was picked up and again put into our fingers, and as we received it we felt distinctly the touch of a large thumb and finger. We did not let it drop this time, and there was immediately a succession of raps of a loud and jubilant nature. They seemed to come from the table in our immediate vicinity. A match was now struck, and we drew our tired hand from under the table, displaying the accordion, the bell, and the sprig. This was the end of the *séance*, for the 'spirit' would do no more. In the account of it we have omitted several experiments about which we cannot speak decidedly. We tried every test we could think of. A subdued light, darkened as the evening went on, was one of the conditions we were obliged to comply with, and while the accordion was in our hand we were desired to sit passive, though, as we stated, the hands and feet of the 'mediums' were in strict custody. Mr. Home seemed to wish to conceal nothing, and gave us every opportunity, consistent with the above conditions, for satisfying our scepticism. Yet we need hardly say that we were unable to satisfy it. By his request we got under the table with a lamp a great many times, insisted always on seeing his hands and feet, or on having them as well as those of Miss Fox held firmly. As to the hand with which Mr. Home held the accordion under the table, all we know is that on one of our sub-mahogany expeditions with the spirit-lamp, we saw that hand quite still, and saw the accordion moving up and down and playing music. We heard the key-notes, but the position of the instrument prevented our seeing the keys moving, if they did move. There was nothing during the whole evening except the phenomena themselves to suggest imposture. We tried our best to detect it, but could find no trace of it. We searched Mr. Home, and found nothing whatever upon him but his clothes.

"Yet, even with all this, we are not a Spiritualist, and do not even believe in 'Psychic Force.' We remember and lay to heart Mr. G. H. Lewes's admirable maxim, 'Distinguish between facts and inferences from facts.' We are certain that the table rose from the ground, that our hand received a sprig under the table from what felt like another hand; but how these things happened we do not know. The nature of the phenomena and of human nature are such as to force us to suspect imposture and legerdemain until we can satisfy ourselves of the true causes, whatever these may be."

This communication was followed by a letter from Mr. Henry Dircks, urging that the efforts of the "spirits" were not allowed to be tested openly as an ordinary experiment, but that certain conditions were always stipulated for; also that the results were unreliable and often incorrect. There was also an insinuation that the automaton chess-player at the Crystal Palace was worked by a small concealed boy, and that a similar artifice might account for the manifestations of spiritualism; but the truth of the insinuation was denied by the proprietor of the automaton figure. An assertion that "no really scientific man believes in spiritualism" was met by the counter-assertion that two Fellows of the Royal Society were believers in "spiritualistic" phenomena, namely, Mr. Crookes, who reserves his opinion as to their cause, and Mr. Cromwell Varley, electrician to the Atlantic Telegraph Company; to these names was added that of Mr. Alfred Wallace.

In concluding our notice of this subject it will be well perhaps to disclaim any sympathy with what is popularly known as "spiritualism;" our opinion is simply this, that the time has come for a thorough investigation of the subject, with the object of preventing unexplained and misunderstood facts being misinterpreted and used to take advantage of credulous people. On this point we cannot do better than quote the following words from a letter to the *Times* written by Dr. Fenton Cameron, of Derby:—

"I am a man accustomed to close and careful examination of intricate matters. I studied spiritualism for about two years with great care, and, I believe, with perfect coolness and impartiality of mind. I saw it in almost all its phases. I saw its manifestations in private and in public, in the light and in the dark; and though there is much that is childish, though many of the believers are most credulous and would accept almost anything coming in the name of the 'Dear Spirits,' and though in many of the dark *séances* there was abundant room for trick, if trick were necessary, I was yet compelled to believe that there was a power at work unknown to science, and which was not under the control of the so-called medium.

"I do not, for what seem to me good reasons, believe that the spirits of our departed fellow-creatures are the agents in all this, but I have no explanation of my own to offer. Faraday's unconscious muscular action theory was quite unworthy such a mind as his. Dr. Carpenter's unconscious cerebration may explain a few phenomena, as may also Serjeant Cox's Psychic force, but there is much, very much, in spiritualism that none of these explanations touch at all; and, as the new faith has now spread so widely and has done so much mischief to many, the time has, I agree with your reporter in thinking, fully come when even our greatest scientists may, without loss of dignity, consent to become as little children, that they may learn something of this strange thing before they pronounce upon it; for many think with me that men who have fairly won great names by scientific discovery rather detract from than add to their reputation by speaking dogmatically concerning that of which they are practically in utter ignorance."

EXPLOSIVE MIXTURE OF NITRATE OF POTASH AND ACETATE OF SODA.*

BY M. VIOLETTE.

An accident in the author's laboratory made known to him a singular reaction between nitrate of potash and acetate of soda, which, under the influence of heat, constitutes an explosive mixture equal in force to gunpowder. In some researches upon saltpetre he had heated moderately in a small phial a few grams each of nitrate of soda and acetate of soda, both previously fused and anhydrous. The two salts melted formed a colourless and transparent liquid, which gave off a few gaseous bubbles. At the same moment, a violent explosion occurred, accompanied by flame and smoke, which scattered the phial in fragments all over the laboratory; a fresh gaseous combination between the elements of the salts had taken place, leaving a slight residue of alkaline carbonates.

In repeating the experiment a gram of nitrate of potash was melted in a small platinum capsule at a gentle heat, and a gram of acetate of soda previously fused added to it. At a temperature of about 300° C. the mixture remained fluid, transparent and without alteration as long as the temperature remained constant; upon raising it to about 350° C. there was slight ebullition followed instantly by a loud explosion, with light and smoke, similar to that of gunpowder. As before, there was a slight residue of alkaline carbonates. The same result followed when a substance in ignition without flame was plunged into the liquid at 300° C.

If the melted mixture be poured upon a cold surface a white substance is obtained, which is hard, brittle, rather hygroscopic, more fusable than nitrate of potash, and being melted explodes violently. In the solid form it does not burn when placed in contact with an ignited body; but reduced to fine powder, it deflagrates violently upon the application of a flame.

The explosive properties of the mixture are only developed when the nitrate of potash and acetate of soda are present in certain proportions,—from 50 to 100 parts of the acetate to 100 parts of the nitrate,—the most explosible mixture being 100 parts of the fused nitrate to 60 parts the fused acetate. When the nitrate is in excess, the combustion is only partial and of short duration; when the acetate is in excess, the mixture burns slowly and similarly to a light wood.

A mixture of nitrate of soda and acetate of potash was found to have the same explosive properties, but to be more hygroscopic. Mixtures of nitrate of potash with the acetates of copper and baryta did not yield an explosive product.

* 'Journal de Pharmacie et de Chimie,' xvi. 333.

BETEL NUT CHEWING.

The Eastern correspondent of the *New York Mail* writes to that paper:—"There is a fascination in betel nut more extraordinary than in a tobacco passion. The consumption of the latter in chewing alone, in the United States, is a modern phenomenon. An inveterate chewer may have moral resolution enough to break off the habit, though it rarely happens that an effort is made to do so, as an apology is found for continuing a practice that is positively destroying the foundations of health. Once addicted to chewing tobacco, to abandon it is an achievement few have the happiness to perform, notwithstanding the melancholy mortality of men in the meridian of life who are constantly being destroyed by the subtle influence of that strange plant on the nervous system. Thus, sudden palsy of the heart, palsy of a limb, palsy of one-half the tongue, and even instantaneous death, are traceable by physicians to excessive use of tobacco. But the vice of betel-nut chewing, however, is still more remarkable. When the habit is established, there seems no retreat. Each victim wears out his teeth, gums, digestion, and dies with an unsatisfied longing for another quid. The betel-nut-tree thrives in most parts of tropical India, the Indian Archipelago, and the Philippine Islands, growing up gracefully about thirty feet, rarely more than eight inches in diameter. It is the *Areca catechu*. Penang is the universal name of the nut in those places where it is produced: hence Pulo Penang means a betel-nut island. At six years of age, the tree commences bearing nuts of the size of a small pullet's egg, of a bright yellow colour, enclosed in a husk similar to the cocoa-nut; within is a spherical nut very much like a nutmeg. Broken, a bit of it is wrapped up with a piece of unslaked lime in a peculiar leaf, the siri betelpiper, extensively cultivated for that purpose. The gums and mucous membrane of the mouth are quickly stained a brick-red; the teeth crumble to a level with the gums; and in that condition an inveterate betel-chewer is wretched without a supply. There are large plantations of betel-nut-trees in Java to meet the demand for home consumption and distant provinces. To augment the pleasure, those who can afford it add tobacco to the lime.—*Brit. Med. Journ.*

THE SURREY MAGISTRATES AND THE ST. PANCRAS VESTRY ON THE NEW ADULTERATION ACT.

At the meeting of the Surrey magistrates on Tuesday, December 31st, a report was presented in which it was recommended that an analyst be appointed in that county, with the following allowance:—For the first hundred cases in any one year £1 for each case, for the second hundred 10*s*. each, and if the number should exceed 200 in the year, then 5*s*. each for cases above 200; and further that the inspectors of weights and measures be appointed to procure samples of food, etc., and be allowed £1 in each case of conviction.

Mr. Gassiott advised the appointment of a practical chemist, as carried out by the Home and Indian Governments.

Sir A. Baggallay pointed out that the Act stated that those competent as medical men and conversant with chemistry and microscopical knowledge should be chosen.

Dr. Webster thought they would not get first-class men to accept the position at such a rate of pay.

Dr. Carpenter said the appointment was a most important one. It was to act as a check to the great adulteration of food at present going on and doing so much harm.

Mr. Hardman said the figures were based upon the scale to be paid Dr. Letheby, who was appointed for the county of Essex.

Some discussion ensued as to the payment by private persons who wished to have an analysis made, and ultimately, after remarks from Sir Francis Hicks, Mr. Locke King, and others, the amount to be paid was fixed at 10*s*., and the remainder of the report and recommendations were agreed upon.—*Morning Advertiser.*

The Vestry of St. Pancras has issued a series of regulations for the conduct of the officers appointed under the Adulteration of Food Act, these rules being divided into two parts—viz., those relating to private purchasers who may wish articles analysed, and those for the inspector under the Act who should submit articles for analysis in his capacity as public officer only. As regards the regulations for purchasers generally, the Act provides for the payment of a fee for analysis of not less than 2*s*. 6*d*., nor more than 10*s*. 6*d*., and the General Purposes Committee, by whom the regulations have been drawn up, state that as the object of the Vestry should be to have the Act carried out efficiently rather than to receive large fees, and as it would be difficult for the ratepayers generally to understand a scale of fees, whether governed by the value of the analysis or otherwise, there should be an uniform fee of 2*s*. 6*d*. charged to all purchasers of articles not intended for re-sale, and a fee of 10*s*. 6*d*. to all purchasers of articles intended to be re-sold. The fee should be paid to the inspector, and accounted for by him to the vestry clerk, and the inspector should not, under penalty of dismissal, be allowed to receive any fee or reward other than that fixed by the Vestry. When a sample is brought to the inspector by a private purchaser, such purchaser shall make a declaration that the article presented has been purchased at a place within the parish. The sample should be divided into three, and each portion enclosed, sealed, and numbered in the presence of the purchaser; but no name or other distinguishing mark should be placed on the sample, except the name of the article and labels descriptive of any admixture; but the inspector should enter in a book provided for the purpose the date, the name, the address of the person bringing the sample, the number of the sample, and other particulars. One portion should be returned to the purchaser, another retained by the inspector, and the third should be divided into two, sealed and marked, in the presence of the analyst—one portion left with the analyst and the other retained by the inspector. The inspector should not, except as provided for in section 3 of the Act of 1860, give the name of the person bringing an article for analysis to the analyst. The analyst should in his certificate of the result of his analysis refer to the particular sample analysed by number and description, and the certificate should be so worded as that it cannot be applied to any other sample, or used in any other way for the purposes of advertisement. The inspector should not be allowed to alter or interfere in any way with the certificate so as to identify such certificate with the vendor of the article or with any other person, and should not be allowed to give any form of certificate himself. As to articles purchased by the inspector, there should be a systematic scheme of sampling. The inspector should be only partially under the control of the analyst—*i.e.*, he should at the request of the analyst obtain samples of any one article—say bread—from the tradesmen in any one ward or district of the parish; but in every other respect he should act only under the regulations of the Vestry, or a committee of the Vestry. When required by the analyst to obtain samples of bread, he must obtain samples as far as possible from all vendors of bread in the ward or district. He must, in the presence of the vendor, divide his purchase into three, and enclose, seal, and number each portion himself, under seal, and dividing the third portion into two, in the presence of the analyst, retaining one portion and leaving the other with the analyst, and upon this portion the certificate of the analyst should be given. The certificate to be given under the same conditions as above-mentioned in regard to a private purchaser. When the analyst shall be of opinion that the result of an analysis of any article is such as to warrant the Vestry instituting proceedings against the vendor, he shall make a report to that effect to the Vestry, using only the number of the sample, and the Vestry shall thereupon, and without the name of the vendor being made known, resolve whether proceedings should be taken against such vendor. The analyst should be required to provide a laboratory at his own expense, and all things necessary for the purposes of analysis. He should be paid by a fixed salary, and not be allowed to receive any fees whatever except fees for attendance in a court of justice on proceedings being taken by the Vestry. The book containing the names and other particulars with reference to the numbered samples should be kept in the custody of the inspector, and no officer or other person should have access to such book or to the sealed samples in the possession of the inspector, except as ordered by a court of law upon any proceedings against the vendor of adulterated articles or by the Vestry or a committee of the Vestry.—*Times.*

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DISPENSING CHARGES.

THE exigencies which have to be satisfied by the editors of our daily evening papers may often be accepted as an excuse for their dealing with subjects they know little or nothing of, or treating those subjects in a claptrap and sensational manner. The idlers and gossips of the clubs must be provided with material for chatter; and if the events of the day do not afford anything of sufficient novelty and interest, the contributors' ingenuity must be taxed to invent something. It is probably under the influence of some such conditions that the *Globe* has lately produced an article entitled "The Charge for Drugs," in which it is sought to maintain the opinion that the pharmacist's charge for medicine is very frequently so excessive, that not only are the general public made the victims of imposition, but at the same time the kindness of medical men in prescribing gratuitously for the poor is often rendered abortive.

With the object of demonstrating that this is the case, the writer of the article referred to carried out what he terms the experiment of presenting a very simple prescription to a number of unsuspecting (*sic*) dispensers and ascertaining the price to be charged for the medicine both in the ordinary course of business and likewise in the event of its being required by an invalid in very poor circumstances.

To judge from the localities mentioned in the article, several of the leading pharmacists of the metropolis were in this way put to the test. At the same time the experiment was extended to Whitechapel and Bethnal Green, while as a crucial demonstration, we suppose, recourse was also had to the stores of a Co-operative Society.

The result, as might naturally be expected according to the most ordinary common sense view of the case, was that, on comparing the prices charged for the medicine at different establishments, there proved to be a very considerable range of variation. This fact, however, the Editor of the *Globe* seems to regard in the light of a great discovery, forthwith proceeding to moralize upon it with the air of a public benefactor, and to declare that, judging by the simple comparison of one druggist with another, there is justification for asserting that, while there may be houses from which the best of drugs are dispensed at a fair profit, there is, at least, a lamentable proportion of those whose charges are altogether unreasonable.

The ostensible object of this inquiry had reference to the numerous applications to our hospitals by the "decent poor" for medicine, and it was taken in hand by the *Globe* to show that they could not do otherwise than thus avail themselves of opportunities of procuring medicine gratuitously so long as present charges prevail; in short, that it is simply impossible for them to obtain necessary medicine elsewhere than at the hospitals.

This conclusion is perhaps perfectly reasonable and well-founded; we may also add that there does not seem to be any impropriety in the practice to which it points; but the case is different as regards the assertion previously referred to, and the doubt raised by the writer in the *Globe* as to whether there are any druggists content with what ought to be regarded as a fair profit.

In considering this part of the writer's opinions we will, in the first place, point out the glaring fallacy there is in regarding the observed variation of charge as being either wonderful or indicative of unfair dealing. The range of variation is no doubt wide—from 8*d*. to 1*s*. 6*d*, 2*s*., 2*s*. 2*d*. 2*s*. 6*d*., and 3*s*., but it is absurd to argue from that, while the conditions of the business carried on at the various establishments are totally ignored. Some of those referred to in the *Globe* were evidently situated in the most fashionable localities, while others were presumably establishments where dispensing prescriptions constituted the chief business, and where consequently an expensive staff of skilled assistants is kept. Others again, to judge from some of the localities named, were not subject to the charges appertaining to either of these conditions, being adapted to the modest requirements of a ready-money trade in small quantities of drugs and preparations,—dispensing being a thing almost unknown. Upon what ground, therefore, a comparison is made between these different cases for the purpose of showing that the higher charges are unreasonable it is difficult to see, and it is still more difficult to perceive why the lowest charge of all, made at a shop of the character last mentioned, should be taken as the measure of reasonableness in the charges made at Bond Street or St. James's. Unless it be for the purpose of making the argument fit the foregone conclusion, we confess our inability to see any such ground.

Moreover, what kind of bearing have the charges of Bond Street and similar localities on the possibility of medicine being obtained by needy persons. If we desired to learn how far the price of pea-jackets was within the means of navvies, we should scarcely go to POOLE or BUCKMASTER for the information!

The remainder of the argument based upon the intrinsic value of the ingredients of the medicine, together with the cost of bottle, label, paper, string, sealing-wax and pill-box, as estimated for the *Globe* by "a competent authority" is equally fallacious with that already referred to, as our readers will readily understand. But the remarkable feature of this is, the almost incredible meanness of the idea it conveys, according to which it might be contended that the value of George Eliot's writings should be assessed at the same rate as that of the news paragraphs or, we might say, the articles of the *Globe*.

It is remarkable that the above-mentioned estimate contains no reference to the value of the skilled labour employed in dispensing, nor to the fact that, irrespective of the cost of materials and of allowances for establishment expenses, a dispenser is in some degree entitiled to an honorarium for his skill and experience, just as the medical man is entitled to his honorarium for prescribing. This view of the case was well put by a "Chemist and Druggist" who replied to the article in the *Globe*, urging it upon the ground that the pharmacist has, like the medical practitioner, to undergo an examination in chemistry, pharmacy, botany, materia medica and practical dispensing before he can open a shop and carry on business for himself. But what will be thought of the competence of the writer in the *Globe* for criticizing the charges for dispensing, or the value of the services rendered in various ways by the qualified pharmacist, when we find him in answer to the letter above-mentioned, confessing such utter ignorance of the subject as is indicated by the following editorial note appended to this letter? "It "was certainly quite unknown to us that before a chemist can open a shop he must have passed an examination. We have always understood that such "an examination was purely optional.—Ed. of Globe!!"

ADULTERATION OF BUTTER.

Recent prosecutions at Liverpool have illustrated some of the legal difficulties which it has been foreseen will arise whenever an attempt is made to enforce the provisions of the new Adulteration Act. They have also illustrated another difficulty, which might equally have been foretold, viz., the confusion in which the administrators of the law would be involved by the conflicting testimony of witnesses in reference to scientific and technical details. An instance of this is the case reported at p. 517 of this Journal. A provision dealer was summoned for selling adulterated butter, and Dr. Campbell Brown, D.Sc., the public analyst for Liverpool, stated in his evidence that a sample of the butter in question contained a quantity of stearin and palmitin, and that it was, therefore, largely adulterated by the admixture of fats containing those substances. Dr. Brown also added, in cross-examination, that he was quite confident that in the pure article there should be no stearin.

Now, it is well known to chemists, as pointed out by Mr. Murphy, that butter consists of a mixture of fats comprising the common kinds of fat, viz., olein, stearin and palmitin, together with certain uncommon kinds, such as butyrin and caproin. So that, in fact, the reverse of Dr. Brown's statement is true; and it might be contended that the *absence* of stearin from a sample of butter would be strong evidence that it was not what it professed to be.

The relative proportion of these different fats in butter is said, moreover, to be subject to variation. Hence there must be no little difficulty in pronouncing with certainty on the genuineness or otherwise of samples of fat alleged to be butter. We require to know to what extent real butter is liable to variation; and until this point shall have been determined, the chemical examination of butter cannot be placed on a scientific basis.

One of the criteria insisted upon as a sign of sophistication is the requiring of a very large proportion of ether in order to effect complete solution. When this is the case, the fat is held to be too rich in stearin, and to have been mixed with some fat which is not butter. It is a question whether a determination of the butyric acid obtainable from a specimen of fat would be a valuable datum; and we understand that Mr. Wanklyn is engaged in investigating this point. A common malpractice in the trade is to cause butter to take up much water; and, as will readily be understood, the selling of water at the price of butter is highly remunerative. Good butter contains some 85 per cent. of pure dry fat; whereas some specimens of the article supplied to workhouses under the name of butter do not contain much over 60 per cent. of fat.

Mr. John James Bancroft, of Ruthin, Pharmaceutical Chemist, and Local Secretary of the Pharmaceutical Society, has been appointed Public Analyst for the county of Denbigh, under the Adulteration of Food, Drugs, etc. Act. Mr. Bancroft was analyst under the old Adulteration Act.

In medical literature the new year has produced no less than three new competitors with the older journals. In England the *Medical Record* is to be issued weekly by Messrs. Smith, Elder and Co.; and the *Students' Journal and Hospital Gazette*, fortnightly, by Messrs. Baillière, Tindal and Cox. The *Irish Hospital Gazette* is also to be issued fortnightly.

Transactions of the Pharmaceutical Society.

ADJOURNED MEETING OF THE COUNCIL.

January 8th, 1873.

MR. A. F. HASELDEN, F.L.S., PRESIDENT, IN THE CHAIR.

MR. WILLIAM SCOTT BROWN, VICE-PRESIDENT.

Present—Messrs. Atherton, Baynes, Betty, Bottle, Greenish, Hampson, Hills, Owen, Radley, Schacht, Shaw, Stoddart, Sutton, Urwick and Williams.

Elections.

MEMBERS.

Pharmaceutical Chemists.

The following, being duly registered as Pharmaceutical Chemists, were elected Members of the Society:—

Squire, Alfred Rook..........London.
Young, John Rymer..........Warrington.

Chemists and Druggists.

The following Registered Chemists and Druggist were elected Members of the Society:—

Abington, Herbert Joseph .....Ringstead.
Fletcher, John........59, Southgate Road, London.
Garstang, John..............Blackburn.
Heppell, Henry Huggins......Shepherd's Bush.
Hodgkinson, George..........Coventry.
Hodgkinson, John Samuel.....Matlock Bridge.
Jones, John Harrison.........Denbigh.
Phillips, John................Brighton.
Plumley, James George.......Bristol.
Shaw, Ralph Hopwood........Seacombe.
Sissmore, Henry Tertian......Cranbrook.
Smith, Richard Edwin........Bridlington.
Wiggins, Henry ....Bermondsey.

ASSOCIATES.

The following, having passed their respective examinations, and being in business, were elected "Associates in business":—

Minor.

Beard, Thomas William ......Walmer.
Butcher, Henry ....Swinton.
Mortiboy, John ....Herne Hill.
Shakerley, Benjamin ....Penzance.

Modified.

Coke, Richard Sweet ....Devonport.
Gee, David Gillam ....Whitehaven.
Gee, Stacey Thomas..........Whitehaven.
Rayner, Hessey..............Hull.
Rees, Joseph ....Cardigan.

The following having passed their respective examinations were elected "Associates":—

Minor.

Anderson, James Laurie......Leith.
Anthony, David ....Cardiff.
Ashwell, Lawrence Thomas ..London.
Atkinson, Miles Christopher ..Manchester.
Ellis, Robert ....Aberystwith.
Fletcher, Frederick William ..Totton.
France, Joseph ....Rotherham.
Hannah, Charles ....Abergele.
Hardcastle, Stephen Barnabas. Knaresborough.
Manlove, Richard Joseph ....Slough.
Roberts, William Henry ......Bath.
Sadgrove, Arthur Augustus ..Faringdon.
Sharrah, Richard ....Hull.
Taylor, Stephen John ....Westbury.
Woolldridge, George ....Birmingham.

Modified.

Furniss, Thomas ....Halifax.
Lugar, Henry ....London.

APPRENTICES OR STUDENTS.

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

Billinge, Mark ....Hyde.
Carter, William Gibbon ......York.
Charles, Thomas ....Bacup.
Clegg, Joseph ....Manchester.
Cooper, Albert Henry ....Walmer.
Davies, George Edward ......Notting Hill.
Dobson, Fred ....Great Driffield.
Fawthrop, Thomas ....Ryde.
Goss, Walter Herbert ....Barnstaple.
Green, George ....Thetford.
Hawken, Alexander Menhinick. St. Austell.
Hine, Alfred Leonard ....Cheltenham.
Hobbs, Thomas Henry Hurle..Wells.
Holyoake, Francis ....Wandsworth Road.
James, Joseph ....Hanley.
Jeans, Thomas Robert ....Mansfield.
Jinks, John ....Tipton.
Jones, Charles ....Wellingborough.
Lewis, David ....Merthyr.
Matthews, George Francis ....Bristol.
Simpson, Robert George ......Stowmarket.
Treadgold, Frederic Cecil ....Ferneley.
Tritton, Charles Edmund......Bristol.
Walker, George ....Liverpool.
Wilson, Thomas Whiting......Harrogate.
Wingrove, Thomas............St. Albans.

Finance Committee.

The report of the Finance Committee was read.

Mr. Shaw asked if the Committee had ever made any report on the subject of varying the investment of the Society's funds, as they were desired to do by resolution in July last.

Mr. Betty said the Committee had obtained the opinion of the solicitor that their funds might legally be invested in freehold ground rents, and a letter from him to that effect had been laid before the Council, but the Committee had made no formal report on the matter. Mr. Urwick had given a notice of motion on the subject, which would be brought forward later.

The report was received and adopted.

Library, Museum and Laboratory Committee.

The report of this Committee was read. It recommended the purchase of the following:—

Attfield's 'Chemistry.' Fourth edition.
Bengal Pharmacopœia.
Fownes's 'Manual of Chemistry.' Eleventh edition.
Valentin's 'Introduction to Inorganic Chemistry.'
Philosophical Transactions.

Professor Attfield reported that there had been fifty-six entries in the Laboratory since the commencement of the session, and that fifty-four students were working very satisfactorily.

Parliamentary Committee.

The report of the Parliamentary Committee was read. The Committee had considered the question of the fees payable at the examinations, and suggested a re-arrangement making the fee for the Minor five guineas, and that for the Major three guineas, leaving the Preliminary examination fee two guineas as at present. The report also recommended the framing of a new bye-law, providing that no resolution be entertained or considered at any general meeting which would affect the legal status of the members, unless a fortnight's notice thereof be given.

The report was received.

New Bye Law.

It was then moved by the Vice-President,

"That the following be added to the Bye Laws, Sec. 20, as Clause No. 4: 'No resolution of the Society by which the legal position of the members of the Society or the legal position of chemists and druggists, whether members of the Society or not, may be altered, shall be passed at any meeting, unless fourteen days' previous notice of the intention to introduce such resolution has been given.'"

Mr. Hampson seconded the motion.

Mr. Williams suggested that according to the wording of the resolution, such a resolution as was referred to might be introduced and discussed the whole day, though it could not be passed, and suggested a slight verbal alteration in it to meet this difficulty.

The Vice-President said the matter had been referred to the solicitor, who had prepared three alternative forms of bye-law, of which he had chosen the one which seemed on the whole most suitable. With regard to the objection made by Mr. Williams, he did not think any chairman would allow a matter to be discussed when it was not competent for the meeting to come to a decision upon it. A distinct pledge was given at the last annual meeting that such a bye-law should be passed before the next meeting; and in order to this being done, it was necessary to take action at once, as the new bye-law must be passed at two succeeding Council meetings, and a special meeting, as well as submitted to the Privy Council.

Mr. Bottle expressed his approval of the new bye-law.

Mr. Williams had much pleasure in supporting the resolution, and only regretted that some further alterations in the bye-laws were not made at the same time, since it would save trouble and be better in every way if they went to the Privy Council with several alterations at once. He might take credit to himself for having called attention in the first place to the fact that under the present bye-laws a resolution of a most obnoxious character might be brought forward and passed without any previous notice having been given.

The President having expressed his approval of the proposed bye-law, the motion was put and carried unanimously.

Provincial Education Committee.

The report of this Committee was read. It stated that the Committee had further considered the schemes which had been suggested for promoting provincial education; that the Committee were early impressed with the conviction that, for the successful carrying out of any scheme for promoting provincial pharmaceutical education the general co-operation of pharmacists throughout the country was necessary, and they accordingly suggested that the Council, in publishing a proposition advanced by one of their own members, should invite the fullest expression of opinion on the matter. This had resulted in a manifestation of so much variety of opinion, that the Committee did not feel able to recommend the adoption of any particular scheme; they, however, recorded their opinion, that any project of this nature should include not only a provision for aiding isolated local efforts, but also a plan by which these could be united in some common ground of mutual interest and mutual rivalry.

Mr. Schacht said he should be sorry if it were considered that the whole matter was at a standstill because the Committee did not feel able to move much further at present. The report truly stated that the variety of opinions elicited had been rather confusing; but for the successful carrying out of any plan something like a cordial co-operation throughout the whole country was necessary, which at the present moment was scarcely to be expected. He hoped, however, that one step had been gained, and that they had arrived at this stage, that any scheme pretending to satisfaction must include some plan for the display of its results upon a larger arena than could be obtained in isolated provincial schools. It was thought that the present method of aiding individual effort throughout the country had this great disadvantage, that both the students and their instructors had not much space in which to distinguish themselves; therefore any scheme, aiming to do good service and to promote really scientific education, should have as an essential feature of its operation, some method of gathering together all these results at the close of the year, so that those who had exerted themselves successfully might meet with recognition at the hands of the pharmaceutical world. He would add that he was by no means discouraged or disappointed at the present result, for he did not expect that any scheme would be universally adopted without a great deal of discussion and consideration, and he was quite satisfied that an important step was gained if the principle were fully recognized which was stated in the report of the Committee, and which he had endeavoured fully to illustrate.

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

Report of Examinations.

ENGLAND AND WALES.

December, 1872.

Examinations.	Candidates. Examined.	Passed.	Failed.
Major	12	7	5
Minor	51	31	20
	—	—	—
	63	38	25

Certificates received in lieu of the Preliminary Examination:—

University of Oxford 2

Investments of the Society.

Mr. Urwick moved, in accordance with notice:—

"That £10,000 of the Funds of the Pharmaceutical Society be invested in Freehold Land or Freehold Ground Rents, and that the Secretary be instructed to look out for such investment, subject to the approval of the President and Treasurer of the Pharmaceutical Society."

He said it was unnecessary to speak at any length upon this topic; the Solicitor had advised that such a mode of investment would be perfectly legal, and as it would increase their income by at least 1 per cent., he hoped it would be agreed to. It had been said that the Council generally ought to attend to this matter, but he had such confidence in the President and Treasurer that he thought they would be quite competent to act as was suggested. He would only add that he did not mean that the whole £10,000 was to be invested in a lump sum on one security, because it might happen that it could be laid out to greater advantage in separate amounts. If the principle were adopted he had no doubt, at some future time, it would be extended to the Benevolent Fund as well as to the General Fund of the Society.

Mr. Baynes seconded the motion, and said he regretted that there was no report from the Finance Committee on this subject, referred to them some time ago. Large life assurance companies were in the habit of getting $4\frac{1}{4}$ to $4\frac{1}{2}$ per cent. for their money, and he thought the Council ought to do something of the same kind, and to endeavour to make the best use of the spare funds they had in hand. They had nearly £30,000 at command, and 1 per cent. increase on equally good security was an important matter.

Mr. Shaw supported the resolution, and hoped it would be extended to the Benevolent Fund, which certainly was in want of all the assistance which could be obtained for it; an increase of 1 per cent. in the interest on their investments would enable them to do considerably more for persons in need of assistance from the Benevolent Fund, perhaps to add three or four annuitants. The sole question was as to the security, and he must say that freehold land or ground rents were fully equal to the Funds.

The PRESIDENT read a letter from Mr. Sandford, who was not able to attend, in which he deprecated the adoption of the resolution on various grounds, but suggested that the funds of the Society might be invested in India Bonds to pay 4 or $4\frac{1}{2}$ per cent.

The VICE-PRESIDENT inquired what was the average rate of interest paid by the whole of their investments.

Mr. HILLS said he could not say exactly; it would be from $3\frac{1}{4}$ to $3\frac{3}{8}$; certainly under $3\frac{1}{2}$ per cent.

Mr. SUTTON said India Bonds were now becoming very prominent as an investment, and they were just as good as English Government securities; at any rate, this was the opinion given to him by a legal gentleman whom he had recently had occasion to consult.

Mr. HILLS said that might be so, but India Bonds did not come within the definition of Government securities to which they were limited by the Bye-laws.

Mr. GREENISH said investments in India Bonds were allowed by the Court of Chancery.

Mr. BAYNES said there were two classes of Indian securities, one guaranteed in India, and the other having the guarantee of the Imperial Government, but the latter, he believed, paid a much smaller rate of interest than the former.

The VICE-PRESIDENT said he did not think this latter class of Bonds could be brought to pay more than 4 per cent. The Treasurer had informed them that the average rate of interest was about $3\frac{3}{8}$, and he should like to know where they could invest their money upon freehold land without buildings upon it, which would pay a rate of interest exceeding that which their Government investments brought in at the present time. He did not think they could do so unless they went into speculative purchases on the contingency of the land increasing in value, and that was totally foreign to the objects of the Society, and ought not to be encouraged. It would open the doors to what might prove hereafter a very awkward state of things. Freehold ground rents were no doubt a very good security, but he did not think they could be purchased to pay more than 4 per cent., not such ground rents as they would have anything to do with. He had known such property sold repeatedly for from 26 up to 32 years' purchase, and 25 years' purchase, which would only give 4 per cent., was a low average value to give for ground rents of an unexceptionable character. Personally, he should be very sorry to confine himself to the Public Funds for any investments he had to make; but they were trustees for the Society, and were placed in a different position.

Mr. BOTTLE said the question of changing investments was an idea which he himself had proposed some fifteen years ago, when he felt extremely warm upon it, and urged the Council to do what was now proposed with all the force he was able to command; but fifteen years had made a change in circumstances relating to freehold ground rents, and at the present time he should feel bound to vote against the resolution. Had they made a purchase of freehold land fifteen years ago, probably £10,000 invested then would be worth £15,000 now, but he saw no prospect of a similiar increase in the value of land taking place in the next ten or fifteen years; on the contrary, he thought it had reached its maximum value, and taking into account the salaries and expenses which would be requried in managing this class of property, he thought they would be losers rather than gainers if they invested £10,000 in freehold ground rents rather than in Consols.

Mr. HILLS said he should prefer the matter being referred to the Finance Committee to report upon.

Mr. BAYNES said he made a similar motion some time ago, referring the matter to the Finance Committee, but it came to nothing.

Mr. URWICK, in reply, said he had confined himself to testing the opinion of the Council with regard to the investment of £10,000 from the General Fund before going into the question of the Benevolent Fund, though he should be glad to see all the funds invested more profitably. He thought Mr. Brown was in error, as he could speak from experience of 4 per cent. and even more being easily obtained in ground rents, though he did not believe more than $3\frac{1}{2}$ could be obtained from the purchase of freehold land. He differed, however, from Mr. Bottle in thinking that land had reached its ultimate value in England, for he did not think this was the case by any means. As a security he believed freehold ground rents were preferable even to the Funds, and with that class of security he should suggest there would be no difficulty in collecting. With regard to foreign funds, which had been suggested by Mr. Sandford's letter, the Council had no power to invest in them, and although India Bonds might pay better interest than Consols, still most of them now stood at from £108 to £110, and were liable to be paid off at £100, and if such a thing were to happen, the percentage would be considerably reduced. But the Council had no power to invest in Indian securities.

The motion was then put, with the following result:—

For—Messrs. Baynes, Shaw and Urwick.

Against—Messrs. Atherton, Betty, Bottle, Brown, Greenish, Haselden, Owen, Radley, Schacht, Stoddart, Sutton and Williams. The motion was therefore lost.

Mr. Hills and Mr. Hampson were present but did not vote.

GENERAL ARRANGEMENTS OF THE HOUSE.

Mr. BETTY, in accordance with notice, moved—

"That the house committee be instructed to inquire into and report upon the present duties of the clerks, and house servants, and generally as to the arrangements and accommodation of the establishment."

He said the present arrangements of the establishment were most inconvenient in many ways, not only for the Council, but also at the times of examinations. On a recent occasion there were upwards of forty young men crowded into two rooms which was most undesirable in a written examination. Great confusion consequently existed, and great annoyance, not only to those who were being examined, but to the whole establishment. It was certainly very clear that a young man could not pass an examination with satisfaction to himself in the midst of such bustle and confusion as took place under such circumstances, especially with the knowledge present to his mind that he was then in one of the most important crises of his career. Various suggestions had been made at former times for the purpose of remedying these evils, but he hoped now the whole matter would be relegated to a committee, and that they would devise some means of more satisfactorily carrying out the Society's business.

Mr. WILLIAMS had great pleasure in seconding the motion. He was very sorry the Society did not see its way some two years ago, to take advantage of an opportunity which then occurred of purchasing the Inns of Court Hotel, and converting the portion fronting Lincoln's Inn Fields into a proper edifice for the use of the Society. However that was past now, but the question which Mr. Betty now brought forward was of even greater importance. He did not think that proper accommodation could be obtained in the premises they occupied without very considerable alteration, involving the expenditure of a large sum of money; and he hoped one of the first steps would be to carry out the principle of Mr. Urwick's motion, and invest a sum of money in purchasing the freehold of their own establishment. He should quite agree that that would be a proper and a right investment of the Society's funds, and he hoped that would be borne in mind before any great expenditure were incurred; in fact that had been one reason which weighed upon his mind in voting against the last motion. He hoped the Council, in agreeing to send this matter to the Committee, would be prepared to act in a bolder spirit than they had hitherto done, and to take steps which would result in providing something like a proper home for the Pharmaceutical Society of Great Britain.

Mr. Hampson said he had noticed when the examinations were going on a great confusion in the building, the stairs and passages being crowded by the students.

The President before putting the motion said, he thought the inconvenience of the examinations had in some respect been exaggerated. With regard to the Modified examination, the numbers did not generally exceed forty, and the candidates were never all in the room at the same time; and with respect to the ordinary examinations, it was now arranged that the number seldom exceeded twenty-five, in fact the examiners would not take more than that number in one day, so that generally not more than fifteen were in the room at one time. The Library was large enough to hold all the students who came, and they all assembled there at the beginning of the day, and the lounging about the staircases which had been referred to, arose, he believed, from young men waiting after they had finished their examinations in the hope of getting some information as to the result, instead of going away.

The motion was then put and carried unanimously.

Lady Students.

Mr. Hampson, in accordance with notice, moved:—

"That all persons attending the Professors' morning lectures be eligible to compete for the prizes and certificates given at the end of the session."

He was sorry to trouble the Council again so soon, but he brought forward the subject again because of its urgency, and this being the season of the year when good resolutions were usually made he hoped to obtain a favourable vote. If the minds of members had been free from prejudice, it would not have been necessary to introduce the matter at all, because the published regulations provided that all students might compete for prizes and certificates, and lady students being now admitted to the lectures, it appeared to him to follow necessarily that they should have an opportunity for competing for the prizes. It was simply giving a full and legitimate effect to their admission. Their fees had been taken, and so long as the present regulations were in force, the Council ought, both legally and honourably, to give them an equal share of the privileges for which they had paid. During the last discussion Mr. Bottle had raised a very wide question as to making the competition perfectly equal, and no doubt as far as possible this should be done; but it had never been attempted for the male competitors, and it would be utterly impossible, in fact, to effect it. He repeated that it was very undesirable that any delay should take place in settling this question, and he hoped it would now be settled in a favourable sense.

The Vice-President seconded the motion, saying he did not see how, having admitted the ladies to the lectures, they could be precluded from competing for the prizes. At any rate, he should be glad to hear any objections stated.

Mr. Betty objected to the way in which these resolutions came forward. He thought it was rather a roundabout way of bringing forward the question. If the intention was to encourage ladies to enter the business, it ought to be plainly stated, and a vote taken upon it in an open and straightforward way. It must also be remembered that the sessional prizes were not a permanent institution, for in the course of a longer or a shorter time their whole educational arrangements might be modified, and there might not be even a laboratory or lectures connected with the institution. It therefore seemed to him uncalled for to bring forward such a resolution now.

Mr. Schacht said the last speaker had insinuated that there was an ulterior object in the minds of those who advocated that which he himself did not quite approve of, but he saw no ground for such an assertion. On the last occasion he (Mr. Schacht) stated that he had no other object in the matter than what was plainly and straightforwardly stated on the motion. Mr. Hampson could, no doubt, answer for himself; but he certainly did not think it was at all necessary to suppose that in this matter there was any other consideration than that which came plainly before them. There was a distinct application made to the authorities at the institution to know whether ladies could be admitted. That was brought before the Council by a direct proposition, and it was determined that they should be admitted to the lectures but not to the laboratory. Next came the question whether they were to be fully admitted or only half admitted; another application being made by the ladies to know if they were entitled to the full privilege of students. That also had to be answered by the Council, and a direct proposition was made for the purpose of obtaining a decision. As far as he could see, nothing could be more straightforward. He did not wish to introduce any more ladies into the business than those who wished to come, but if they wished to attend, and the Society was bound to admit them on the Register, they ought to have the same opportunities as others to qualify themselves for the duties. That position had never yet been answered, nor did he see how it could be.

Mr. Shaw endorsed the argument of Mr. Schacht. He said he had before deprecated the reintroduction of this question over and over again, as he thought it very undesirable that ladies should be admitted to the privileges of the Society, but with regard to the immediate resolution before them, inasmuch as lady students had been admitted, it appeared to him that the bye-laws were conclusive that they were entitled to compete for the prizes. He therefore scarcely saw the necessity for the resolution—unless, indeed, the Council had the power to veto the presentation of prizes to ladies simply because of their sex. He did not, however, think they would come to that conclusion.

Mr. Stoddart said he could not yield to any man in kindly feeling towards the ladies, but, at the same time, his opinion was that the school of pharmacy was not their proper place at all. He considered it quite an act of grace to admit them to the lectures. To take a case in point. If he sent his own daughter to that institution, and she were admitted to the classes, he should consider himself very much obliged for the favour, and should certainly never dream of her coming to compete for the prizes. He therefore could not vote for the resolution.

Mr. Baynes said he was bound to vote not exactly according to his own personal feelings, but taking a broad view of the whole question. He did not think there was any probability, in his day at least, of ladies being members of Council or filling the Presidential chair, but, nevertheless, if in accordance with the times such a thing were to happen, he for one should be prepared to accept it. The chief difficulty in his mind was this, not whether ladies should be put upon the same footing as all other students—and he thought they should, for having once admitted them he saw no other course open—but that although the institution was formed for the promotion of pharmacy, as he took it, amongst persons actually in the business, yet mere amateurs, medical students, or any one else might attend the lectures, and if they did they might compete for the prizes. The bye-laws appeared to him a little defective in this respect, but so long as they stood in their present shape he could not make any distinction between a male and female student.

Mr. Sutton said that there was a difference made with regard to those attending the lectures as to the fee which they paid according to whether they were connected with the Society or not. Now the lady students would naturally fall into the latter class, and the question was whether a regulation could be made that all persons competing for the prizes should be connected with the Society. As far as Mr. Hampson's proposition was concerned, he did not see how they could stop the ladies from competing under the existing regulations.

Mr. Radley thought it was quite a privilege given to the ladies in allowing them to attend the lectures, and he certainly should be averse to holding out any inducement to ladies becoming competitors in the trade. It was not the province of the Society to do anything of that kind, and rather than go on in that direction, he should prefer retracing the step they had already taken.

Mr. Atherton said there was some excuse for ladies seeking a medical education, but there was none for their desiring to become chemists and druggists. He should therefore vote against the resolution.

Mr. Urwick said he should support it. They had no right to look into the future and speculate as to what was to happen hereafter. He believed it would have a very beneficial effect if some of the ladies did take prizes.

Mr. Williams said when he voted in favour of ladies becoming students, he had no idea of their desiring to attend the lectures for anything except their own information, and he certainly was averse to their competing for the prizes.

Mr. Bottle said Mr. Schacht had asked whether ladies were to be fully admitted or half-admitted. As far as he understood, they were only half admitted, availing themselves of the privilege of attending the lectures; but if they desired to become students and obtain all the privileges of the Society, they must become students and pay their annual subscriptions accordingly, as provided by the bye-laws. They would then be in a fair position to compete.

Mr. Sutton said prizes were now given to those who were not registered students of the Society.

Mr. Bottle said if that were done it was a mistake, it was not intended when the prizes were instituted. He was most desirous not to place the ladies in any different position to those of the opposite sex, but on the other hand, if they were desirous of becoming pharmacists, they must do it on the same footing as the male students. He believed the prizes were intended for those connected with the Society, and if any one else had been allowed to compete it was plainly an error which ought not to be perpetuated. He would ask Mr. Hampson, therefore, to advise his lady friends, if they desired to compete for the prizes, to become registered students of the Society.

Mr. Shaw said he did not think the bye-law quoted by Mr. Bottle was binding at the present time.

Mr. Hampson, in reply, said Mr. Bottle professed himself anxious as far as he could to act justly in this matter, but he did not think that the lady students were entitled to compete for prizes, because they were really not genuine students in the same light as others. This was a mistake on his part, inasmuch as the three ladies now in attendance had already undergone the test of the Preliminary examination, and were going through the regular course which male students usually took. Consequently it was not any amateur attempt on their part, but a genuine desire to obtain a position in pharmacy. On these grounds, therefore, he claimed Mr. Bottle's support. These young ladies were not studying for a mere pastime, but with a view of earning their daily bread. With regard to there being some prospective changes to be made in the educational arrangements hereafter, it was mere nonsense to set that up as an obstacle on the present occasion, there being no positive connection whatever between the two things. The ladies in question were students of the Pharmaceutical Society; they were anxious to gain all the information they could, and they simply wanted the common privileges given to the other students.

The President said it was no doubt a mistake to allow those not connected with the Society to compete for the prizes, but because one mistake had been committed, that was no reason why they should go on and commit another.

On putting the question to the vote, the result was as follows:—

For: Messrs. Baynes, Brown, Hampson, Schacht, Shaw, Sutton and Urwick.

Against: Messrs. Atherton, Betty, Bottle, Greenish, Haselden, Owen, Radley, Stoddart and Williams.

The motion was therefore lost. Mr. Hills was present but did not vote.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The fifth general meeting of the session was held on the evening of December 19th, the President, Mr. E. Davies, F.C.S., in the chair.

A discussion took place on the decision of the magistrate the preceding day, in a prosecution under the Adulteration of Food Act, in which the President, Mr. Abraham, and Mr Shaw took part. Mr. Shaw stated that the magistrate's ruling was directly opposed to that in a previous case. The President repeated his conviction that the Act would prove powerless unless the vendor was made responsible for any adulteration whether he were aware of it or not.

The President called attention to a new quinimetric process by P. Carles, published in the December number of the 'Journal of the Chemical Society,' and mentioned some experiments he had made with a view to determine its success. He also stated that he had tried a process contained in the same number of the Journal for testing for nitro-benzol in essential oil of almonds, which was simple and had proved in his hands perfectly successful.

Mr. A. E. Tanner was glad that the President had tried the process mentioned for testing strength of barks; he had seen it described in the 'Year Book of Pharmacy,' and felt a wish that the method should be tried.

The President said that he had found the use of the air-pump of great advantage in his experiments in Carles's process, as the causing a vacuum in the receiver of the percolator had facilitated the extraction of the matter very much.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

A meeting of the Midland Counties Chemists' Association was held on Monday evening, December 30th, at the rooms of the Association, Quadrant Chambers, New Street. The chair was taken by Mr. J. Lucas, pharmaceutical chemist. A paper by Mr. H. W. Jones, on "Yellow Cinchona Bark," in which the subject was ably treated, was read by the author, who gave some interesting information about some new alkaloids, etc.

Proceedings of Scientific Societies.

MEDICAL SOCIETY OF THE COLLEGE OF PHYSICIANS.

Disinfection in Connection with Small-pox.

BY CHARLES R. C. TICHBORNE, F.C.S., M.R.I.A.;

Hon. and Corresponding Member of the Chicago and Philadelphia Colleges of Pharmacy, etc.

In considering the contagious nature of small-pox and the value of antiseptics in connection therewith, I will ask you to bear with me for a short period, whilst I consider the germ theory of disease generally. It has been conclusively proved that all rooms are filled with a certain amount of dust moving about in variable quantities —at least, to all intents and purposes, it may be considered as never being absent. The greater proportion of this dust, as shown by Tyndall in the analysing tube, is organic, or, in other words, can be destroyed by heat. Some medical men of great celebrity are of opinion that most of the epidemic diseases are carried through the atmosphere in the form of germs peculiar to each disease—that certain diseases again may be instigated by the change or fermentation induced during the growth of germs (not peculiar to the disease), at the expense of their surroundings. As regards experiments performed upon the development of bacteria, they would properly only bear upon epidemic diseases from this point of view; but I myself do not see that there is anything particularly to connect them with small-pox or such like contagious diseases. They are always the forerunners of putrefactive change where atmospheric air has been in contact, but this simply proves that the germs of bacteria are always present in ordinary atmospheric air. Here is a substance that was once a solution of milk-sugar, now converted into solid lactate of lime by germs taken at as high an altitude as the top of Nelson's Pillar. But these results can be obtained equally well when there is no small-pox in the city. As regards the nature and actual appearance of most contagious germs connected with epidemics, I plead total ignorance, and think the biologist, physicist and chemist are all equally ignorant. We are not yet armed with instruments powerful enough to investigate or classify the "milky way" of minute organism, as Ehrenberg terms it.

There is, however, another view to take of the atmospheric propagation of disease, which, I think, has been too much lost sight of. This is the mechanical action of this dust, or the raft theory, as I will call it. I, however, lay no claim to the use of the word raft. It was used by Professor Tyndall in one of his lectures to explain how the particles of a *non-volatile* salt, chloride of sodium, were always found in the air. Now, as we know that the virus of small-pox may be dried without impairing its activity, we have all the requisites for dissemination by the atmospheric rafts. It is self-evident that we can inoculate contagious diseases directly or indirectly (I use the word contagious and other similar words in their strict sense). The Otomak anoints his thumb nail with the deadly curara, and scratches his enemy, but the Indian generally anoints his arrows with it to send his poison through the air, and yet these arrows are equally efficacious as engines of death. Is not this the raft theory of indirect contagion merely exaggerated? If we consider the immense amount of inoculable matter that is disseminated in a city like this, where 600 to 700 lie ill of the same contagious disease, we shall see no difficulty in arriving at this conclusion. I have no hesitation in saying that there is not a cubic inch of atmosphere in Dublin where the small-pox virus is not. But, like all poisons, there is, I suppose, a point of attenuation where it is inert, and to keep it below that point is the great use of volatile disinfectants. The dried virus floating upon those rafts cannot be affected by non-volatile disinfectants.

I listened a few nights ago with a great deal of pleasure to a paper read by Dr. Cameron upon this subject, it being filled with a number of observations of great originality. The tendency, however, as I understood it, was rather to undervalue disinfection as regards epidemics of this class. Now, I am of opinion that it would be dangerous in the extreme to cast away these now old and well recognized friends. In fact, to me it seems to be only within the last few years that we have been beginning to understand the principles of disinfection. We are frequently told by the medical men that there is nothing like "fresh air," which, translated chemically, means oxygen, plenty of it, and in an active state. Such remarks are the true harmonic chords of science, but how are we to get fresh air in a contaminated city, if my mechanical theory of atmospheric dust is correct, or has the slightest stability whatever? Does not the real difficulty of disinfection lie in our misapplication of each particular disinfectant which has its peculiar function, and our want of knowledge of its action on those germs at present unknown? If we use chlorinated lime to disinfect a room (chlorinated lime being simply an oxidizer), what do we do but facilitate the efforts of the atmospheric oxygen to purify by oxidation? We charge the air with nascent oxygen, or that element in its most active form. Thus this air that had been already artificially deprived of its activity outside by contact with contagious matter, is re-oxidized to its maximum capacity. Now, although this is quite consonant with our chemical knowledge, it might be said that, after all, it is but a theory; but let us see how it agrees with our experience.

On the first week in November, 1871, in an establishment, the name of which, from obvious reasons, it is not desirable to mention, a case of small-pox occurred. As there were about 200 beds upon this establishment, it is almost needless to remark that considerable alarm was felt by those with whom rested the responsibility of management. A consultation was held, and a well-known and well-advertised disinfectant was used with every precaution as regards cleanliness. Imagine the consternation when case after case was sent out of the house, until the eleventh was taken to the hospital on the 6th January, who died on the 11th of the same month—a case every fifth day. A consultation was again held, and with advice the following plan was adopted. The disinfectant was changed, and the use of carbolic acid and chlorinated lime was agreed upon. The carbolic acid (pure) was chiefly used in water-jugs, a few drops in each jug. A man was told off specially to disinfect the place, and to do nothing else. In the morning he made his solution of "chloride of lime," about ½ lb. or 1 lb. to the gallon of water, in a large tub. It was allowed to subside, so that it was quite bright and clear when he wanted it for use. At three o'clock P.M., he went through all the rooms, sprinkling the solution over every floor, and the windows were left open, so that the rooms were dry by the time they were required for use, equal attention being paid to the mechanical cleaning of the walls. The change in the system of disinfection was made on the morning of the 11th of January, the day when the last case was buried, and from that day to the present there has not been a single case of small-pox in this seething mass of humanity.* Can we believe, after such an instance as the above, that there is nothing in disinfection if systematically and judiciously applied? I may mention that other establishments in Dublin have had a very similar experience. Cresylic and carbolic acid are the most efficacious volatile antiseptics, and chlorinated lime one of the most efficacious as an atmospheric oxidizer. Permanganate of potash is invaluable for certain special applications. Here is a simple experiment which, I think, conclusively proves the value of chloride of lime as an oxidizer. I blow through a series of wash bottles and tubes. In the first bottle the air traverses a fermenting mass containing a weak solution of a ferrous salt. If the air contained any readily available oxygen (it matters not whether we consider it ozone, or condensed oxygen, or nascent oxygen, if it does its work), it will be deprived of it. This fact is demonstrated by being passed over ozone test-paper contained in the next tube. There is no evidence of decomposition. It is then passed in the next bottle through water containing a few drops of chlorinated lime, and then through a wash-bottle con-

* On the 24th of June, when this paper was going through the press, this house was still free from any case of small-pox.

taining a solution of ammonio-chloride of silver to remove any trace of chlorine. It lastly passes through a tube containing the ozone paper, which is now seen to be rapidly acted upon by the air. It is completely changed in its character, and is now a powerful oxidizer; and it is immaterial to our purpose how this has been brought about. It is now replenished, ready to do its duty and fight the battle with the rafts of contagion; and if it only succeeds in further attenuating the effects of this poison by burning up a fraction, the "disinfectant" has done some good.

As regards antiseptic treatment in the blood, it is a subject with which, I think, chemists are justified in dealing. Medicine may act simply by a certain portion of it getting into the circulation by diffusion, by some inherent virtue of its own upon other constituents of the body; or it may act by virtue of a partial decomposition or oxidation occurring in the blood, and producing effects not directly from the operation, but from an infinitesimal small amount of a new product being liberated in the nascent condition in the blood. Thus in the case of chloral hydrate it is probable that it is but a fraction of the dose given that finds its way by diffusion into the circulation as chloral hydrate, but there it is also converted into nascent chloroform, and produces its well-marked effects; no dose of chloroform will, when taken internally, produce similar results. Such reactions as these are the most potent and valuable in medicine.

Xylol's action is said to be due to the fact that it becomes an antiseptic in the blood. Now it is probable that if it does act as such, it is due to some product of oxidation. That it is really rapidly oxidized there can be no doubt from the fact that a peculiar odour, distinct from xylol, can be perceived in the urine. It is worthy of note that this hydro-carbon xylol, C_8H_{10}, may be viewed as either dimethylbenzene $C_6H_4(CH_3)_2$ or ethylbenzene $C_6H_5(C_2H_5)$. Now if either of these be its true composition, the residual molecule benzene is the hydride of phenyl, the radical of the so-called carbolic acid. Thus if we act upon benzene by bromine, which is merely a convenient mode of oxidizing, hydrogen is given off, and we get bromide of the radical phenyl.

$$\text{Phenyl}—\left.\begin{matrix}C_6H_5\\H\end{matrix}\right\} O = \text{Carbolic acid.}$$

From the reports of the medical men I should consider the efficacy of xylol as doubtful, but it is self-evident that it may not necessarily possess specific properties to be an active medicine. It would require a lengthened experience of its capabilities at the bedside to determine its actual value in the human laboratory. Although its action may be generally prognosticated, it can never be proved in the test-tube.

The ultimate oxidation products of carbolic acid would probably be oxalic acid and carbonic anhydride, and therefore the action of sulpho-carbolates of which some medical men speak very highly, is that the carbolic acid *per se* acts as an antiseptic being diffused into the circulation. I have tried experiments upon dilute solution of albumen and vibrios, from which it would appear to me that the dilute solutions of carbolic acid destroy the activity of the vibrios before they coagulate the albumen. The more diluted the solution of carbolic acid the more marked is this phenomenon. The sulpho-carbonates being crystalloids are more suitable for diffusion than the carbolates, whilst the residual carbolic molecule acts as if uncombined. In addition to the sulpho-carbolates of iron and sodium, I should suggest the use of the potash salt, which, from its action upon the skin and kidneys, would probably be useful. It is readily prepared. The real colour of the sulpho-carbolate of iron is green or nearly white, but it is always found of a dark violet colour in commerce, and it is stated to be that colour in works upon chemistry. This, however, is due to the fact that as soon as there is a trace of ferric salt formed, it reacts upon the carbolic acid molecule to produce a beautiful violet, which is characteristic of the molecule.

In seeking for a remedy for internal disinfectives of the blood, it is evident, from my point of view, that we should try to search into the substances which will produce in the blood the antiseptics slowly, but in a nascent condition. Carbolic acid is the most available antiseptic (for the production of sulphurous acid in the circulation would be out of the question), therefore on consideration, the first things that will present themselves are the methylsalicylates ($C_8H_7M'O_3$), or the salicylates. Methylsalicylates I find are slowly but perfectly decomposed in the cold, and in alkaline solutions, such as the blood. Therefore it is theoretically immaterial which is used. Salicylic acid, if heated, is converted into carbolic acid and carbonic anhydride, and there seems to be a wonderful chemical relation between these two substances, *i.e.*, carbolic acid and salicylic acid; thus either of them can with facility be formed from the other.

The salicylates only require one equivalent of oxide to convert them into carbonates and carbolate of the metal. Thus:—

$$\underset{\text{Salicylate.}}{C_7H_5M'O_3} + M_2O = \underset{\text{Phenate.}}{C_6H_5M'O} + \underset{\text{Carbonate.}}{M_2CO_3}$$

And if we use dilute solution, we get the same reaction with reagents. Thus ferric chloride gives the same beautiful violet reaction independently if we use a carbolate, sulphophenate, or salicylate; it acting in each case upon the carbolic, or phenol residue. I am sorry that this paper is not more matured, and that I cannot give you the results of some practical experiments that some of my medical friends are trying, but the situation would not allow of my doing so. In concluding these rather disjointed remarks, I have to apologize to so learned a body as this for bringing before them a lot of matter, which will probably appear stale and unprofitable, and I have no doubt occasionally not very pertinent; but I could not do myself any justice if I did not put my views on paper in some manner of sequence, even at the risk of appearing loquacious. As I have studied the subject of disinfection and atmospheric dust with some care for years, I thought that these observations might be of use from the very fact of being trammelled by the ideas of a chemist. Out of a great mixture often come good compounds. I almost feel that we are in a degree neglecting our duty in not constructing committees of investigation upon such occasions as the present visitation. To work with one object, and approach it with the best intention of seeking truth and shutting out emulation. Such a work should run in no grooves, but should emanate from the biologist, physician, and chemist; in fact, from science itself.

The reading of the paper gave rise to the following discussion:—

Dr. Cameron said, as he had recently read a paper on this subject he wished to make a few observations, more especially as he apprehended that the views Mr. Tichborne had put forward might appear to clash with those which he had submitted to the Society. He did not at all doubt the efficacy of gaseous disinfection to a certain extent, but what he said was this—and he spoke from the results of his own experience—that gaseous disinfection, as ordinarily carried out, was totally inefficacious as a means of wholly destroying germs in a room. He held that the recent experiments of Chauveau—who occupied the first position as an investigator in this department of medical science—and more recently the experiments of Dr. Burdon-Sanderson, one of the medical inspectors of the Privy Council and professor in the Brown Institution, rather indicated that as a rule the contagious matter of zymotic diseases was deposited on solid substances. The experiments of Burdon-Sanderson proved that while the sporules of vegetables float freely around us in the air, and are deposited in solutions with great rapidity, causing the development of vegetable life to take place in solutions in an hour or two, organic solutions might be kept for an almost indefinite period of time exposed to the air without producing the slightest appearance of animal life. It might be said that the infectious matter of small-pox or other contagious diseases might be cells of plants of different kinds of fungi, and that in that way germs of disease would float in the atmosphere; but the whole drift of scientific investigation pointed in a different way, and showed that animal infectious matter—the contagium of disease—was a non-soluble solid substance, and the experiences of mankind proved that these matters were extremely small. It was probable that they adhered to solid substances, and that they clung to our clothes. If they were floating about in the air, it was utterly impossible that the germs of typhus fever, of small-pox, or of scarlatina could linger for months in rooms, as they had been proved they do, for the air was renewed hundreds of times in a day. The great use of the disinfection at present employed was that it obliged people to open the windows and let in the fresh air. They all knew how well the Germans did everything in scientific and medical matters, and he would mention the results of their experience of disinfection during the visitation of cholera in Leipsic in 1866. The chemical professor, Carus, was appointed head disinfector of the town, which was divided into 100 districts, each of which had a separate inspector. Never was disinfection more thoroughly carried out. Every house in which cholera appeared was disinfected with chlorine gas. And what was the result? There had been thirteen outbreaks of cholera in Leipsic since the first appearance of the disease in Europe, and never was the attack so severe as in the year 1866, when disinfection was carried out in so careful a manner. It was the same in Stettin and Erfurth, where disinfection was carried out under the orders of the Government and by a staff such as we could not have in this country. The following observations, which appeared in the *Lancet*, expressed his opinions on the subject of disinfection much more clearly and tersely than anything he could say:—"Recent experience has proved the insufficiency of the ordinary process of disinfecting dwelling-rooms without at the same time stripping off the paper and washing the walls and painted surfaces with caustic soda. In Manchester nearly all the men engaged in this duty have had fever or infectious disease, although the houses previous to their visits had been disinfected by chlorine, carbolic acid, etc. It is believed that contagious matter is retained in the paper, particularly when a number of layers have accumulated on the walls. In some cases the men removed as many as fifteen coats of paper, and they describe a fusty odour, which of itself may probably give rise to fever. We would recall to our readers the case of the Knightsbridge Barracks, where the accumulation of successive layers of size and paper formed a nidus for thousands of maggots. We must not, therefore, be satisfied with mere cleaning, whitewashing, and re-painting, but insist also on the cleansing and scouring of the walls. It is satisfactory to find that the recurrence of fever in the same houses in Manchester has greatly diminished since the introduction of this thorough mode of cleansing." Dr. Cameron proceeded to say that his views had been adopted by the Public Health Committee of the Corporation. They had increased their staff, and now, instead of merely disinfecting a room with chlorine gas, they removed the paper, if there were any, from the walls; scraped off the old whitewash, and whitewashed the walls afresh. If the whitewash did not destroy the infectious matter, at all events it imprisoned it. By the use of common water and whitewashing more good would be effected than by the circulation of thousands of feet of chlorine gas.

Dr. Hayden said he was particularly pleased at hearing Mr. Tichborne's paper read so soon after the paper of Dr. Cameron, which, with all respect to him, he thought missed the point. Dr. Cameron, he thought, meant to convey that germs, bacteria in particular, were identical with the *materia morbi* of epidemic disease.

Dr. Cameron said that he did not mean to convey that.

Dr. Hayden: Dr. Cameron said that the gases used as disinfectants were unable to destroy bacteria; therefore, they were useless as disinfectants in epidemic diseases. He had alluded to the experiments of Dr. Burdon-Sanderson; but when that gentleman was questioned on the point in a recent debate he declined to say that bacteria were themselves the *materia morbi*. The opinion he expressed confirmed the view taken by Mr. Tichborne, for he used the words that they might be carriers of the disease. Dr. Cameron seemed to think the atmosphere could not be a medium for the conveyance of disease. That, however, he (Dr. Hayden) doubted. Dr. Cameron, that evening, said it would be sufficient to cleanse the walls, but if it be true that the air was impregnated with organic matters, every one of which might be the medium for conveying the *materia morbi* of disease, he could not see how that could be neutralized without acting on the whole body of air in the room. He was glad to hear this practical paper of Mr. Tichborne, because the opinions urged in it had fallen in with his own preconceived views.

Dr. Cameron: What I meant to say was that if gaseous disinfectants did not destroy those tiny creatures, the bacteria, or destroy the contagious character of vaccine lymph, it was not likely to destroy the contagious matter of other diseases. I, therefore, said that unless they are applied dissolved in liquids, they are inefficacious.

Dr. C. Moore said that disinfection, as at present carried out in Dublin, was of very little use. In many parts of the Liberty the houses were nothing but a mass of infection, and the mere whitewashing of the walls would be ineffectual to destroy it. As long as the old floors of these houses were left full of the dirt of ages, the *débris* of persons who had suffered from countless epidemics, they must expect disease to prevail in these localities. Nothing but the most thorough cleansing of these houses would do good, and, indeed, many of them ought to be thrown down altogether.

Mr. Tichborne, in reply, said that Dr. Cameron, who had not heard the whole of his paper, had mistaken the drift of it. His theory was that the contagious matter of small-pox was a substance which was carried on the atmospheric rafts, and deposited on the clothes. Before it could be deposited on the clothes or on walls, it must have passed through the air; and he proposed to act upon it by gaseous disinfectants. Dr. Cameron believed in the germ theory of disease generally. There was evidently something in it; but if he believed in it, one thing was self-evident—namely, that non-volatile disinfectants could do no good, for they could not touch it; but volatile disinfectants would be found effectual; and this was wonderfully borne out by the case he had stated that evening, which was only one of several cases that had occurred under his own observation.

Dr. Cameron: What do you think of the spray mode of applying disinfectants?

Mr. Tichborne replied that it might be very useful. Disinfection was generally applied once, twice, or thrice, sometimes at long intervals; and that method was quite ineffectual. It must be applied in a systematic manner, like that which he had adopted in the house referred to; and should be kept up as long as there was any renewal of the disease.

Parliamentary and Law Proceedings.

Death from an Overdose of Morphia.

On Saturday, January 4th, Mr. Coroner Maynard held an inquest at the Sunderland Infirmary, on the body of James Sharer, aged fifty-seven, who died on the previous day from an overdose of morphia, which he had been in the habit of taking. From the evidence, it appeared that the deceased had become addicted to intemperate habits, and had also contracted a habit of taking laudanum, morphia, and similar drugs, through which his life had been, on two previous occasions, nearly sacrificed. His friends had more than once warned the druggists in the town against supplying him with anything of the kind, but he still seemed able to procure laudanum by the plan, it is supposed, of sending boys into shops for small quantities. On Thursday night he went to the shop of Mr. Cockburn, druggist, and asked for three drachms of the solution of morphia, but Mr. Cockburn declined, saying that he never supplied it except on the order of a medical man. The next morning, about half-past ten, he went in and asked for a small phial containing fourpennyworth, or nearly an ounce, of laudanum, which Mr. Cockburn gave him, believing his representations that he wanted it for a lotion, as he suffered from rheumatism in his hip. But even this, Mr. Cockburn said to the jury, was not an excessive quantity for any person who habitually used the drug, as he had seen women drink off more than that in the shop. Between twelve and one on the day named he was met not far from his house, reeling very much, and was assisted home.

Dr. Welford was called in, who, seeing the danger, drove at once to the Infirmary and brought the house surgeon, Dr. Hopgood, with the stomach pump, which, when applied, brought off the laudanum mixed with alcoholic spirits. As deceased continued to get worse, however, he was removed to the infirmary, where every effort was made to keep him awake by shouting at, pinching, and walking him about the floor, but he gradually sank into the fatal slumber and about four o'clock expired.

The Coroner said that the constable had been round to the druggists, but Mr. Cockburn was the only one who would admit having sold deceased any drugs. It was possible he might have obtained a large quantity by getting other persons to procure it for him in small quantities.

Mr. Cockburn stated that deceased was never in his shop before, and he was not aware that he was addicted to the use of opiates.

The jury returned a verdict in accordance with the above facts, there being no one to blame in the matter.—*Newcastle Daily Chronicle.*

THE CHARGE OF FRAUD AGAINST A HERBALIST.

On Friday, January 3, Henry Jackson, thirty-five, described as imperfectly educated, was charged at the Hull Borough Sessions with fraudulently obtaining from John Richardson certain sums of money under false pretences. The evidence was similar to that given at the preliminary hearings of the case, an abstract of which has already been given.

The jury found the prisoner guilty, and the Recorder sentenced him to twelve months' hard labour.

Obituary.

ADOLPHE-GEORGES GUILLEMETTE.

The death of one of the most distinguished French pharmaciens, Adolphe-Georges Guillemette, at the age of 64 years, took place recently. On the 28th of October the last honours were paid to him in the presence of a numerous concourse of relations and friends, when an allocution was pronounced over his tomb by M. Gobley, in the name of the Paris Société de Pharmacie.

Born in 1808, at Magny, near Caen, M. Guillemette commenced his studies as a pharmacien with an uncle at Bretteville. He afterwards went to Paris, and had the good fortune to obtain an engagement with M. Boutron-Charlard, under whose superintendence he perfected himself in the art of pharmacy. Being about to make an attempt to better his position he received an offer from M. Boutron, his employer, to succeed him in his business, and he thus, in 1835, became head of one of the most important pharmacies in Paris. In this position he superintended with great ability the production of medicaments, and at one of the national exhibitions he showed numerous crystallized products of opium of surpassing beauty.

M. Guillemette also published several researches of great interest. In concert with M. Boutron he showed the identity with mannite of grenadine, a crystalline substance obtained from the pomegranate, which had previously been looked upon as a peculiar principle. The crystallizable substance to which the melilot owes its odour was looked upon as an acid substance until Guillemette showed that it was neutral, and identical in properties and composition with the coumarine of the Tonqua bean. After thirty-five years of incessant labour, M. Guillemette was looking forward to the enjoyment of the competency he had won, when the events of the late war caused him to leave Paris with his family, and the anxieties caused thereby probably sowed the seeds of the malady which carried him off after an illness of scarcely three weeks.

Notice has been received of the death of the following:—

On the 6th June, 1872, Mr. John Taylor, Pharmaceutical Chemist, of Preston. Mr. Taylor had been a member of the Pharmaceutical Society from its foundation. Aged 68.

On the 21st December, 1872, Mr. Joseph Templeton, Chemist and Druggist, of Liverpool. Aged 47.

Notes and Queries.

[326].—SOLUTION OF SULPHURETTED HYDROGEN IN GLYCERINE.—Can any correspondent inform me whether a solution of sulphuretted hydrogen in glycerine can be preserved for any length of time without change? I have tested the strength of a sample, recently obtained from a London wholesale house, by precipitating with nitrate of lead, washing, drying, and weighing the sulphide so obtained, and find that it contains 210 volumes of the gas in 100 measures —or little more than double the strength of an aqueous solution. Its merit, therefore, must arise from its keeping qualities, and regarding these I ask the favour of information.—J. F. BROWN, Dover.

[324.]—SYRUPUS CALCIS LACTO-PHOSPHATIS.—P. Vincent (Paris) forwards the following for the Syrupus Calcis Lacto-Phosphatis, and states that having made the syrup several times with the same formula, he can strongly recommend it, as it continues to keep its clear appearance for some time.

Os Ustum	10 grams.
Hydrochloric Acid	20 grams.
Liquid Ammonia	13 grams.
Concentrated Lactic Acid } Distilled water }	. . q. s.
Sugar	528 grams.

Leave together for some time the bone ash and hydrochloric acid, until effervescence ceases, then add distilled water 500 grs., precipitate with the ammonia, filter, and well wash the precipitate with distilled water, until washing cease to give a precipitate with solution of nitrate of silver. Leave to drain for twelve hours, after gently heat in a porcelain capsule, and add sufficient lactic acid to dissolve the precipitate, add sufficient distilled water to make the product weigh 272 grams., filter and add the sugar, make dissolve with a gentle heat.

Correspondence.

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

Milk Testing.

Sir,—Mr. Southwell questions the accuracy of my statement, that cows' milk has a slightly alkaline reaction. It is a matter of very little practical moment, but if he will examine milk directly it is drawn from the cow, he will find I am correct.

Pereira (4th Edition 'Materia Medica,' p. 814, vol. ii. part ii.) says, "when recently drawn from the animal, milk is slightly alkaline."

Fownes ('Chemistry,' 9th Edition, p. 726) says, "milk is a slightly alkaline liquid;" and again (p. 728) "In a fresh state, and taken from a healthy animal, milk is always feebly alkaline."

All the other authorities I have referred to say the same; and, indeed, considering the composition of milk, I do not see how it can be otherwise.

Of course no one would attempt to estimate the total solids in milk, without first making sure of the absence of such substances as starch and chalk; however, as I have said before, they are really never to be met with.

Vogel's lactoscope affords a good rough-and-ready way of estimating the value of any given sample, but we have already too many of such rough methods, and I think no one would venture to rely upon the lactoscope alone to give a decided opinion in a Court of law as to whether milk was adulterated or not.

In the table at the end of his letter, does Mr. Southwell intend us to infer that milk, having a specific gravity of 1027, must necessarily be mixed with 10 per cent. of water? I need hardly point out that this is very far from being the case. A milk containing a large amount of cream, which is lighter than water, may have a sp. gr. even lower than 1027, and yet be a better and richer milk than one having a sp. gr. of 1031.

Next to obtaining the total solids, perhaps the estimation of the milk sugar in the whey, as recommended by Mr. J. F. Brown, is the most satisfactory way of detecting adulteration by water. I have not found though, that titration with a standard solution of copper gives such accurate results, as determining the milk sugar directly by weight.

We must remember, too, that although milk sugar varies perhaps less than any other constituent of milk taken by itself, still it varies considerably.

Messrs. Henry and Chevalier found that with cows fed on grass, the quantity of milk sugar per cent. was 4·77, when the same cows were fed on carrots the milk sugar rose to 5·30, and when fed on beet, to 5·95 per cent., a difference from first to last of about 20 per cent.

Charles Ekin.

Bath, Dec. 26th, 1872.

Payment of Local Secretaries.

Sir,—Mr. Sutton asks for some further expression of opinion on the subject of remuneration to local secretaries for their services in the Preliminary examinations.

In responding to his request, I think there is no remuneration needed or desired; it is quite competent for every local secretary to deduct payments out of pocket from the sum he remits annually to Bloomsbury Square. These deductions would be exceedingly small, and during the twenty-five years I have been secretary, I do not recollect having made a charge for these trifling payments, but, on the contrary, have considered the honour of the appointment more than an equivalent.

While I am writing these lines five candidates for honour in the Preliminary examination are in my presence working on their papers. Three hours spent in this superintendence may not be always convenient, but the time may always be profitably employed; and as the Council receive no remuneration for the time devoted to the interests of the Society (the country members receiving a railway pass), why should any be given to local secretaries?

Should anything be done in this matter the railway pass is in my opinion the best suggestion.

Nathaniel Smith.

Cheltenham, January 6th, 1873.

The Subscription for Mrs. Stockman.

Sir,—May I trespass once more on your kindness by asking you to announce on behalf of Mrs. Stockman and family:—

Allen Smith, Sale, 27*s*., and J. J., Aberdare, 10*s*. 6*d*. The total sum subscribed is £185. 4*s*. 8*d*. This has been the means of placing the widow in a hosiery and haberdashery business. She and her family return their best thanks to the subscribers for their generous kindness.

Allow me also to thank you most sincerely for your kindness in allowing the acknowledgments of subscriptions to appear gratuitously in the Pharm. Journal.

Charles Mumby

Gosport, January 2nd, 1873.

J. Smith, M.D.—(1) We are unable to give you the formula. (2) The formula for Pommade de la Comtesse, as given by Dorvault (L'Officine) is as follows:—

"Noix de galle	30·0
Noix de cyprès	30·0
Ecorce de grenade	30·0
Sumac	30·0
Mastic	30·0
Onguent rosat	590·0

La Pharmacopœia Hispanica remplace la pommade rosat par de la cire jaune et de l'huile de myrte." (3) We believe the article is a specialty of Messrs. Gosnell. (4) We have been unable to obtain the information.

"*Inquirer.*"—We believe that no separate returns have yet been made. See *ante*, p. 347.

"*Spes.*"—The subject has already been discussed and a remedy suggested (see *ante*, p. 419). We therefore refrain from printing your letter, which would be only adding to the amount of "talk" upon the subject deprecated by you.

"*Chemicus.*"—Blaine's 'Veterinary Art.'

"*Hyoscyamus.*"—Valentin's 'Inorganic Chemistry,' or Fresenius' Works on analysis.

J. J. M. (Manchester).—Bentham's 'Handbook of British Botany,' or Hooker's 'Students' Flora of the British Islands.'

J. Davidson.—For a description of the manufacture of oxalic acid on the large scale, see Ure's 'Dictionary of the Arts,' Richardson and Watts's 'Chemical Technology vol. i.; Watts's Dictionary, vol. iv.

W. J.—There is no such law in force as that described by you.

J. A. Clarke.—The report was received too late for insertion this week. The lecture shall be attended to.

The following journals have been received:—The 'British Medical Journal,' January 4; the 'Medical Times and Gazette,' January 4; the 'Lancet,' January 4; the 'Medical Press and Circular,' January 4; 'Nature,' January 4; the 'Chemical News,' January 4; 'English Mechanic,' January 4; 'Gardeners' Chronicle,' January 4: the 'Grocer,' January 4; the 'Journal of the Society of Arts,' January 4; 'Grocery News,' January 4; the 'Scientific American,' January 4; 'L'Union Pharmaceutique' for December; 'Journal de Pharmacie et de Chimie' for December; 'Répertoire de Pharmacie' for December; 'Moniteur Scientifique-Quesneville' for January'; the 'Doctor' for January; 'Food, Water, and Air' for January; 'British Journal of Dental Science' for January; 'Practitioner' for January; 'American Chemist' for December; 'Medical Record' January 8; 'Journal of Applied Science' for January; 'Irish Hospital Gazette' January 1; 'Students' Journal' January 4.

Communications, Letters, etc., have been received from Messrs. W. R. Jones, Pattison, T. M. Stone, F. Coles, C. Hall, W. Proctor, G. Brown, P. Vincent (Paris), E. Gallois (Paris), M. C. Cooke, R. Smith, "Plumule," "Hyoscyamus," "Spes," and J. J. M.

EXTRACT OF MEAT.

BY BARON LIEBIG,

President of the Royal Academy of Sciences at Munich.

In a letter by Dr. Edward Smith, which appeared in the *Times* of October 16th, he reproaches me with several quotations contained in my letter of October 1st, which require on my part some vindication.

Dr. Smith says that the passages I have quoted on "economy of nutrition," "the small morsel of meat," "fish," "tea," are not extracts from any published work of his, and he calls upon me to explain where I had obtained my (most unaccountable) "quotations." My vindication is not a difficult one, and I gladly take this opportunity to explain more fully the real value of extract of meat for the alimentation of the people; the only unpleasant part of the task is, that in doing so I am compelled to speak more of myself than I like.

In the first place it is quite correct that the above mentioned quotations have not appeared either in the article in the *Standard*, or in that of the *Times* of August 20th. They are taken word for word from an article entitled "The Butcher's Bill," which appeared in the *Saturday Review* of August 31st. This article is avowedly based on Dr. Edward Smith's views, so that any one who took the trouble to read it, must, like myself, have arrived at the conviction that its sentences contained the authentic opinions of Dr. Edward Smith.

Dr. Edward Smith says, "Let it be clearly understood that at length Baron Liebig is in accord with other scientific men, and that all may adopt the words of Liebig—'Neither tea nor extract of meat are nutriment in the ordinary sense,' and all I contend for is accomplished." This does not seem to say less than that I have now been converted to views which either I formerly had not, or which I even disputed, while the real truth is that all that has been ascertained within the last thirty years on these subjects is in perfect accord with my teachings. Thirty years ago I taught in my 'Animal Chemistry,' that for the preservation of life the food of men, as also that of animals, must contain one indispensable element for the formation of blood or of the albumen in the blood. I have further explained in my 'Researches on the Chemistry of Food,' (1847), that "beef-tea" or "extract of meat" contains none of the substances called albuminates, as these latter coagulate and separate when the meat is boiled in water. In my 'Familiar Letters on Chemistry,' xxix. p. 421 (edition of 1851), I said, "In the albumen of this fluid (juice of flesh) we have the substance serving as transition product to the fibrine of flesh, and in the other substances (contained in beef-tea) the matters required for the production of cellular tissue and nerves." From this it will be seen that I never asserted that "beef-tea" or "extract of meat" contained substances necessary for the formation of albumen in the blood or of muscular tissue. I have, on the contrary, designated them as "food for the nerves," in the same sense as common salt is also designated as food, although one cannot always define in which manner it acts usefully.

It cannot, therefore, be said that "I am at length in accord with other scientific men," but that these scientific men, including Dr. Edward Smith, have simply adopted what I have always, and from the very beginning, taught. Based on my own definitions, Dr. Edward Smith informs me that extract of meat is not "food," but a "nervous stimulant." But what is a nervous stimulant? everybody will ask who is not satisfied with a word, but wishes for a definition. We take the constituents of extract of meat in our daily food, just as we take tea and coffee in addition to our food, and nothing can be more undeniable than that these substances produce a certain beneficial effect on all the functions of the body, and also on the process of nutrition. It is clearly not the duty of a scientific man simply to deny these effects, but to find out how great is the share these substances have in the functions of the animal organization.

Some years ago two physiologists at Vienna attempted to prove by experiments on themselves, respecting the effect and value of common salt in the process of nutrition, that salt is a luxury and of no value for nutrition and the preservation of health. In matters affecting the alimentation of the people no importance can be attached to such trifling experiments if they are in contradiction to confirmed experiences, and this contradiction will grow in the same proportion the less the experimentalist is capable of observing and rightly interpreting facts.

In order to comprehend the difference between "common food" and "nervous food," as I will call it in order to avoid circumlocution, it must be considered that man has two kinds of work to perform, muscular or mechanical work and brain or nervous work. The one, the muscular work, is under the dominion of the nerves and the brain.

By "common food" must be understood those substances which serve for the preservation of the temperature and restoration of the machine. Coffee, tea and extract of meat are not suited to these purposes; by their effect, however, on the nerves they exercise a decided influence.

The experiments made with extract of meat in Russia, France and Sweden are what in the scientific world are termed "sham experiments." They are not undertaken to find out that which is not known, but as the result is known beforehand, appear really only to be made with a view to deceive others, and the conclusions drawn from them are simply absurd. It will suffice to describe one of these experiments in order to convince any one who bears in mind that it has been scientifically determined that extract of meat does not contain any substances necessary for the formation of albumen in the blood, and for the restoration of the waste of muscular tissue.

Two dogs of almost equal weight were fed, the one with meat, the other with extract of meat. The former was fed with 400–500 grm. fresh meat, the other with 12½–15 grm. extract of meat (the quantity contained in 400–500 grm. fresh meat). The dog fed on meat flourished, his weight rather increased, while the other fed on extract of meat only, became thin, was attacked with diarrhœa, and would have died if the experiment had been continued. The inference drawn from this experiment is:—Extract of meat is not nutritious, it rather has poisonous effects, causes diarrhœa, and would produce death. That the other dog had likewise consumed 12½–15 grm. extract of meat in the 400–500 grm. of meat without being seized with diarrhœa or feeling any injurious effects, this fact does not trouble the experimentalist, nor does it concern him that a dog weighing from 2 to 3 kilogrammes requires from 40 to 50 grm. of carbon in his food for the process of respiration and to keep up the weight of his body, while 12 to 15 grm. extract of meat only contains 3–4 grm. of carbon.

These experiments, made by Dr. Beljawski, in Moscow, and the conclusions drawn from them, are identical with the French, *vide* 'Moniteur Scientifique Quesneville' 1–15 Dec. 1871). That no experiments have been made in England similar to those in Russia and France proves that English physiologists possess more common sense.

Concerning the standing of Professor Almen, in Sweden, it will suffice to mention here his assertion that "a glass of warm water with a little pepper must produce the same effect as a cup of beef-tea." What sensible physician would venture to prescribe warm water with pepper instead of meat broth to a patient recovering from typhoid fever? Nor in spite of Professor Almen is this done in the Swedish hospitals. Beef-tea is used there in the same cases and for the same purpose as with us.

That in Göttingen extract of meat is generally used in family households and also in that of Professor Mussner, I may venture to affirm.

In order to understand correctly the significance of meat diet and extract of meat, it is necessary to turn one's attention to the difference of the component parts of meat and those of vegetable foods. Meat contains in its albuminates the chief requirements for the renovation of the muscular tissues and for the preservation of lasting muscular action. Those constituents of the meat which are soluble in boiling water take no part in the formation and renovation of the muscular tissues. But by their effect on the nerves they exercise a most decided influence on muscular work wherein meat differs from all other animal and vegetable food.

By the use of meat we consequently obtain two effects, the one (effect on the nerves) perfecting and strengthening, the other (muscular action). The prices of other articles of food, even of those containing a considerable amount of muscle-forming material, are much lower than that of meat, and are not in proportion to the contents of muscle-forming substance. According to calculations made in my own household, we obtain in 100 lb. of butchers' meat (67 lb. muscle, 12½ lb. bones, 8½ lb. fat, 3 lb. membrane) 13·9 lb. albuminates. In 100 lb. cheese there are from 26 lb to 30 lb. albuminates, and the liver and brain are likewise richer in albuminates than the same weight of butchers' meat. The blood of animals is richer still in albuminates in proportion to its price. Nevertheless, nobody thinks of placing blood, liver or cheese fully on a par with butchers' meat.

Vegetable albuminates are still lower in price, and from these is produced in the bodies of animals all the muscular food which man consumes. 100 parts of ordinary wheaten flour contain very nearly as much muscular food as 100 parts of fresh meat, but how small is the price of bread as compared to that of meat!

This clearly shows that the instinct of man discovered a difference in the effects of his various foods, and that he does not estimate and judge them in proportion to their contents of carbon and nitrogen, or of muscle-forming and heat-producing substances; but that he pays a higher price for meat because meat contains certain other substances which are totally wanting in other articles of food, and it is these very substances which form the component parts of beef-tea as well as of extract of meat.

These substances, as is well known, impart to meat its peculiar value for nutrition, and constitute the difference between vegetable and animal diet. The difference between the two, therefore, is not based on the dissimilar nature and facility of assimilation of the albuminates contained in the animal and vegetable food, but consists in the fact that meat contains certain elements which are not to be found in cheese, in blood or in vegetables.

I believe that the researches of Pettenkofer and Voit are calculated to throw some light on the effects of the component parts of extract of meat. In their experiment on the tissue waste of a man in normal condition while abstaining from food, the individual breathing in the apparatus of respiration was left in three instances without food with the exception of water, salt (15 grm.) and a little extract of meat (12½ grm., rather less than half an ounce), and with respect to the results obtained the two experimentalists say, "The state of health during the privation of food for thirty-six hours was a completely normal one, and according to the assurance of the fasting man, he could have borne it longer." This fact explains, I believe, the physiological importance of the soluble parts of meat or extract of meat; they do not serve for the renovation of the machine, but they maintain it by their effects on the nerves during temporary disturbances, even when deprived of food, in normal action, and it cannot be doubted that it is this effect which is paid for by the higher price of meat.

London navvies who were sent out during the Crimean war to construct the railway at Balaclava, and who, according to the report of Dr. Baudin, created the greatest astonishment among the English and French soldiers by the extraordinary amount of work they performed, consumed daily in their food from 150 to 159 grm. albuminate.

The agricultural labourer in Upper Bavaria consumes in his farinaceous food, according to the experience and calculations of Professor Dr. H. Ranke, 153 grm., therefore almost the same quantity of albuminates as the English navvy; but how extremely different are the working capabilities of the English and Bavarian labourer in reference to the energy of work, *i.e.*, the amount of work accomplished within a given time? and this difference is attained by the English navvy consuming more than one half of the albuminates in the shape of meat, whilst the Bavarian eats meat only on six days of the year. A few slices of bread and butter with milk at breakfast give nutriment enough for a child; an adult, however, has very different work to perform, and he therefore increases the effect of his food by a cup of tea or coffee. It is stated in Frankfort-on-Maine as a well-known fact that old Mayer Anselm Rothschild, the founder of the eminent firm, never despatched any important business at night without having previously taken a cup of strong black coffee; and it may be supposed that the celebrated financier derived some advantage from the effect of the coffee on his decisions, for he was not the man to spend a farthing for anything which would not have given him a return.

When the meat by boiling has been freed from its soluble parts, the remainder, or more correctly the albuminates in such residue, have no greater nutritive value than the gluten of wheaten flour, which remains after the manufacture of starch. Both the meat albuminates and the gluten are chemically and in their physiological effect identical things.

If to meat exhausted in this way, the extracted parts are again added in the shape of beef-tea or extract of meat, it is eagerly eaten by dogs who despise it without such addition; in fact, all the component parts of meat which are contained in roast meat are thereby reunited.

Now, as vegetable albuminates are identical with albuminates contained in the flesh of animals, it will be easily perceived that if we add to our vegetable food, rich in vegetable albuminates—for instance to bread, peas, beans, or even potatoes and rice,—the soluble parts of meat such as are combined in extract of meat, we thereby impart to it the peculiar nutritive value which distinguishes meat in our estimation from other food.

Dr. Gerhard Rohlfs, well known by his travels in Morocco, says, in reference to the effect of extract of meat in a letter addressed to me:—"As regards extract of meat it has proved, particularly to us travellers in Africa, one of the greatest blessings. On my travels through the great desert from Tripolis to the Ischad Lake, it was my daily food. Being without any meat I took it in the morning spread upon biscuits, and this was not only very palatable but it proved a complete substitute for meat diet. In the evening I made beef-tea, adding a good portion to rice, lentils, or kuskuss, or whatever I happened to possess in the shape of vegetables. I have become so accustomed to the extract of meat that I am still obliged to keep it constantly in my house."

It will be well understood, therefore, that by the addition of extract of meat to our food, we neither economize carbon for the maintenance of the temperature nor nitrogen for the sustenance of the organs of our body, and that therefore it cannot be called "food in the ordinary sense," but we thereby increase the working capabilities of the body and its capacity to resist exterior injurious disturbances, *i.e.*, to maintain health under unfavourable circumstances. Thus an addition of extract of meat to vegetable food forms the only means to make up for a want of meat.

All this taken together gives to these substances, to which also belong tea and coffee, a very high value in the alimentation of our populations, the last and true object of which is the production of working power for mental and bodily work; and it becomes perfectly intelligible why the great historian Macaulay, in his celebrated work, very properly devoted an entire chapter to the introduction of coffee into England as being to some extent connected with modern life.

For our object it is tolerably indifferent with what name the effect of the so-called "Nervous stimulants" is designated.

A few years since agriculturists still considered gypsum, lime, and bone meal to be stimulants for the growth of plants; now we know perfectly well that they are nutritive substances for plants. In modern life men on the whole perform more muscular and brain work than formerly; still the average duration of life of individuals has not decreased but increased, and nobody who takes a comprehensive survey of life can doubt that coffee and tea contribute largely to this end, and that extract of meat properly used is a really good and most useful thing.

In conclusion, it may be mentioned that I have given my ideas on this subject in two treatises, both of which appeared in English scientific journals; the one "On the Nutritive Value of Different Sorts of Food," in the *Lancet* (January, February, and March, 1869), the other in the London PHARMACEUTICAL JOURNAL ("The Source of Muscular Power"—September and October, 1870), and I think that no English physician wishing to criticize my opinions should be allowed to ignore these two treatises of mine.

One word more about Dr. Edward Smith. It is a pity that he thinks himself competent to give his opinion on questions of which he cannot be said to have a perfect knowledge. This becomes evident as soon as he touches on chemical subjects. For instance, in a letter to the *Standard* (October 24th, 1872) Dr. Edward Smith declares that beef-tea made of fresh soup meat would certainly contain albumen, etc., and he charges me with "hardihood" for comparing extract of meat with such beef-tea. Dr. E. Smith apparently forgets that the soluble albumen of meat is coagulated by boiling it with water, exactly in the same way as the albumen of eggs, and that, therefore, beef-tea cannot contain albumen any more than extract of meat. Both extract of meat and beef-tea are prepared from the same material exactly in the same manner, and the difference of the former from beef-tea consists simply in extract of meat being beef-tea condensed to the consistency of honey.

ORIENTAL ACONITE.

BY M. C. COOKE, M.A.

Dr. Hooker has expressed his opinion ('Flora Indica') that the "Bish" of the Himalayas is the produce of four species of *Aconitum* respectively.

ACONITUM LURIDUM, *Hook. and Thom.*, found in Alpine East Himalaya at an elevation of 14,000 feet.

ACONITUM PALMATUM, *Don.*, inhabiting the Temperate Himalaya from Sikkim to Garwhal, at an altitude from 8000 to 10,000 feet.

ACONITUM FEROX, *Wall.*, in the Temperate sub-Alpine Himalaya, from Sikkim to Garwhal, at an elevation of from 10,000 to 14,000 feet.

ACONITUM NAPELLUS, *Linn.*, in Temperate Alpine Himalaya, from 10,000 feet to the highest limit of vegetation in the North Western Provinces.

Such being the case, it would be satisfactory if the varieties of "Bish" could be traced to the plants producing them; but on this point the same author adds:—"We have not detected any characters by which the dried roots of these species can be specifically recognized, nor do we believe that any such exist." It is very clear that some samples of "Bish" are very distinct in appearance and texture from others. The question arises whether this is determined by the mode or period of collection, method of drying, or distinctive features of the species or variety of plant. The latter seems to be most probable. There is a confusion of species most probably, and of native names, in the drug as found in the Bazaars. Moodeen Sheriff, in the Supplement to the Pharmacopœia of India gives all the native names under the head of *Aconitum ferox*, of which the Arabic is *Bish*, and the Persian *Bishnag*, whilst in

Hindustani *Bis*, *Singya*, *Singya-bis*, *Mitha-zahar*, *Teliya-bis*, and *Bachhnag* are given to varieties of the same plant; *Navi* and *Vasha-navi* being the Tamul, and *Vasanabhi* and *Nabhi* the Telugu names. *Bish* is also the Bengali, *Vachhnag* the Gujerate, and *Vachanabhi* the Cinghalese names. The same work mentions four varieties of Bish, two of which are named *black* and *white* according to the colour of their substance internally.

1. *Kala-bachnag* (*Black Bish*). "The black variety is generally of a reddish-brown colour, and is considered by native practitioners and druggists to be more virulent than the other." This is the whole description which Moodeen Sheriff gives of this variety.

2. *Sufed-bachnag* (*White Bish*) is not described at all.

3. *Mitha-zahar* (sweet poison). This name is usually applied to "a root an inch or an inch and a half in length, and its circumference at the base about the same; it is tapering, slightly compressed, and very rough from wrinkles; brown externally, and pale brown internally; slightly but distinctly sweet in taste, and produces a kind of tingling or peculiar sensation on the tongue when chewed."

4. *Singya-bis* (*Horny Bish*) or *Teliya-bis*, "looks like a small horn of a deer or goat, being very hard, smooth and tapering; and of a dark brown colour. It is generally longer than the sweet variety, but seldom more in thickness; and the colour of its substance is dark brown, shining when recently broken. On chewing a very small bit of it, there is a feeling of great acridity on the tongue and lips, which is followed by a kind of numbness or altered sensation." Of these varieties the *Singya-bis* is considered the strongest of all, and *Mitha-zahar* the weakest.

Dr. Buchanan, in his 'Account of the Kingdom of Nepaul,' names four kinds of *Bish*, of which the *Singya-bikh* is one, and is referred by him to a species of *Smilax*. In the absence of specimens and detailed information, it would be fruitless attempting to determine the sources of the varied drugs bearing the name of *Nirbisi* or "*Buchnag*" in different parts of India.

The officinal drug is described in the Pharmacopœia of India as follows:—"It occurs in the form of tuberous roots of a more or less conical form, from two to three inches in length, and from half an inch to one inch in thickness at their upper end. They have usually a shrunken appearance, and are covered with a dark shrivelled bark; fracture shining and resinous, sometimes waxy, varying in colour from pale to deep brown. Some specimens are white and spongy, and these, it is asserted, are superior in activity to the more compact kinds. Inodorous; taste at first slightly bitter, leaving a peculiar sense of numbness on the tongue and fauces." In Baden Powell's 'Punjab Products' *Bish* is described as a dark brown wrinkled conical root, with either a black or white centre, very brittle, containing much starch, Taste, irritating and acrid, causing a persistent tingling sensation; a virulent acronarcotic poison, containing from 50 to 90 grains of aconitine in a pound. It produces tingling and numbness, debility and contraction of the pupil. Used by natives and Europeans in rheumatism and neuralgia, but seldom given internally; by the latter also employed in tetanus, rheumatism, gout, and heart disease, also leprosy, and cholera fever. Dr. O'Shaughnessy observes that the roots (which enter into several formulæ constantly employed by the native practitioners, and which are also doubtless too often used as convenient instruments of poisoning) are sold in every bazaar in India, and may be purchased in large quantities for about 10 annas the seer. A preparation of the root is much used in all the hilly districts in India to poison arrows for the destruction of wild beasts. "We seldom, however, obtain the root sufficiently fresh in the plains to produce such effects as would explain its alleged utility for this purpose. It has been used on several occasions to poison wells and tanks, and doubtless might be made a formidable means of defence against the invasion of the territories in which it abounds."

Captain Lowther, writing from Assam in 1859, with a specimen of the 'Bikh' or aconite poison, observes that "of twenty-five wounded Europeans only four died, one of these in half an hour. Fortunately for humanity the Digarroo tribes are the sole producers of this virulent drug, and they are chiefly peaceable traders. It is almost solely to the rascality of our subjects that the hostile tribes are now indebted for their comparatively small, and hence adulterated, supply of this root, which, under the present system of frontier trade, finds its way down into the shops of the covetous Hindostanee Bunneahs, and thence oozes out in the transactions for rice and boats with the Mori nomades of the Dihong, and these in their turn purvey all they can get to the Abors. Fortunately, our enemies have to pay for their poison, and even then cannot obtain the genuine article, or our force would all be dead men. The great alpine region of the Digarroo country is described as abounding with the plant furnishing the Bish. Last cold season I was out with a Digarroo hunting party; one of the men stalked a large female sambur deer feeding on the grass; he made a bad shot, merely ripping up the skin on her side, and off she bounded, followed by the active savage, who caught her up in her death struggles a few hundred yards. I am told that the method of preparing the drug is as follows:—Bruise the root on a flat stone, gradually grinding it into a mass with the fresh juice of the fruit of *Dillenia speciosa;* while in this moist state it is to be kneaded to the required size of the wood of the arrow to be poisoned, a few deep notches being first cut just below the junction of the metal that the weapon may break off into the wound. The 'Singpho' people slay their elephants and rhinoceroses after this fashion —the hunter patiently tracking them till they drop, and which sometimes occupies many hours.

"The Kamptees tell me they employ saltpetre both externally and internally in case of wounds so poisoned, with success; others profess to heal with seeds or barks of the jungles, and which I have seen administered to a wounded man without saving his life. However small and superficial the said arrow wounds, even those made with pointed bamboos, the pain is described as horrible, and the appearance is invariably highly inflamed and attended with suppuration. Dysentery too is a usual feature, and concomitant of these venomous applications, and which seem to affect the native less than the European system, to judge by the rapid recovery of the former under medical treatment. Dr. White of the Naval Brigade was eminently successful in his treatment of wounded soldiers. It ought to be known that he sucked all the wounds himself like a veritable leech of the olden time, and made the caste gentry of the native force stare in astonishment at this novel application of the sacred organ."*

In this instance of an important drug involved in mystery, we see the necessity for some official medium through which to prosecute inquiry. Individual effort is insufficient, and the only effectual mode would emanate from the Government of India, to ascertain the areas and statistics of production of the different aconite roots in the Himalayas, their value commercially on the spot, the native names applied to the different kinds, and the plants producing them properly and satisfactorily identified. Then, as a consequence, the different varieties will be analysed and the value of each determined according to the amount of alkaloid present. This is but one out of scores, perhaps hundreds, of instances, in which information is required, of a special character, on the products of our vast Indian empire, and which no private effort is capable of obtaining.

The Chinese species of aconite, allied to those of the Himalayas, are enumerated by Dr. Porter Smith as *Aconitum sinense, Aconitum variegatum*, and one or more other species known as *Ts'au-wu-t'u*, and *Tuh-peh-t'sau*. The first named (*A. sinense*) are top-shaped, conical, tuberous roots, tapering down to a point, from one inch and a quarter to one inch and a half in length, and rather more than half an inch in thickness, according to the size and number of the dried rootlets which project irregularly from the surface. The external cuticle is irregularly rough and hard, and of a brownish-black colour, whilst the interior mealy structure is firm and of a dirty-white colour. The taste is bitter, acrid, and benumbing. Highly poisonous and scarcely used.

The *Ts'au-wu-t'u* may be *Aconitum ferox*, but of this there is no certainty. They are probably the mixed roots of several species of *Aconitum*, of a very poisonous character from Kiangnan and Chekiang, and were formerly used to poison arrows for military and hunting purposes. "The specimens vary a good deal, being sometimes ovoid, oblong, and tapering to a point, or bifid, or even rounded at the extremities. They vary from three quarters of an inch to one inch and a half in length, are covered with a smoothish or wrinkled dark cuticle, and are very frequently worm-eaten. Internally they are whitish and starchy, have very little, if any, odour, but the taste is very acrid and benumbing. Liautung is said to yield the plant, from which a very powerful sun-dried extract is said to be prepared."†

Tuh-peh-t'sau is a species of aconite from a country west of China, where a kind of arrow-poison is said to be prepared therefrom.

ACTION OF BORAX ON FERMENTS OF THE DIASTASE GROUP.

BY M. DUMAS.‡

In a note recently presented to the French Academy, M. Dumas communicated the following interesting information relative to the action of borax upon the ferments of the diastase group:—

Solution of borax coagulates beer-yeast, and the supernatant liquor does not invert cane-sugar as yeast-water does. It dissolves albuminoid membranes; those, for example, which separate from white of egg when suspended in water.

Solution of borax neutralizes the action of yeast-water upon cane-sugar. If solutions of sugar and yeast be placed together in one tube, and solutions of sugar, yeast, and borax in another, the first will quickly give signs of inversion; the second will not.

Borax also neutralizes the action of synaptase. It is known that the bitter almond contains amygdalin, and the sweet almond the synaptase, which, mixed with the amygdalin, produces the essence of bitter almonds, accompanied by prussic acid. It suffices to suspend the meal of sweet almonds in the one instance in pure water, and in the other in a solution of borax, and to add amygdalin to both liquids, to demonstrate this influence. With pure water, the odour of essence of bitter almonds becomes increasingly manifest, and the presence of prussic acid becomes more and more evident by the formation of prussian blue. With the solution of borax, neither is the odour of essence of bitter almonds perceptible nor the formation of prussian blue.

Borax neutralizes the action of diastase. If four tubes containing water and potato starch be kept at 70° C., the first without addition, the second with the addition of borax, the third with the addition of diastase, the fourth with the addition of both diastase and borax, it will be found that after several hours there will be no glucose present in the first and second; after the first quarter of an hour there will be a considerable and increasing quantity in the third; in the fourth, where the borax and diastase are both present, the conversion of the starch into glucose does not take place.

Malt suspended in water quickly yields an abundance of glucose if heated to 70° C., but the addition of borax arrests this action. With malt, water and borax, traces only of glucose are observed, which are probably due to its pre-existence in the malt.

Borax interferes also with the action of myrosin. Flour of black mustard suspended in water, exhales almost immediately the odour of essence of mustard, which increases in strength. Suspended in solution of borax, the odour characteristic of mustard meal is perceptible, which is due to the presence of a trace of the essence already formed; but this does not augment, and there is nothing that recalls the known effects of water upon mustard, and the plentiful production of irritating vapours to which it gives rise.

So that borax, by a property as remarkable as unsuspected, neutralizes the action of yeast, synaptase, diastase and myrosin. M. Dumas promises to make known its effects upon pepsin, and the bearings these curious reactions have upon the theory of ferments.

THE MORE IMPORTANT SUBSTITUTES FOR GUNPOWDER.

BY F. A. ABEL, F.R.S.*

No progress has been made since 1868 in the application of explosive agents, other than gunpowder, to artillery purposes. Somewhat limited experiments with gun-cotton in small field guns led the Austrians, about ten years ago, to the erroneous conclusion that they had conquered the difficulties attending the safe employment of gun-cotton, applied according to Van Lenk's system, in guns of small calibre at least. Considerable progress was made in England during 1867–68 towards the production of a thoroughly safe cartridge of compressed gun-cotton for field guns, but much evidently still remained to be done when the experiments were suspended before a sufficiently uniform action of such a cartridge

* Journal Agri. Hort. Society of India (1860), vol. xi. part 2, p. i.

† Dr. Porter Smith's 'Chinese Materia Medica.' 1871.

‡ 'Comptes Rendus,' vol. lxxiv.

* Read at the Royal Institution of Great Britain, on Friday, May 17th, 1872.

would be secured. The difficulties which have since been encountered in moderating and regulating the explosive force of gunpowder when employed in the large charges which have now to be used in heavy guns show how remote is the prospect of successfully applying explosive agents more rapid and violent in their action than gunpowder to artillery, with the exception perhaps of the smallest calibres.

The numerous attempts to apply substitutes for gunpowder in small arms have in some instances been attended with partial success. Many of these have differed greatly from each other, but all of them have been more rapidly explosive and therefore more violent and destructive in their action than powder. Gun-cotton in one form or another has been repeatedly made the subject of patient experiment as a material for use in small arms. The first attempts at its employment, made soon after its discovery in 1846, were disastrous in their results, and the success which long afterwards was believed to have been achieved, by Von Lenk's indefatigable labours, in the production of a safe and uniform cartridge, ingeniously constructed of layers of braided gun-cotton threads, was not confirmed by experience. Several methods of reducing the rapidity and increasing the uniformity of action of gun-cotton in small arms have since been made the subject of experiment in England. Some of these, which consisted in the uniform dilution of gun-cotton either with ordinary cotton or with less explosive varieties of the material, have furnished fairly-efficient cartridges for sporting purposes, which, though wanting much in uniformity, have established for themselves a superiority over gunpowder in regard to freedom from smoke and fouling, and one or two other qualities. But the only direction in which substantial prospect of success has hitherto attended the use of gun-cotton cartridges in arms of precision has been the conversion of gun-cotton pulp by moderate compression into very uniform masses, the rapidity and violence of explosion of which were retarded by impregnating these throughout with some perfectly inert material, thus enveloping each particle of gun-cotton in a film of non-explosive substance. The experiments upon this system of preparing cartridges have not been pursued for the last four years, but some very good targets at 500 yards were made with the service Enfield and Snider arms in 1867 and 1868, with cartridges of gun-cotton impregnated with small quantities of paraffin or stearin. India-rubber has also been employed in a similar manner as a retarding, and, at the same time, water-repelling agent. Considerable success has recently attended repeated trials with a species of gunpowder devised by Mr. Punshon, in which the principle of dilution of gun-cotton is also adopted, this explosive being incorporated with sugar and saltpetre. A preparation of somewhat similar nature, containing as one component an imperfect kind of gun-cotton made from sawdust, and known as Schultze's powder, has also acquired some reputation, though scarcely bidding fair to compete in uniformity of action with the excellent gunpowder now manufactured for breech-loading rifles.

The application of powerful explosive agents in shells would appear at first sight to present little difficulty, beyond that involved in the selection of a material which presents a decided advantage in point of disruptive power over gunpowder, without exerting an excessive disintegrating action upon the mass of the shell, and thereby effecting its comparatively harmless dispersion. An important obstacle to the employment of many of the more powerful explosive agents as charges for shells exists in their liability to premature explosion by the concussion which the shell has to sustain upon the discharge of the gun. Attempts to employ gun-cotton in shells have several times been attended by such premature explosions, more or less disastrous to the guns used. In comparing the relative sensitiveness to explosion by a blow or concussion of different compounds and mixtures, their submission, under precisely similar conditions, to the blow of a weight falling from measured heights has furnished satisfactory results, and by pursuing this line of experiment, very useful data have been obtained. The conditions which are variable in such experiments require, however, very careful regulation, as the results attained may be modified to almost any extent by variations of such elements as the area of the surface of material struck, the thickness of the mass, its mechanical condition (whether in coarse or fine powder, or in a rigid or plastic mass), the nature of the materials composing the weight and the anvil or support. Thus, a layer of mealed powder 0·05 inch thick placed between two flat brass plates one inch square is exploded by the blow of a 50-lb. weight falling from a minimum height of 36 feet, while a layer of the same thickness placed between brass plates like the preceding, but 0·5 inch square, is exploded by a fall of the 50 lb. from a height of about 9 feet. Small flat charges of fine-grain powder weighing five grains, enclosed in tin-foil and placed upon a steel support, were always exploded, in ten successive experiments, by the fall of a steel 25-lb. weight from a height of 2 feet; when a brass support was substituted for that of steel, only four charges out of ten were exploded; when both weight and support were of brass, only two out of ten were fired, and when the support and weight were of lead or wood, no explosion was obtained even when the weight fell from a height of 40 feet. Again, a nitro-glycerine preparation, of which a layer of a particular thickness, placed between brass plates resting on a solid block of iron, was exploded by a fall of a 50-lb weight from a height of 2 feet, was not exploded by a fall of 40 feet, when the lower brass plate was fixed upon a wooden block, the upper plate being attached to the weight by means of a small block of wood.

Of the many explosive preparations more violent than gunpowder which have been submitted to comparative experiments of the above nature, a mixture of ammonium picrate with saltpetre proved the least sensitive to explosion by blow, thus contrasting remarkably with the violently explosive mixtures of potassium picrate, which have been made the subject of experiment in France. Picric acid, which is now manufactured extensively for tinctorial purposes by the action of nitric acid upon phenol or carbolic acid, has been known since the end of last century as capable of furnishing explosive mixtures. Some of its salts, such as those of potassium and barium, are of themselves explosive, and furnish violently detonating mixtures with saltpetre and potassium chlorate. The mixtures of ammonium picrate with these salts, though less powerful in their action, are considerably more so than gunpowder, and the saltpetre mixture which has been called *picric powder*, has been shown by extensive experiments to be as safe as powder in manufacture and use, and as permanent in character; shells charged with it have been repeatedly fired from guns of large calibre, with heavy powder-charges, and there appears strong reason for placing confidence in this material as fulfilling the conditions, in regard to safety and power, of a very efficient powder for shells.

Most important progress has been made, during the last few years, in the application of explosive agents, more violent than powder, to mining and quarrying, and to various civil and military engineering purposes. The hope of realizing the advantages which would be secured, especially in point of economy in time and labour, by an explosive agent combining increased power with other essential qualities of a practically useful material, has led to the production of a great variety of preparations designed to serve as powder-substitutes in its industrial applications. The powerful oxidizing agent potassium chlorate has thus been applied in numerous ways; and some of its preparations, of comparatively safe nature, such as Horsley's and Ehrhardt's powders, have afforded prospect of advantageous employment, though at present it appears doubtful whether they can enter into competition with the more violent explosive agents which have within the last six years become formidable rivals of powder.

Gun-cotton was gradually growing into extensive use, as a mining agent in England, within a year of its discovery by Schönbein; but its application was arrested for many years by the explosion which occurred at Messrs. Hall's works in 1847. Between that period and 1863, when its manufacture was resumed in England, the material was made the subject of elaborate experiment in Austria. Important improvements were eventually introduced in its production and purification by Baron von Lenk, and it was converted by him into a form decidedly better adapted for mining purposes than the gun-cotton wool, namely, that of a compact rope, having a central perforation, and cut into suitable lengths for mining charges. An extensive series of experiments, instituted in Austria with gun-cotton in this form, appeared satisfactorily to establish its superiority over gunpowder, bulk for bulk, as regards rending and shattering effects, when used in hard rock or when confined in strong cases. The absence of smoke, and the considerable reduction in weight of the charge required to produce a particular result were also important advantages, substantiated by the experiments of Sir Edward Sabine's Committee on Gun-cotton, and by the results of practical trials in this country. The benefits, in point of economy and efficiency, derived from the employment of the rope-charges, were very greatly increased when the system was devised of reducing the gun-cotton fibre to pulp, and converting it by powerful compression into compact homogeneous masses, having about double the density of the rope. Important consequences of the large reduction in the space occupied by gun-cotton, when used in this form, were the very considerable increase in the amount of tamping which could be used in blast-holes, and the greater concentration of the force applied; the destructive effects in hard rock were consequently much augmented, and the blast-holes could be placed further apart, and reduced in dimensions. Large charges of compressed gun-cotton occupied so much less space than the rope-charges, and were so considerably lighter than powder-charges, that the material became specially valuable for submarine operations. Other peculiar advantages were presented by the compressed material; thus, its cost of production was greatly reduced, because cotton-waste could be employed in its manufacture, and because its conversion into the required forms required comparatively little time; its purification was more complete, as the finely-divided fibre was much more readily washed than the long fibre required for furnishing rope-charges; and its uniformity was much greater, because the products of a large number of successive small operations were intimately blended together in the pulping and washing processes.

One point of inferiority, exhibited by gun-cotton in the form of wool or rope, was not at first remedied, but rather increased by its conversion into compressed masses. This consisted in the necessity for very strong confinement of the material, for the proper development of its explosive force. If used just like gunpowder, in rock which was soft or contained fissures, its destructive effects were very imperfect, and under these circumstances very irritating and unwholesome vapours were produced by its ignition. Large charges used in military operations or for the removal of great masses of rock required to be confined in very strong receptacles. Hence, although the use of compressed gun-cotton in ordinary blasting and quarrying operations in hard rock soon began steadily to increase, and though its value for submarine operations was undoubted, it continued for some time to be uncertain in its effects when employed in a particular class of mining operations and when used for military engineering purposes. After it was found, however, that compressed gun-cotton could be exploded through the agency of detonation, the metamorphosis being thereby so rapidly transmitted throughout a mass as to render any confinement unnecessary, its application became extended to new and important purposes, and it became closely allied, in regard to the results which it furnished, to the companion explosive agent, nitro-glycerine, which has been raised within the last nine years from the obscure position of a useless chemical product to an exalted rank among practically useful explosive agents entirely through the labours of Mr. Alfred Nobel.

In 1863 Mr. Nobel first attempted to apply nitro-glycerine by impregnating the grains of gunpowder with it, and igniting the mixture in the usual way. But this mode of proceeding being uncertain in its results, he concluded that the certainty of exploding nitro-glycerine would be increased if a small portion of the mass were raised by some special contrivance to the heat at which it would violently explode, the explosion being thereby transmitted through the entire mass. He suggested several devices for producing what he termed the initiative explosion of a portion of the charge, but the most simple and successful one consisted in the employment of a large percussion cap, by the explosion of which the adjacent particles of nitro-glycerine were suddenly exposed to a high temperature and to a sharp concussion. This was the first instance in which the violent explosion or detonation of compounds of this class, known not to explode violently unless strongly confined, was accomplished through the agency of initiative detonation. Compressed gun-cotton was soon afterwards observed by Mr. Brown to behave similarly, and in the course of an investigation instituted by Mr. Abel into these and other phenomena exhibited by explosive agents, this susceptibility to violent explosion, without the aid of confinement, through the agency of a detonation, was found to be shared by all explosive compounds and mixtures, even including gunpowder, though the force and nature of the detonation required to develope the explosive metamorphosis differed very considerably with different substances. Numerous interesting results were obtained which showed that the development of detonation was at any rate not simply due to the exposure of particles of the substance to a very high temperature or to the suddenness and violence of the concussion to which they were submitted.

Mr. Nobel's discovery of a simple method of exploding nitro-glycerine placed this substance at once at the head of practically useful explosive agents in point of power; and the success with which he developed the manufacture of nitro-glycerine soon rendered this remarkable liquid available for extensive technical uses. Its value as an explosive agent for mines, especially where very hard rock had to be operated upon, was speedily established in Sweden, Germany, and some other countries; but its extensive manufacture and employment was very soon followed by numerous fearful accidents, which appear mainly ascribable to the physical peculiarities of the substance. Its liquid nature, though valuable in special instances of its employment, constituted a serious obstacle to its safe transport, storage, and use; its liability to leak from receptacles in which it was stored and the great susceptibility to explosion, by friction or blow, of portions which escaped confinement, were unquestionably fruitful sources of accident. The precaution of storing and transporting nitro-glycerine in the form of a non-explosive solution in wood-spirit did not prove to be a trustworthy safeguard against accident, as the spirit was liable to evaporate or become weaker, and thus allow the nitro-glycerine to separate from it to a sufficient extent to re-establish danger.

A very simple expedient, which Nobel devised in 1867, soon enabled him to provide the miner with nitro-glycerine in a very convenient and comparatively safe form. The observation that this substance could be exploded by detonation as readily (and even with greater certainty) if mixed with solid substances, which might be perfectly inert in character, as when used in the liquid form, led him to the production of solid but plastic preparations of this substance, to which he gave the name of *dynamite*. The earliest of these supplied to the public, and the one which, in its present improved form, is superior to any other known nitro-glycerine preparation in point of safety in storage, consists of 75 parts of nitro-glycerine held absorbed by 25 parts of a porous infusorial silicious earth, existing abundantly in Germany, and known as "Kieselguhr." This mixture was first supplied as a loose unctuous powder, from which the nitroglycerine appeared to have a tendency to separate; it is now converted by pressure into small cylindrical rolls or charges wrapped in parchment paper, from which, as far as the lecturer's observation goes, the liquid does not appear liable to exude, even upon prolonged exposure to elevated temperatures, though immersion in water will cause a separation of nitro-glycerine after some time. Many experiments were made in Paris during the siege, by MM. Girard, Millon, and Vogt, to ascertain what absorbent materials could be best applied to the manufacture of dynamite, in the absence of Kieselguhr; precipitated silica or aluminia, sugar, and several other substances were found to be suitable media, but the material originally selected by Nobel was undoubtedly superior to all in its power of absorbing and retaining a very large amount of nitro-glycerine.

The preparation of dynamite by Nobel was speedily followed by the production of other nitro-glycerine preparations, in some of which, such as Dualine, Horsley's mining powder, and Glyoxiline, explosive substances are used as the media for absorbing nitro-glycerine. Nobel himself prepares a less violent form of dynamite by mixing nitro-glycerine in smaller proportions with powder, saltpetre, and resin or coal. A preparation which is perhaps intermediate in value between this and the "Kieselguhr" dynamite is manufactured by Messrs. Krebs, of Cologne, who have called it *Lithofracteur*. As far as its composition has been made public, it is known to contain less nitro-glycerine than Nobel's ordinary dynamite; the absorbent material includes silicious earth and sand, saltpetre, coal, and sulphur. Some good practical experiments, made with this preparation at the Nantmawr and Breidden quarries, near Shrewsbury, satisfactorily demonstrated its safety in transport and use, when in its normal condition. In this, as in all other nitro-glycerine preparations containing solid materials of inferior absorbent power to Kieselguhr, freedom from liability to a partial separation of the liquid can obviously be only secured at the sacrifice of explosive power, by reducing the proportion of the nitro-glycerine, and it is difficult to conceive that the consequent loss in power can be compensated for by introducing solid explosive materials less violent in their action than nitro-glycerine as components of the preparation.

Nobel's dynamite, though obviously inferior to the pure nitro-glycerine in explosive power, weight for weight, is still one of the most violent explosive agents now in practical use. In regard to power, it seems to be on an equality with compressed gun-cotton, and the results of experience in mines and quarries appear to warrant the conclusion that in the class of work where these agents can be applied to the greatest advantage, their power is about six times that of blasting powder.

The advantages in point of saving of time and labour attained by the use of these violent explosive agents in tunnelling and other operations in hard rock are very important; they are also specially valuable in submarine operations, in the breaking up of large masses of rock or of large castings and forgings, in the rapid destruction of military works, bridges, and other structures, the clearing of forests, the removal of ice obstructions, etc. Their special value is partly due to the comparatively small weight and bulk of the charges of gun-cotton or nitro-glycerine preparations required to perform the work (which in many instances could scarcely be accomplished, even by extremely large quantities of gunpowder), and partly from the facility and expedition with which these explosives can be brought into operation through the agency of detonation. Hard tamping or strong confinement is superfluous, and in many instances operations of demolition and disintegration may be effectually carried out, though with some waste of power, without any confinement whatever of the explosive agent.

Dynamite and similar nitro-glycerine preparations possess two defects in common. One arises out of the poisonous nature of the liquid, which is readily absorbed into the system, producing severe headaches and other unpleasant effects, which, however, are said to diminish in severity and even to disappear by continued use of the material. Experience has scarcely been yet acquired regarding the ultimate influence upon the life of those constantly engaged in manufacturing nitro-glycerine or using its preparations. The form in which dynamite is now furnished appears to reduce to a minimum the liability of those employing it to be injuriously affected. The other defect arises out of the readiness with which nitro-glycerine freezes at a comparatively high temperature, especially when mixed with solid substances. The occurrence of several very serious accidents during manipulations with frozen nitro-glycerine, and the fact that the sensitiveness of a substance to explosion by a blow is in direct proportion to the rigidity of its particles, favoured the conclusion that nitro-glycerine was specially dangerous when frozen; there is, however, no doubt that the substance is very much less sensitive to explosion by blow or concussion in that state—a fact which must be due to the greater expenditure of heat requisite for conversion of the solid than of the liquid into gas. The accidents with frozen nitro-glycerine and its preparations appear to have arisen from reckless handling in consequence of over-confidence in the safety of the material, and also from want of care or ignorance in carrying out the necessary operation of thawing the explosive agent before applying it in the usual manner. The necessity for thawing dynamite and similar preparations, which remain frozen even at 50° Fah., is a serious inconvenience, which further experiment in the use and properties of these materials may perhaps set aside.

Plastic preparations of nitro-glycerine possess some advantages over compressed gun-cotton in several ordinary blasting operations. The application of a little pressure after the charge has been inserted will cause it to spread out and fill up any inequalities in the hole, and thus a larger charge may in some instances be employed than if the rigid cylinders of compressed gun-cotton were used; the latter are also liable to become jammed or fixed when they are being pushed down a rugged or irregularly-shaped hole; if the miner then proceeds to force the charge home by powerful blows, which, with reckless confidence engendered by the general safety of the material, he not unfrequently will, it may become ignited and must explode violently if force is being applied at the instant of its ignition, as it is then in the position of a strongly-confined charge. Accidents in the charging of holes are obviously less likely to occur with plastic materials. Dynamite has the additional advantage of being readily applicable in blast-holes from which water cannot be excluded, as the material resists penetration by water for a considerable period. To counterbalance these advantages, gun-cotton is perfectly innocuous, and its ready explosibility by detonation is not in any way affected by cold. When carried into the field for military purposes, compressed gun-cotton is very decidedly safer than nitro-glycerine preparations; because if carts or packages containing the latter are fired into from accident or design with ordinary small-arm bullets, their contents will be violently exploded as by detonation, while the gun-cotton under the same circumstances would be simply inflamed.

(*To be continued.*)

THE MANIOC, OR TAPIOCA PLANT.*

BY M. PAUL SAGOT.

Tapioca is obtained from the Manioc, or Cassava, a suffrutescent plant belonging to the Order Euphorbiaceæ, which has long been cultivated by the indigenous Indians of Guiana and intertropical America. It is the *Jatropha Manihot* of Linnæus, and the *Manihot utilissima* and *Manihot Aipi* of Pohl. By the Indians it is known under various names; the Caribs call it *Kière* and *canhim*; the Galibi, *Kie ray;* the Arrouagoue, *calôli.* In the Antilles, the Spanish colonies, New Granada, Peru, and Pará it is called *yuca;* in Brazil *mandiocca* and *maniba* and *aïpi* (sweet manioc); in Mexico it is called *tziim.* A great number of varieties have been observed under cultivation, each of them permanent, although sometimes closely resembling another variety, and each distinguished by some particular quality. Botanists have not yet met with any form of the cultivated manioc in a wild state; but in Brazil, Guiana and Venezuela many undoubtedly spontaneous species of the genus *Manihot* exist, and some of them resemble the cultivated varieties very closely. The province of Goyaz in Brazil produces the largest number of species, and amongst those offering the closest points of resemblance are *M. pusilla*, *M. flabellifolia*, *M. digitiformis* and *M. triphylla.* Pohl describes the sweet (non-poisonous) manihot (called *Aïpi* in Brazil, *M. Aïpi*, Pohl) as a distinct species from the poisonous manihot (*Yuca brava* or *Mandioca brava* of the Spanish and Portuguese colonies); but the author agrees with Goudot in thinking that they are only varieties of the same species.

The manioc or cassava plant is propagated by cuttings which grow with extreme facility. The plant appears at first as a straight stem, furnished with large digitate leaves, with about seven lobes. At the age of from six to ten months, and when from one to two metres high, it throws off from its summit lateral branches, with smaller leaves, and shortly afterwards bears flowers. The root then commences to develope several elongated amylaceous tubers, which continue to grow underground as long as the branches yield leaves and flowers. At the end of a year and a half or two years the roots are ready for collection; but if not wanted may be left in the ground for some time, provided they be watched that they do not rot. On the other hand, they may, if required, be gathered earlier, but the yield is not so good. The stalks, which are planted about a metre apart, usually produce two or three tubers, varying in size and weighing together from one to three kilograms. The plant is not very choice as to soil, but flourishes most in freshly cleared ground, and prefers well-drained spots, an excess of moisture causing it to rot. Although living for two or three years, the plant is not strictly a perennial, since it becomes gradually exhausted as the tubers attain their full size. The sweet manihot is usually gathered earlier, since the root becomes hard and bad if left to develope too much.

The yield of the manioc root, considering the time it occupies the ground, when compared with other farinaceous roots is not great; but on the other hand, it contains less water than any other starchy root;—when mature, less than sixty per cent. Its texture is very dense and compact. It contains much starch, and its richness in albumen and other nitrogenized matters is estimated at two per cent. In converting the roots into an edible flour, they are scraped, peeled, and then washed; next they are rasped upon a wooden plank armed with small iron teeth, and the pulp is left twenty-four hours, by which time a slight fermentation is set up. It is then placed in a long, flexible basket, called a *couleuvre*, usually made of plaited rushes. The *couleuvre* is suspended by a handle at its open end, and a heavy weight is attached to the other end, by which means the sides are compressed together, and a slightly opaline aqueous juice, which is highly poisonous, is caused to ooze through the plaits. The pressed meal is then taken out and exposed for some time over a fire; afterwards pounded, coarsely sifted and roasted on a brass plate over a fire to upwards of 100° C., care being taken by constant renewals to prevent scorching. Sometimes during the roasting it is stirred to and fro with a small rake of wood or metal; it is thus formed into small hard grains, having the appearance of semolina, which are called *couac.* When *cassava* is to be prepared, the meal is more carefully pounded and better sifted. It is then spread circularly upon the plate, pressed slightly with a pallet knife to cause it to aggregate and turned two or three times during the roasting. In both operations there is complete cooking and desiccation effected, which enables it to be kept an almost indefinite time. The aggregation of the meal is caused, not by the addition of water, but by the action of heat, softening and agglutinating some of the particles of starch.

M. Sagot considers the manioc to be healthy food, although of small nutritive value. Dr. Schier estimates it to contains 0·18 per cent. of nitrogen, but little phosphorus, and a very small quantity of fatty matter. The indigenous tribes, who make it the basis of their food, supplement it with a good quantity of fish and meat.

In the preparation of tapioca, the root is rasped and diluted with water, in which it is well worked up; the grosser parts are removed and the finer allowed to be deposited by subsidence in the water. In this form it is imported into this country in considerable quantities as Brazilian arrow-root. The tapioca is produced by roasting this starch on metal plates, stirring it the while with an iron rod; the starch grains burst, some of the starch is converted into dextrin, and the whole agglomerates into small irregular masses.

In Demerara, the manioc juice, deprived by boiling of its injurious properties, is used under the name of *cassareep*, as a sauce for the table. Besides this, the Indians use the root of the manioc to prepare fermented drinks, which, however, would hardly suit European tastes.

It is probable, M. Sagot thinks, that the poison present in the manioc is an instable organic compound, hurtful in itself, but especially dangerous from the fact that, under certain conditions, it will engender hydrocyanic acid. The leaves when bruised exhale a smell of bitter almonds, and the presence of prussic acid in the roots has been established. This he considers to explain the fact that while the manioc water, especially when distilled, is very poisonous, in Guiana and Brazil the Indians, after boiling it and removing the scum, use it as a beverage. Although wild animals, too, are sometimes poisoned through eating the leaves, sometimes they are not; this, he thinks, occurs when, a small quantity being eaten, the gastric juice exercises an energetic action before hydrocyanic acid can be developed.

The sweet cassava, or Camanioc, contains so small a quantity of acrid principles that the roots are cooked at a fire and eaten like potatoes. It is a rapid-growing variety, becoming ripe in five or six months, and in two or three months more the roots become hard and unfit to eat. The bark of the stalk is white, the petioles of the leaves are of a fine purple-red colour, and the luxuriant leaves at the foot of the stalk are 7-partite. The tubercles are long and of small diameter; when cooked in the ashes of a fire they are agreeable to the taste, sweet and of a fine consistence.

* Abstracted from a paper read before the Société Botanique de France, Dec. 18th, 1871 (Bull. de Soc. Bot. Fr. xviii. 341).

LACTO-PHOSPHATES.*

BY R. ROTHER.

Lactic acid abundantly dissolves many of the insoluble orthophosphates when freshly precipitated; among the most prominent of the resulting combinations are the so-called lacto-phosphates of calcium and iron.

When lactic acid is treated with an excess of either of these phosphates in the cold, a solution is obtained which still retains the acidulous taste of diluted lactic acid. If this solution is boiled, a copious granular precipitate occurs. However, if it be not heated and simply converted into a syrup by the addition of sugar, the saccharine solution, after the lapse of a few days, will deposit a voluminous white precipitate, or even completely gelatinize. The precipitates produced by heat or time are again readily and completely soluble in hydrochloric acid, producing then a permanent solution. The precipitation is also perfectly prevented if the saturated phosphate mixture is treated with an additional portion of lactic or hydrochloric acid before precipitation has begun. The supernatant liquid from which the phosphate precipitate has spontaneously separated apparently loses much of its acidity.

It is highly probable that the act of solution in the first instance is merely mechanical, and that the application of heat or a certain amount of time is required to determine a combination.

Nevertheless, the freshly precipitated phosphate is always taken up in a certain fixed proportion, and when the solution is thoroughly saturated with the phosphate, the resulting mixture invariably corresponds to one molecule of tricalcic-orthophosphate and four molecules of lactic acid, equal to one molecule of acid calcium phosphate and two molecules of normal calcium lactate, thus:—

$$(PO_4)_2Ca_3'' + 4\,(C_3H_6O_3) = (PO_4)_2Ca''\,H_4 + 2\,(C_3H_5O_3)_2Ca''.$$

On standing, actual combination, however, does take place, yet differing from the result indicated in the above equation. The phosphoric acid is then almost totally precipitated as the normal dicalcic orthophosphate ($(PO_4)Ca''H$) and the generation of acid calcium lactate, in solution, thus:—

$$(PO_4)_2Ca_3'' + 4\,(C_3H_6O_3) = 2\,(PO_4)Ca''\,H + (C_3H_5O_3)_2Ca''\,2\,C_3H_6O_3.$$

But, as above stated, an additional quantity of lactic acid ensures a stable product. This is effected by adding half as much more lactic acid as at first consumed, which then indicates a mixture of two molecules of free orthophosphoric acid, and three molecules of normal calcium lactate, thus:—

$$(PO_4)_2Ca_3'' + 6\,(C_3H_6O_3) = 2\,(PO_3H) + 3\,(C_3H_5O_3)_2Ca'' + 2\,OH_2.$$

The general process for permanent solutions of the so-called lacto-phosphates is then as follows:—Take any convenient quantity of concentrated lactic acid, and saturate two-thirds of it with any desirable orthophosphate, freshly precipitated, then add the remaining one-third of the acid, and if the preparation is to be a syrup, dissolve the sugar in the solution without heat, and strain.

In the preparation of syrup of calcium lactophosphate, the writer finds the officinal U.S. process the best method of obtaining the calcium phosphate, but the direction to wash the precipitate with boiling water must be faithfully ignored, as this produces the crystalline phosphate, which is insoluble in lactic acid. To obtain the gelatinous phosphate heat is not admissible.

The following is the process for permanent syrup of calcium lacto-phosphate:—

Take of either the precipitated calcium phosphate or calcined bones, about . . . . 6 drachms.
Lactic acid (concentrated) . . . $1\frac{1}{2}$ Troy ounces.
Sugar . . . . $10\frac{1}{2}$ Troy ounces.
Orange flower water . . . . . 2 fluid-ounces.
Hydrochloric acid, sp. gr. 1·16, one Troy ounce, or sufficient.
Ammonia water.
Water of each sufficient.

Mix the hydrochloric acid with one fluid-ounce of water, and add it to the powdered calcium phosphate previously mixed with four fluid-ounces of water; when the phosphate has dissolved, dilute the solution to twelve fluid-ounces, and precipitate it with an excess of ammonia, pour the magma upon a filter and wash it with cold water, add this washed magma to the lactic acid, and when dissolved dilute the solution after the addition of the orange flower water to $10\frac{1}{2}$ fluid-ounces, add the sugar to 9 fluid-ounces of this liquid, stir frequently, and after most of it has dissolved, pour the syrup through a muslin strainer, mix the undissolved sugar with the remaining liquid, and after solution add it to the rest of the syrup, through the strainer, and mix.

* Reprinted from the Chicago 'Pharmacist.'

ADMINISTRATION OF ACETATE OF BARYTA IN THE PLACE OF SULPHOVINATE OF SODA.

A medical man at Verdun having last July prescribed a purgative consisting of 30 grams of sulphovinate of soda in q.s. of water, to be taken in three doses at half-hour intervals, a mixture was made up by a pharmacien, of which a third part was taken by the patient. Immediately afterwards the patient was seized with severe vomiting and other symptoms of poisoning. The medical man and the pharmacien were both summoned, and in order to reassure the patient as to the innocuousness of sulphovinate of soda, each drank a portion of the remaining mixture. The pharmacien, who had just eaten his dinner, was at once seized with vomiting, which caused the expulsion of the greater part of the liquid, but the medical man, although he had taken but 8 or 10 grams of the liquid, suffered from its effects for some months. The patient died twelve hours after taking the dose. At first it was thought the poisoning was due to a defective sample of the sulphovinate of soda, in the preparation of which it is known that great care is required to obtain it in a state of purity, and M. Duquesnel published a note on the subject. But M. Limousin reports that the mixture and the bottle containing the substance from which the mixture was prepared, having been sent for examination to the professors of the Paris School of Pharmacy, they discovered that the salt that had been employed was acetate of baryta, and not sulphovinate of soda. Upon further inquiry it was found that the wholesale druggist in labelling the bottles had labelled a bottle of sulphovinate of soda as acetate of baryta, and one of acetate of baryta as sulphovinate of soda.

M. Limousin considers this case instructive as showing that acetate of baryta, and possibly other salts of the same base, are more poisonous than is generally supposed. Referring to a method of preparing sulphovinate of soda, described at the last meeting of the Paris Société de Pharmacie, and printed at p. 536 of this Journal, in which the use of a baryta compound is avoided, M. Limousin states that in conjunction with M. Adrian he has tested it and that it appears to yield satisfactory results.

The Pharmaceutical Journal.

SATURDAY, JANUARY 18, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

VERMIN KILLERS.

WE have frequently had occasion, in replying to correspondents and otherwise, to point out how desirable it is that chemists and druggists, when dealing with "vermin killers" containing strychnine, arsenic and other poisonous ingredients, should comply with the conditions prescribed for regulating the sale of those poisons in the Pharmacy Act, 1868. This week we have to report two instances where these precautions have been neglected, and the result has been that in one the vendor has been prosecuted by the police authorities and fined, and in the other he has been sharply reprimanded by a coroner and threatened with further proceedings.

It appears useless to ignore the fact that the public is still desirous that the restriction attending the sale of poisons should in no way be relaxed so as to facilitate their purchase. We have on former occasions stated our opinion that in this desire there is nothing that should be looked upon as objectionable by the registered chemist and druggist, who is the only lawful seller of such poisons. For the work which is involved in providing the requisite safeguard is a need recognized by the public, and should not be performed without sufficient remuneration to prevent it becoming irksome. This seems to be the most fair and reasonable mode of dealing with the question.

But each of the cases mentioned illustrates an error, and these errors are prevalent amongst those in the trade who are too ready to look upon vermin killers and drugs generally as commodities to be dealt with after the same fashion as groceries or hardware. In the case at Cambridge the defendant pleaded that he had sold the vermin killer under the old law, and that vermin killers had been included for the first time in a new regulation which he had received the previous day. It is true that "Vermin Killers" were not included in the original Schedule A to the Pharmacy Act, 1868; but they were among the additions sanctioned by the Privy Council in December, 1869. In consequence of some doubt that existed as to which part of the schedule they were to be classed under, the Council of the Pharmaceutical Society, upon the report of a committee recommending the addition of some explanatory words, recently resolved that a copy of the revised regulations should be issued to every registered chemist and druggist, and it appears to have been one of these copies which the defendant looked upon as a new regulation, and to which he attributed his first knowledge that a vermin killer was a "poison!"

In the case at Wolverhampton, the druggist urged, in reply to the coroner's censure, that he did not know that "BATTLE'S Vermin Killer" contained strychnine. But, irrespective of this being a matter of common repute, surely in dealing with a substance prepared for the express purpose of destroying life, it is advisable that a man should have some idea as to what he is selling: and it is to the belief that the chemist and druggist is a man capable of acquiring and acting upon this knowledge that the willingness of the public to entrust the sale of such articles as vermin killers to registered chemists and druggists alone is to be attributed. We hope and believe that nothing will be wanting on their part to strengthen that confidence.

MEDICAL ELEGANCE.

DOES the *Lancet* represent the medical profession? This is a question which might be supposed to interest principally its subscribers; but in the light of recent circumstances it is one that may well be asked by those who have hitherto believed in the propriety of the phrase "gentlemen of the medical profession." For although the *Lancet* was never famed for being delicate in its choice of weapons when dealing with those who might fall under its displeasure, what gentleman can sympathize with the following paragraph, which is the summing up of a diatribe against dispensing chemists for their assumed exorbitant charges?

"The fact is, that retail trade has gone mad. There are far more shopkeepers than the wants of the public require, and they think themselves entitled to all the luxuries and enjoyments of life. Their wives, glorious in sealskin jackets and redundant jewellery, are to be seen everywhere; and the pretensions of the class are becoming a nuisance that it is high time to put down."

Is this another "sign of the times?" A short time since the *Lancet* favoured its readers with a singular argument that because the College of Physicians and the Apothecaries' Company had failed in their duty to regulate medical practice, the Pharmaceutical Society became responsible for the consequences of that failure. In a subsequent number it followed up this specimen of feminine logic by devoutly quoting, as if it were gospel, a rather foolish remark of an old lady of its acquaintance, with the object of proving that members of the Pharmaceutical Society were misled in claiming to be eligible as analysts. And now we have another instance of these feminine proclivities, but in a repulsive form that is seldom found far apart from the garrulity of dotage and the neighbourhood of Lower Thames Street.

THE CHEMISTS' BALL.

Those who in former years have been privileged to join the pleasant gathering known as the Chemists' Ball, will scarcely need reminding that Wednesday next is the day fixed for that of 1873. To them there can be offered no inducement stronger to accept the invitation of the stewards, than an assurance that—

"This festive fête, in fact, will be
The former fêtes' *fac-simile*."

Nor can it be doubted that the Ball at Willis's Rooms, on the 22nd, will be attended by many for the first time. For occasions like these will never lack patrons, affording, as they do, to gentlemen who pursue the same avocation, opportunities for friendly greeting and social enjoyment.

A few tickets still remain for disposal, and to prevent disappointment immediate application should be made for them, either to Mr. T. D. Watson, the Hon. Sec., 46, Halton Road, Canonbury Square, N., or to Mr. Richard Bremridge, 17, Bloomsbury Square, W.C.

"So prithee, come! our fête will be
But half a fête if wanting thee!"

THE PRIESTLEY MEMORIAL.

The discoverer of oxygen, the inventor of the pneumatic trough and of the artificial preparation of mineral waters is about to be honoured with a memorial. Birmingham, the city of his chief scientific triumphs, while Leeds was that of his birth, has taken the initiative, and Mr. Williams, the sculptor, has been commissioned to prepare a statue of the philosopher. Subscriptions are in course of collection for carrying out the movement, and already a considerable sum has been contributed. We trust that pharmacists will respond handsomely to the appeal of the promoters. Priestley has laid not only chemistry proper but pharmacy itself under deep obligations, while the example of his life—so rich in noble traits of character, not only as a *savant* and teacher, but as a vindicator of the catholicity of science and of the great principle of toleration—is a bequest which every votary of inductive research, in whatever field, ought to cherish with gratitude and pride. Science in general and chemistry in particular are not, in these days, so very rich in first-rate men that they can afford to seem indifferent to the life and labours of Joseph Priestley.

DANGERS OF GLUTTONY IN A PHARMACY.

According to the *Répertoire de Pharmacie*, a curious occurrence took place a short time since in a Paris pharmacy. An assistant, having to prepare some granules of arsenious acid according to the formula of the Codex, had made the mass a little soft, and in order not to augment the weight by an addition of inert powder, it was divided into little masses of about 100 granules each and spread out upon a raised place, behind some other articles, to dry. In the course of the day a tall young American lady, while waiting the dispensing of a prescription, made the round of the pharmacy, touching each article she fancied, as is too often the custom with foreigners. The pharmacien, accustomed to this sort of behaviour paid little attention to her proceedings, until happening to raise his eyes he saw her putting into her mouth one of the masses in question. Calling out to her sharply to spit out what she had in her mouth,—forty granules at least,—he gave her to understand that a pharmacy was not a confectioner's shop. The lady, somewhat surprised, obeyed, and excused herself by saying that she had mistaken the substance for *guimauve* paste, and that American pharmacists provided such things as pastes, bonbons, etc., for their customers. She treated the affair very lightly, was evidently not at all frightened by the words "arsenious acid," and left the shop soon afterwards evidently under the impression that the pharmacien had sought by frightening her to punish her for her free and easy behaviour.

MICHELIA CHAMPACA.

At the recent meeting of the North British Branch of the Pharmaceutical Society (see *ante*, p. 431) the President, Mr. Baildon, read an extract from a letter received from Mr. Jamie, of Singapore, referring among other things to the *Michelia Champaca*. The following additional information respecting this plant has been communicated by Mr. P. L. Simmonds, and has been placed at our disposal by Mr. Baildon:—

"The *Michelia Champaca*, Lin., is a native of the Indian islands, although cultivated in Bengal and in gardens in the Peninsula of India for its large yellow fragrant flowers. The tree is highly venerated by the Hindoos, and is dedicated to Vishnoo. It is celebrated for the exquisite perfume of its flowers. Sir W. Jones states that their fragrance is so strong that bees will seldom if ever alight upon them. The natives adorn their heads with them; the rich orange colour of the flowers contrasting strongly with their dark black hair. There are several Indian species of *Michelia*, but they have been somewhat confusedly arranged by botanists. The flowers of another species, *M. Rheedii*, growing in Malabar and Travancore, boiled up in oil, are applied in headaches and affections of the eyes. Oil in which the flowers have been steeped for forty days is also used occasionally in anointing the head.

"It is strange how little attention has yet been given to the distillation of new essential oils for perfumes, etc., from the odoriferous flowers of the East. The large white fragrant flowers of *Mesua ferrea* when dry are mixed in India with other aromatics, such as the sandal-wood, and used for perfuming ointment. The blossoms are found in a dried state in the bazaars, and are called Naghusur; they are used medicinally and much esteemed for their fragrance, on which account the Burmese grandees stuff their pillows with the dried anthers. The white flowers of *Mimusops Elengi*, Lin., are somewhat fragrant and powerfully aromatic. The natives distil an odoriferous water from them. Many other flowers might be cited."

THE DISPENSING OF ERGOT IN FRANCE.

A question having been raised whether ergot, which occurs in the schedule of substances that only medical men and veterinarians have the right to prescribe, should be supplied by the French pharmacien on the order of a midwife, it was referred by the Government to the Academy of Medicine to consider and report upon. After much discussion the Academy has agreed that although such a proceeding is contrary to the law as it at present stands, yet, in view of the fact that midwives are examined in the theory and practice of midwifery and that it would be inhuman to deprive them of the advantages offered by ergot in accouchements, it will recommend the Minister of Agriculture and Commerce to take the necessary measures for authorizing pharmaciens, pending an alteration of the law, to supply ergot upon the presentation of a prescription signed and dated by a certificated midwife.

By a decree dated November 29th, 1872. M. Quatrefages, pharmacien-major of the first class, Chevalier of the Legion of Honour since June, 1863, has been promoted to the rank of officer. M. Hebert, head pharmacien of the Hôpital des Cliniques, has just been named Chevalier of the Legion of Honour.

The members of the British Pharmaceutical Conference will be pleased to learn that the 'Year Book for 1872' is now ready, and will be issued immediately to every member who has paid the subscription for the current year. We have been favoured with an early copy, and our first impression is that in merit it ranks at least as high as either of those which have preceded it.

On p. 561 of the present number will be found an original contribution to the history of Extract of Meat with which we have been favoured by Baron Liebig. As the subject is one in which the learned author is *facile princeps*, and one not without its bearings upon pharmacy, we commend it to the attention of our readers.

Mr. A. Pedler, formerly a student at Bloomsbury Square, has just been appointed Professor of Chemistry in the University of Calcutta.

NOTICE.

We are requested by the Secretary and Registrar to state that the list of successful candidates in the Preliminary examination of the 6th inst. will be published in the next number of the Journal.

Provincial Transactions.

BRIGHTON ASSOCIATION OF PHARMACY.

The usual monthly meeting was held in the Hanover Lecture Hall, on Friday evening, January 3rd, Mr. W. D. Savage, Chairman, being unavoidably absent through indisposition.

The subject for discussion was, "The Adulteration Act in relation to Pharmacy," introduced by Mr. Cornish. Several points of importance were discussed, the principal, "What is an adulteration?"

This, in the opinion of the members present, was not clearly or satisfactorily defined by the Act, nor have the decisions in cases recently brought before Mr. Raffles at Liverpool, where attempts have been made to enforce the Act, proved more successful in elucidating the question.

The feeling generally expressed was, that different degrees of quality did not constitute adulteration.

Official articles of the B.P. should answer to the tests provided for them, and as *pure* and *impure*, or *commercial* were relative terms of degrees of quality, adulteration can only apply to those cases where goods are supplied with a guilty knowledge of being reduced in quality *fraudulently*, and represented as being what they really are not.

The value of pharmaceutical education was urged as a more important safeguard against sophistication than defective Acts of Parliament.

The appointment of analysts was also considered, and it was thought properly qualified pharmaceutical chemists were more eligible for the office than medical officers of health, possessing very little knowledge of practical chemistry.

Messrs. Schweitzer, Armitage, Ettles, Garrett, Smith, and others, took part in the discussion, which was carried on with animation.

After a vote of thanks to Mr. Cornish for his paper, the meeting, a small one, separated.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The third general meeting of the Association was held in Anderson's University on Wednesday, January 8th, 1873, at 9 p.m.; Mr. Davison, President, in the chair. There was a good attendance of members.

The minutes of last meeting having been approved of, the Secretary read a communication that he had received from the Midland Counties Chemists' Association regarding a magazine connected with chemists' associations, which that association purposes issuing, provided the circulation of a given number can be guaranteed.

After some discussion, the Secretary was instructed to write to the secretary of the Midland County Chemists' Association, intimating that the Glasgow Chemists' Association are willing to subscribe to the number of fifty copies of the proposed Journal monthly.

The question as to whether the annual festival should take the form of a supper or of a soirée and ball was next considered. On the vote being taken it was found that the members were nearly unanimous in the desire that it should take the latter form.

The necessary committee having been appointed, the Chairman then introduced Mr. James Stitt, assistant to Professor Thorpe, Anderson's University, who delivered a lecture on "Phosphorus," in which he gave a history of its discovery, and described its chemical and physical characteristics.

At the close of the lecture, Mr. Stitt was awarded a cordial vote of thanks, as was also Mr. D. Clark, who acted as Mr. Stitt's demonstrator.

Mr. Fairlie then moved—"That the secretary call a meeting of assistants to consider the granting to them the use of the hall fortnightly, alternately with meetings of the Association."

This was seconded by Mr. Alexander Kinninmont, and agreed to.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL ASSOCIATION.

The annual general meeting was held on January 10th. The report as read showed a slightly unfavourable aspect, considering the position an association such as this should hold in the midst of such a large business centre. The expenditure also has been in excess of the income, and an appeal was made to the members to give their personal support to the society, and by so doing restore it to something like its former condition of usefulness.

Much anxiety is caused by the seeming indifference with which it is regarded by the bulk of the trade in this district: and it is felt to be most important that every exertion be used that may possibly increase its influence.

The establishment of a Pharmaceutical Students' Association is a source of gratification, and it is hoped that as it has hitherto gone on most successfully, it may be a means of considerably increasing, which is felt in the doings of the society.

The election of officers for the ensuing year placed Mr. W. Ward, F.C.S., in the presidential chair, with Mr. W. V. Radley as treasurer, and Mr. E. R. Learoyd, secretary. The meeting, which was not so well attended as it might have been, was most sincere in its appreciation of the necessity for further exertion if its operations are not to be considerably curtailed in the future.

SHEFFIELD PHARMACEUTICAL STUDENTS' ASSOCIATION.

The annual meeting of this association was held in the Music Hall (Tudor Place) on Thursday, January 9th. After a preliminary speech by the President, Mr. E. R. Learoyd, in which he congratulated the association on the success which had attended its efforts, a report of past proceedings was given, which was considered very satisfactory, bearing in mind the short time the society has been in existence.

A latin class, a materia medica class, and a chemistry class are conducted weekly under the supervision of able gentlemen, and it is hoped they will be appreciated by the chemists' assistants and apprentices of Sheffield more than they are, although the attendance hitherto had been nothing to complain of.

A list of officers and rules were then presented, and received confirmation, after which a very interesting and exhaustive paper was read by Mr. J. S. Wilson, on "Nux Vomica and its Alkaloids," much amusement being caused by the fact that Mr. Wilson (to better illustrate the therapeutical effects of strychnia) had been experimenting upon himself, and when reading his paper was still under the influence of that poison.

A short discussion after the paper, and a vote of thanks to Mr. Wilson, proposed by the President and seconded by Mr. Dunnill, concluded the business of the evening.

Parliamentary and Law Proceedings.

The Sale of Vermin Killers containing Strychnine.

Mr. Crabb Gillett, a chemist, of Peas Hill, Cambridge, has been charged with unlawfully selling a quantity of strychnine to Walter Kirbyshire, on January 2nd, without entering the sale of the same in a book, against the provisions of the Pharmacy Act, 1868.

Walter Kirbyshire, aged thirteen, said that he went on January 2nd to Mr. Gillett's shop for a threepenny packet of "Battle's Vermin Powder," with which Mr. Gillett served him, and whilst he was in the shop Mr. Gillett did not enter anything in a book. The packet had on defendant's name and address, and the name, "Vermin Killer."

Detective Kirbyshire received the packet from his son and gave it to Mr. Deck, of King's Parade.

Mr. A. Deck, pharmaceutical chemist, said he received a packet marked "Battle's Vermin Powder" from Kirbyshire. He had subjected it to an analysis, and found it to contain strychnine in the proportion of a grain and a half to the packet. To take one-sixth of the packet would be very dangerous. The packet contained about forty grains.

Defendant said that he had sold the powder under what was then law, vermin killers not being mentioned in the Act of 1868, but the day before there had been a fresh regulation, in which vermin killers were added.

The Clerk said that that was only an explanation of the Act, and not a fresh regulation.

Chief Superintendent Turrall said that the summons was not laid against defendant individually; but in summoning him he considered himself proceeding against all chemists in Cambridge who failed to comply with the Pharmacy Act.

The magistrates mentioned that in August last a child had died from this same poison, and that in Cambridge nearly 100 dogs had been poisoned.

Fined in the mitigated penalty of *5s.*, with costs.

The Alleged Negligence of a Chemist and Druggist.—Powell *v.* Hingston.

This case came before the Court of Queen's Bench on Wednesday last. The particulars, which were recently reported in this Journal, were as follows:—

The plaintiff, a hairdresser at Liverpool, sent a child of 10 or 11 years old to the shop of the defendant, a chemist and druggist, for some acid. The truth was that the hairdresser used nitric acid in his business, but, at the same time, he wanted sulphurous acid for his throat. It was admitted, however, that the chemist did not know this, and he had sold the man nitric acid before, so he gave the child nitric acid, and labelled it so. The man, however, unfortunately did not observe the label, and applied the acid to his throat, the result of which was that he was very severely burnt. He sued the chemist for damages, and the case was tried at the last assizes at Liverpool before Mr. Justice Lush, who, upon the evidence thought that there was no negligence, and expressed that opinion to the jury, who found for the chemist.

Mr. C. Russell, Q.C., moved on the part of the plaintiff for a new trial on the ground of evidence of negligence, but

The Court thought there was no ground for disturbing the verdict, as there was no negligence on the part of the chemist. They thought, indeed, that it was foolish to send such a mere child on such an errand. The phial was duly labelled, and the mistake was the plaintiff's.—*Times.*

Suicide in Wolverhampton.—A Caution to Chemists.

On Friday evening an inquest was held at the New Market Inn, Cleveland Road, by W. H. Phillips, Esq., Borough Coroner, on the body of Thomas Woodward, 22, driller, employed at the Great Western Railway Works, Stafford Road, whose death had, it was supposed, been caused by poison. John Argyle, "boots" at the Coach and Horses, Snow Hill, was the first witness called. He said he had known deceased very well for some time. He was a single man and lived on the Stafford Road. About twelve o'clock on the previous day the deceased came to the Coach and Horses Inn, as he was in the habit of doing, to give any assistance he could. He remained on the premises until about nine o'clock. He went out, but returned some time afterwards, and about twenty minutes past ten he fell down in the kitchen; he went black in the face, and very stiff. Witness thought he was in a fit, and bathed his temples with vinegar. He sent four times for Mr. Pope, surgeon, but he did not attend, and then witness sent for Mr. Bunch, who came shortly after eleven o'clock. By his advice, deceased was then taken to the Hospital. In reply to further inquiries, witness said the deceased had been in very low spirits of late, owing chiefly he (deceased) had said to the manner in which his father (from whom he lived apart) had treated him. He had been very much down-hearted because his father had not taken so much notice of him, he said, as he did of his housekeeper, and he had told witness that he should kill either that person or himself. He had recently been in a "bother" at Tettenhall, and had been discharged from his work. This, also, had preyed on his mind. On two occasions, several weeks ago, deceased said he should poison himself, but witness persuaded him not to do so.—Susan Evans, waitress at the Coach and Horses, said she saw the deceased several times on the previous day, and noticed that he was more dull than usual; he would scarcely speak to any one. At about twenty minutes to eleven o'clock at night witness found him in a fit on the floor of the kitchen. She had not previously seen him since three o'clock, when she had given him some port wine at his own request. When Mr. Bunch arrived, he said (in reply to that gentleman's inquiries) that he had taken six pennyworth of vermin killer, which he had purchased from Mr. Moses, the chemist, and had taken it at ten o'clock.

Mr. H. Moses, chemist, Dudley Street, said that on the previous evening, about ten minutes to nine o'clock, he sold six pennyworth of Battle's Vermin Killer to a young man, whom he did not know, and whom he could not recognise in the person of the deceased. He had no recollection of the man. Witness did not make any entry of the sale, neither did he explain to the purchaser the nature of the purchase. It was labelled "Poison."

Alfred Henry Carter, house physician at the South Staffordshire Hospital, stated that he was called to attend the deceased at twenty minutes past eleven on the previous night, and found him insensible. He was then slightly convulsed. Witness administered an emetic within two minutes of the man's admittance, having heard that deceased had taken poison, and at once went for the stomach pump. Witness used other means to retain life, but the patient died within twelve minutes of admittance. The symptoms displayed were the same as those he might have expected from a person who had taken poison, but they were not definite. At this stage of the proceedings the inquest was adjourned till Monday, for the purpose of a *post-mortem* examination.

The adjourned inquest was held on Monday morning, at the New Market Inn, before W. H. Phillips, Esq., Borough Coroner. Dr. Carter stated that he made a *post-mortem* examination of deceased's body on Saturday afternoon. The heart was healthy, but gorged with red blood, lungs congested, the lining membrane of the stomach highly congested and covered with unusual viscid mucus and spotted with adherent particles of varying sizes with what appeared to be a white powder. It also contained a considerable quantity of grumous-looking matter, amongst which were small particles of what seemed to be Prussian blue. Mr. F. J. Barrett (the hospital pharmaceutist) made under his superintendence an analysis of about one-third of the contents of the stomach, and separated nearly one grain of strychnine, showing that the stomach contained about three grains, besides absorbing a sufficient quantity to cause death. There was no arsenic present. The witness was satisfied that the deceased died from poisoning by strychnine. He did not find any curvature of the spine or lockjaw.

After a short consultation the jury returned a verdict to the effect that "the deceased destroyed his life by taking some of Battle's Vermin Killer whilst in a state of temporary insanity."

The Coroner (addressing Mr. Moses, the chemist who sold the powder to the deceased) said it became his duty to call his attention to one or two matters. It appeared that he (Mr. Moses) sold a packet of Battle's Vermin Killer to a person whom he did not know, and after seeing the body of the deceased was unable to identify him as the same person. It became his (the Coroner's) duty to call his attention to section 17 of the Pharmacy Act, 1868, which required every chemist to endorse every packet of poison which he sold with the word "poison," and to enter the name of the person to whom he sold it in a book. Also the person to whom the poison was sold must be either known or introduced to the chemist. The Pharmacy Act contained a schedule of poisons for which caution was required to be taken, and "vermin killer" was amongst them. The chemist who did not comply with the regulations was liable to a penalty, on the first offence to £5, and on the second offence to £10. Mr. Moses had omitted to comply with these regulations by selling the "vermin killer" to the deceased without first being introduced to him; and secondly, not entering the name of the purchaser in a book. He (the Coroner) was therefore bound to bring the matter to the notice of the police authorities of the Borough.

Mr. Moses: I did not know that it contained strychnine.

The Coroner said he should have made himself acquainted with the matter. He had sold the packet of "vermin killer" without entering the name of the deceased in a book. Although he labelled it poison, he sold it to a person whom he did not know, and to whom he had not been introduced. The Coroner then thanked the jury for their attendance.

Alleged Attempt to Poison a Schoolmaster.

At the Thames Police Court on Tuesday, January 14th, James Thomas Langton, aged 15 years, a compositor, of No. 40, White Hart Place, Newgate Street, William Finchcliffe, aged 11 years, and James Grant, aged 11, were brought before Mr. Lushington charged with attempting to poison John Sonden, assistant-master at the industrial school, No. 96, Mansell Street, Whitechapel.

A police-constable said that the complainant came to the station, and from what he told him he took the prisoners in charge. At the station, Langton said that Finchcliffe gave him a penny to purchase a precipitate powder, and he went to a Dr. Squares and bought it of the assistant. He gave the powder to Finchcliffe, and asked him what he was going to do with it. Finchcliffe said he was going to give it to the master as a medicine, because he had flogged him. He (Langton) told him if he had known it was going to be used for that he would not have fetched it, and asked Finchcliffe for it back again. The latter refused to give it up. When the prisoners were told the charge Finchcliffe said he put the powder in the medicine, but was told to do so by the prisoner Langton.

Mr. Segueria, a surgeon, said that Mr. Pitt, the superintendent of the school, brought him the bottle of physic produced on Saturday last. It was half full. There was a sediment in the bottle, which he found to be precipitate powder, which was poison. There was about half a drachm of powder, which would be sufficient to destroy life.

Mr. Lushington remanded the prisoners for a week, and told the constable to bring the person from whom the powder was bought, on the next hearing of the case.—*Echo.*

REPORTED ARSENICAL POISONING OF SEVENTEEN PERSONS.

A singular case of wholesale poisoning is reported from Hampton-in-Arden, near Birmingham. A provision dealer in the village had a quantity of "collared" pork in his shop, and portions of it were purchased by a number of the poorer inhabitants on Saturday. After partaking of the pork seventeen persons were attacked with symptoms of arsenical poisoning. Medical men were called in, and all the sufferers recovered. The remainder of the meat has been seized by the police.—*Echo.*

DISGRACEFUL, IF TRUE.

At the Westminster Police Court on Saturday, Jan. 11, a young man was among the applicants to the magistrate for advice and assistance. He wanted to know whether the keeper of a chemist and druggist's shop could not be punished for being in a state of drunkenness while carrying on his business and serving customers. He said he went into a chemist's shop on Saturday morning in the neighbourhood of the court, and, after waiting twenty minutes to be served, was surprised to find the keeper of the shop crawl up from off the floor fearfully drunk, and wishing to know what the applicant required, but he would not allow such a dangerous person to serve him. Mr. Arnold could not see how he could interfere; people had better not deal with such a man, that was about the best remedy he could suggest. Applicant observed that a woman came in with a child and complained that he had given her a powder for her baby which had greatly injured it. The neighbours said he was eccentric, and the police reported that frequent complaints were made of the wrong drugs being served by the chemist. Mr. Arnold said he could not prevent a man getting drunk in his own house. He could not offer better advice than he had already given. If, however, the man sold drugs to persons which injured them, or to young persons, then he could be made amenable to the law. Applicant said the people who complained were poor, and could not lose their time.—*Times.*

Obituary.

GEORGE WAUGH.

Our readers will learn with unfeigned regret that one who held a prominent position among the early supporters and promoters of the Pharmaceutical Society, one who long filled the office of Councillor, who was Vice-president in 1850, and was often urged but persistently declined to fill the Presidential chair, has passed from amongst us, and that the familiar voice and genial countenance of George Waugh will no longer exercise the influence they have so often exerted in smoothing the ruffled waters of debate, or adding dignity to the deliberations of the council chamber. Mr. Waugh was one of those who took an active part in the formation of the Society, and a deep interest in the cause of pharmaceutical education. The character and position he had acquired, both morally and intellectually, together with his reputation as a high class pharmacist, gave to him an influence which was beneficially exercised in moderating and controlling occasional tendencies to extreme measures on the part of those who took an interest in pharmaceutical politics. His opinion and advice were frequently sought by his friend and neighbour Jacob Bell, to whose measures he generally, although by no means uniformly, gave his support. After Mr. Bell's death, Mr. Waugh may be said to have been the originator and one of the most active promoters of the Jacob Bell Testimonial Fund.

During the many years that he occupied a seat at the Council Board of the Pharmaceutical Society, he was regular in his attendance at councils and committees, and took part in the discussion of most subjects of importance. He was more given, however, to pass judgment on the measures of others than to originate any himself. In common with what is frequently observed in those who exercise a controlling influence upon the decisions of others, his own opinions were not hastily formed, and he may sometimes have subjected himself to the charge of inconsistency by the way in which his own decisions were arrived at. During the early history of the Pharmaceutical Society, Mr. Waugh was one of those well-known London chemists whose names appeared from year to year on the list of its Council, and who were at last thought to partake too much of the character of hereditary councillors. Mr. Waugh indeed was himself one of the first to contribute to the breaking up of the metropolitan character of the Council by withdrawing from it to make room for a greater infusion of new blood. He died on Sunday, the 12th inst., at his residence, Queensborough Terrace, Kensington Gardens, aged seventy-one, and was buried at Kensal Green Cemetery on Friday, the 17th. By the death of Mr. Waugh another link is broken in the chain which connected the pharmacy of a past generation with that of the present day.

Notice has also been received of the death of the following:—

On the 10th January, 1873, Mr. Edward Fowler, Pharmaceutical Chemist, of Bedale, Yorkshire, aged forty-two. Mr. Fowler had been a member of the Pharmaceutical Society since 1853.

Suddenly, on January 9th, 1872, at 40, Aldersgate Street, E.C., James Davies Parker, upwards of twenty years the confidential clerk of Messrs. Herrings and Co., wholesale druggists, London.

Reviews.

INTRODUCTION TO INORGANIC CHEMISTRY. By WM. GEO. VALENTIN, F.C.S. London: J. and A. Churchill. 1872.

This is a new edition of the first part of the 'Laboratory Text-Book of Practical Chemistry,' published by the author about two years ago. It has been slightly enlarged by the addition of a number of experiments, and by the further development of some of the explanatory and theoretical matter. The author hopes "that this first volume may now take rank as a suitable text-book for elementary classes preparing for the chemical examinations which are held annually under the Science and Art Department." Our conviction is that this hope will not be disappointed, and that Mr. Valentin's new volume will certainly find a very wide circulation, and meet with a very cordial reception both from students and teachers. We say this because we feel bound to reiterate the commendation which we took occasion to express in a former volume with regard to the original work. Both are very excellent books, and will satisfactorily supply an undoubted demand. The experienced author will, however, we trust, forgive us if we point out one or two considerations which in the compilation of a work of this kind deserve to be kept in view. In the first place with regard to the experiments.

Inasmuch as detailed directions are given for the performance of each experiment, it may be assumed, we suppose, that they are to be followed pretty closely. Does the author really mean to say that all, or even any large proportion of the students under his charge do absolutely perform the experiments as indicated? If so, each student would require at the outset to provide himself with a far larger and more expensive stock of apparatus than is usual. Gas-jars, gas-holders, complicated drying tubes for gases, fragile eudiometric apparatus and things of that sort are freely employed in the course of the experiments, and there seems in most cases to be no instructions for demonstrating the same facts by the use of instruments less elegant but more easily managed by inexperienced hands. It is true that the author says in his preface that some of the experiments he describes are more suited to the lecture-room; but this may be said of so many of them that he would probably render the book more acceptable to mere beginners, and especially to students working alone, if in the next edition he would add considerably to the number of *simple* and easy experiments such as might be carried out without the aid of special apparatus. According to our own experience nothing is more troublesome to beginners than being called upon at an early stage to employ apparatus which is not only strange in appearance, but is called by an unfamiliar name, and at the commencement it taxes sufficiently the patience and memory of most young students to recollect the uncouth titles of all the strange substances which form the indispensable material for work, and which are unavoidably introduced so rapidly one after the other.

In the treatment of some theoretical matters, we regard it as decidedly preferable to face difficulties boldly, and say to the student without rigmarole, "Here are the facts stated as plainly and in as few words as possible, and there is the explanation which has been generally accepted." In the majority of cases a more distinct impression is at once made upon the mind than can be produced by adopting any modification of the inductive process. In the book before us, as in so many other manuals, this latter is made use of in discoursing of the laws of combination and the atomic theory. In the early editions of 'Fownes,' which was the text-book of our own student days, a chapter was headed 'Chemical Philosophy,' in which the laws of combination were first distinctly enunciated in three or four short and impressive paragraphs, and *afterwards* illustrations and examples were supplied, all the unintelligible jargon about little particles being left till last of all. We should be disposed to maintain that, especially in the present stage of the progress of chemistry, this dogmatic kind of way of stating well-established laws is distinctly preferable to the possibly more logical but infinitely more difficult process of working from primary facts up to generalizations. But these things are after all a matter of opinion, and we by no means wish to find fault on this score with Mr. Valentin's book more than with others of the same class. It is astonishing, though, to what difficulties and inconsistencies even experienced teachers like Mr. Valentin are led in treating of this part of chemical theory, and we think the following definition on p. 44 a fair instance of this:—

"An atom is the smallest *particle of matter* capable of entering into or existing in a state of chemical combination." In the paragraph immediately preceding this we are told that "the smallest *proportion** by weight in which an element enters into or is expelled from a chemical compound constitutes its atomic weight, the weight of hydrogen being taken as unity," so that the smallest particle of matter weighs a *ratio!* If the author and not a few other chemists would be content to leave the "small particles" to whomsoever they may concern and be satisfied with proportions, no such absurdity could arise.

We observe that the author continues to make use of the hideous hybrids, monovalentic, divalentic, etc. Will no remonstrances induce him to change them, and are there no ears at the college?

In conclusion, there are one or two statements in the book which will probably be modified by the author in a future edition. We may select one as an example' "the *evolution* of *heat* which accompanied the combination of the white powder (anhydrous sulphate of copper) with water points to an actual *chemical* combination between the water of crystallization and the salt."

We think this conclusion admits of dispute.

* The italics are ours.

A MANUAL OF CHEMISTRY, THEORETICAL AND PRACTICAL. By GEORGE FOWNES, F.R.S. Eleventh Edition, revised and corrected by HENRY WATTS, B.A., F.R.S. London: J. and A. Churchill, New Burlington Street. 1873.

We cannot commence an examination of this well-known work without protesting in the loudest tone we can utter against the inordinate dimensions which all the old-fashioned books, familiar to by-gone generations of students, are gradually assuming under the hands of their modern editors. We entertain the highest possible respect for the learning of Mr. Watts, and for his experience in the literature of chemistry, but in the present instance we feel that although, as might be expected of him, he has produced a text-book that may be relied upon for accuracy, he has certainly made the volume unwieldy. We fully admit the difficulty of dealing with the daily increasing mass of organic compounds, but in mercy both to students and teachers we do hope Mr. Watts will not allow the book to grow any larger, and will, if possible, reduce the present number of pages. This can be done, we think, without difficulty and without detracting from its usefulness, by simply omitting the details of preparation and properties of all but really important and representative compounds.

As in the original editions of the work, the first part is devoted to a short treatise on physics, good enough in itself, though, we think, better omitted altogether in the present day.

Following this we have the usual account of the non-metallic elements and their chief compounds, but here, as throughout the whole book, is interspersed much new matter. It is, however, in the chapters devoted to "Chemical Philosophy," the history of the metals, and especially in the organic division, that the most important changes and additions are noticeable.

The chapter on the general principles of chemical philosophy is entirely re-written, and now includes not only the enunciation of the so-called "Laws of Chemical Combination," but also a discussion of the theory of atomicity and other subjects of comparatively recent growth.

In the classification of the elements we observe that Mr. Watts still uses the term "metalloïds" to designate that class of elements which are not metals. We should have expected almost that his ingenuity would have discovered or devised a new name, seeing that the title "metall*oïd*" is most inappropriately applied to these elements which in no respect bear any likeness to metals, and also because it ought to be reserved for that small class of bodies which *do* to some extent imitate metals in physical characteristics and chemical relations. Now we venture to make a suggestion, and crude as it is, leave it to the consideration of writers of text-books.

The elements may fairly be arranged in three classes. For the first of these the name "metal" must obviously be adopted. To the second, under which tin and titanium, antimony, arsenic, bismuth, and vanadium; tantalum and niobium; tungsten and molybdenum range themselves, the name "metalloïd" as obviously belongs. These elements resemble metals in possessing as a rule metallic lustre, rather high specific gravity, and in forming at least in some cases oxides in which the basic character is more or less developed. On the other hand, they differ from metals in being (except tin) so brittle as to be easily reducible to powder, in being comparatively feeble conductors, and in the fact that among the most stable and definite of their compounds are the higher oxides which invariably function as acid anhydrides. For the third class of elements those hitherto clumsily styled "non-metallic" we think there should be a name expressive of the opposition of their characters to those of the metals. With this view we suggest that the name "chloroid" might be used; it would serve, at least, to indicate the functions of the elements grouped under that title. The adjectives, "chlorous" and "basylous," have already been introduced and are sufficiently expressive and intelligible.

Mr. Watts gives much greater prominence to the rare elements than is usual in text-books of this sort. This, we think, is quite as it should be. One element is certainly as important as another from a theoretical point of view. At the same time, we think the description of their compounds is in some cases detailed at unnecessary length. It could not surely be necessary in a work which professes to be elementary to give, for example, to the ammoniacal compounds of platinum more than four pages.

The third part of the book, which constitutes very nearly one-half of the entire volume, is devoted to organic chemistry. It commences with a short but instructive section on the transformations of organic bodies under the action of reagents. In the following section, in which an account is given of the ordinary processes of organic analysis, less care seems to have been exercised than in the rest of the book. For purposes of organic analysis we should hardly consider that the copper oxide is best prepared from the nitrate;—the method of mixing in the tube itself is by many operators preferred to the use of the mortar;—the straight chloride of calcium tube (Fig. 150) is not by any means the best form, nor is calcium chloride the best desiccating agent for absorbing aqueous vapour from the gases generated in a combustion. In the analysis of chlorinated compounds the very convenient method of Carius, by heating with nitric acid and silver nitrate, would always be used, except in a very few cases in which the older method would be preferred.

The reader who has used one of the older editions of Fownes will find a great many changes introduced into the organic part. Organic compounds belonging to the several classes of alcohols, aldehyds, acids, hydrocarbons, etc., are now arranged in series, and the whole divided into two great groups—fatty and aromatic. The natural-history sort of arrangement served well enough in the early days of chemistry, but can now no longer be retained with advantage.

We observe that for the principal hydrocarbons Mr. Watts employs the names proposed for them by Dr. Hofmann. On looking in the index for "marsh gas," we are referred to page 164 among the compounds of carbon in the early part of the book; but to the name methane we find three references, two of them to pages in the organic part. Olefiant gas is indexed among inorganic compounds, and ethylene is nowhere to be found; but ethene, the new name, has two references. This is a little unfortunate, because nine people out of ten would certainly look for the older word. Moreover, it seems as though the new nomenclature for these bodies had not been adopted—at least, in the index—very consistently; thus, whilst we fail to find ethylene glycol, its homologue butylene glycol does occur.

In the aromatic group the theory of the isomeric derivatives of benzene is pretty fully explained, and the editor has of course introduced a notice of nearly all the recent researches of sufficient importance in the organic as well as the inorganic division. On the whole we can confidently recommend this new edition to students as being thoroughly trustworthy, though, as we have already explained, we think from its increased size it will scarcely meet with the universal favour enjoyed for so many years by the older editions.

Notes and Queries.

[325.]—DETECTION OF STEARIN IN BUTTER.—The micro-polariscope affords the only means of detecting the presence of stearine in butter without very refined chemical analysis. The procedure is briefly this. Take a clean glass slip and place on it a small portion of the suspected butter (about the size of a small pillule of homœopathic medicine). On the butter place a ¾-inch circle of thin glass, and slowly press it as close to the slide as possible so as to obtain a very thin and therefore transparent layer of butter between the cover and the slip. If it be now examined by polarized light, the crystals of stearin will easily be seen and recognized by their feathery arrangement. Their action upon a thin plate of selenite is also characteristic. It is obvious that other adulterants, as starch, may be detected by this means. It is well to bear in mind that stearin is not the only doubly refractive substance to be found in butter. Oil and fat globules under certain conditions are as doubly refractive as starch corpuscles, and have to my knowledge been mistaken for starch. The shape and arrangement of the stearic "crystals" are, however, sufficiently distinct. I believe there is no other means by which stearin can be detected as an adulterant, and even this only shows that it is present and not necessarily that it is not present, for very small quantities appear to be acted upon by the other components of the butter, and escape detection.—H. P.

[327.]—ILIAC PILL OF RHASIS.—Can any correspondent furnish me with the formula for the Iliac Pill of Rhasis?—J. S.

[328.]—HAIR RESTORER.—"*Alpha*" asks to be furnished with the formula for a good Hair Restorer.

[*⁎* Dr. B. Godfrey, speaking of general baldness in his little treatise on 'Diseases of the Hair,' says, "The tincture of cantharides should be applied with a sponge daily to the sterile surface on going to bed, and a diurnal wash be given with soap and cold water every morning; the head should then be dried with a rough towel, until the skin glows and blushes like a bashful maiden. Three months of such treatment ought to restore the lost hair. The expressed oil of mace and benzoated lard, in equal parts, vigorously applied daily will produce a like result."—Ed. Pharm. Journ.]

BOOKS RECEIVED.

The Owens College Junior Course of Practical Chemistry. By Henry E. Roscoe, B.A., F.R.S. and Francis Jones. London: Macmillan and Co. 1872. From the Publishers.

Change of Air and Scene. A Physician's Hints; with Notes of Excursions for Health amongst the Watering Places of the Pyrenees, France (Inland and Seaward), Switzerland, Corsica and the Mediterranean. By Alphonse Donné, M.D. London: H. S. King and Co. 1872. From the Publishers.

Elementary Treatise on Physics, Experimental and Applied. Translated and Edited from Ganot's 'Eléments de Physique.' By E. Atkinson, Ph.D., F.C.S. Fifth Edition. Illustrated by a Coloured Plate and 726 Woodcuts. London: Longmans. 1872. From the Publishers.

The First Book of Botany, designed to Cultivate the Observing Powers of Children. By Eliza A. Youmans. New and Enlarged Edition, with 300 Engravings. London: H. S. King and Co. 1872. From the Publishers.

Correspondence.

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

"Dispensing Charges."

Sir,—Your article on the *Globe* deserves the best thanks of the trade at large. It completely disposes of such clap-trap, and shows the ignorance of non-professional journalists in such matters. The *Lancet* of this week, however, among its "medical annotations," recites the "inquiry" of the *Globe*, and sums up the case in the following paragraph:—

"The fact is, that retail trade is gone mad. There are far more shopkeepers than the wants of the public require, and they think themselves entitled to all the luxuries and enjoyments of life. Their wives, glorious in sealskin jackets and redundant jewellery, are to be seen everywhere; and the pretensions of the class are becoming a nuisance that it is high time to put down."

Can the force of scientific and gentlemanly journalism further go? Need any comment be made when a wretched scribbler stoops to conquer in this style? I have been a subscriber and reader of the *Lancet* for twenty years and more, and am aware of its frequent assaults on pharmacists, but this is, I believe, the first funding which has touched our wives, and I for one desire to protest against such indecencies. I do not object much to be called mad myself, but I do assert that it is simply idiotic and to the last degree contemptible to vilify the whole retail trade and their wives upon the strength of such a ridiculous inquiry as that instituted by the *Globe*.

Wm. Matthews.

12, *Wigmore Street, January* 15*th*, 1873.

Lancet Amenities.

A correspondent, writing under the signature "Translator," suggests the following amended reading of the "elegant" paragraph to which we have referred in another column:—

"The fact is that the medical profession is gone mad, there are far more medical men than the wants of the public require; and they think themselves entitled to all the luxuries and enjoyments of life. Their wives, glorious in sealskin jackets and redundant jewellery, are to be seen everywhere, and the pretensions of this class are becoming a nuisance that it is high time to put down."

[We do not, however, quite agree with our correspondent, inasmuch as we believe the alteration to be admissible only in so far as medical men are content to endorse such representation as the *Lancet* seems to think suitable for the profession.—Ed. Pharm. Journ.]

Sir,—It has often been to me a subject of annoyance that my long-continued exertions in the cause of pharmacy have not been recognised by a public testimonial. Let it not assume the form either of a teapot or of a silver inkstand, as I have the former and never use the latter. My wife is not clothed in a manner I should desire, nor can she realize the description in the *Lancet*—a sealskin jacket would be most acceptable; and if the body of Pharmacists would kindly add a brougham my services would be amply rewarded.

Joseph Ince.

Sir,—Truly we are the best abused race of people in existence. It is only a short time since the leading medical journal very kindly and very considerately called us, without rhyme or reason, "malefactors." The *Pall Mall Gazette*, that aristocratic journal, written essentially "by gentlemen for gentlemen," "improved the occasion" by adding "it was high time a chemist was hanged" (*pour encourager les autres*, I suppose). The *Globe* being in want of something approaching a Christmas sensational article, and probably taking its cue from the *Times* article on "Spiritualism and Science," suddenly finds out that our charges are "excessive;" that we "impose" on our "victims," the general public, and "render abortive the gratuitous prescribing of medical men." The writer, in common with many of his class, will persist in confounding the "druggist" *pur et simple*, who is merely a retail tradesman, who buys goods for so much and sells them for so much more, with the "dispensing chemist" who passes a classical examination, pays a large premium, subjects himself to a studentship of four or five years, and subsequently passes two successive examinations before he receives his diploma. He will then, let us suppose, look out for a shop already established, and will give, say, £500, for one where the returns amount probably to £400. May I ask our friend if he would put a son to the business if the profits were only, say, 30 per cent., equalling £120 per annum, for an outlay of at least £1000, and out of which profits he must pay rent and taxes, and keep himself and family in a respectable manner? The profits of a business must be in a direct ratio to the turn over; a butcher or a grocer will turn over £500 a week, many of our brethren do not take that sum in a year. The butcher's profits at 5 per cent., more than double the chemist's whole receipts, and yet the butcher may not be able to sign his name, while the chemist must have had a thoroughly good education. The lawyer does not charge merely for the skin of parchment or sheet of foolscap; nor the penny-a-liner for just the pens, ink and paper he may consume, consequently the professional dispenser is entitled, *cæteris paribus*, to professional profits, which are totally different and entirely distinct from the ordinary profits of a retail druggist.

In applying the test, how is it that the open surgery and the apothecary's shop were not visited, so that the charges of properly qualified medical men might be compared with ours, and how many physicians actually do give their advice? Might they not be almost counted on the fingers? Many profess to do so, but it is rather singular, to say the least about it, that they compel their free patients to go to one particular chemist for their medicines.

If the *Globe and Traveller* wishes to organize a new crusade, let it commence at the top of the tree—the medical profession. Let it attack the physician who believes in "an equal division of labour," and also "an equal division of profits;" let it attack the surgeon who keeps an "open surgery," and sells hair oil and toilet soap; let it attack that anomalous animal the apothecary, who is chemist, druggist, midwife and bleeding-barber rolled into one; let it attempt to put down the nest of herbalists, Coffinites, hucksters, etc., who sap our very vitals. And let it also endeavour to teach the masses the different qualifications of the medical profession, so that if a person wishes medical advice he may go to a physician; if he requires his leg or arm amputating, he will go to a surgeon; if his wife be in labour, he will fetch the apothecary; and if he require medicine, he will go to a dispensing chemist. There is surely scope enough here for even such a "Traveller" as the "Globe," though he may travel in such a limited circle as not to know that dispensing chemists require to be examined; and then what a pleasure it is to possess a friend who is such a "competent authority" as to estimate articles at twice their actual cost!

In conclusion, I can assure the writer of the article that notwithstanding the "excessive profits," the chemist does not spend his life on a bed of rosæ fol.; many of us have great difficulty, and have to exercise great self-denial to enable us to pull through. The gratuitous insults which the *Globe* thinks fit to throw in are perhaps the result of New Year festivities—the toughness of the turkey, the plum-pudding being just a little "sticky," or the presence of mother-in-law may have deranged his digestive organs, and caused him to be splenetic. May I with all due deference prescribe a few doses of pepsin, and then hint that in a few years I hope to see the dispensing of medicines entirely in the hands of the chemist, and the present prices considerably augmented.

T. C.

Sheffield, January 10*th*, 1873.

Payment of Local Secretaries.

Sir,—I quite agree with the remarks of your correspondent Mr. Nathaniel Smith relative to the remuneration of local secretaries, and am also firmly persuaded he is expressing the views and feelings of the majority of those gentlemen who have hitherto acted, or are at present acting, in that capacity. If not positively insulting, it is, at any rate, paying but a poor compliment to their generosity and disinterestedness, to seek to rob the office of its honorary character by attaching to it either a meagre stipend or a paltry honorarium. We are becoming utilitarian with a vengeance, and all our better impulses will soon be utterly degraded, if every act of generosity and self-abnegation are to be made objects of pecuniary gain. To the major part, "the honour of the appointment," and the consciousness of doing good, will fully reimburse them for both time and any little pecuniary loss in the shape of stamps and paper, etc.

GENEROSITATE.

January 14th, 1873.

FELLOWS OF THE PHARMACEUTICAL SOCIETY.

Sir,—I beg to make a suggestion in reference to the above, as chemists in active business have but little leisure to devote to the scientific advancement of pharmaceutical chemistry, and still less to give much attention to analysis, other than their own business requirements, though, of course, all are not alike situated.

I cannot help feeling the force in the remarks of Dr. Attfield in respect to the great difficulty he experiences in inducing talented young men to remain in the ranks of pharmacy, owing probably to the unattractive prospects behind a retail counter that present themselves to the studious mind of a man who has attained a high standard at Bloomsbury; thus many are drifted away into other channels, and discoveries that might otherwise brighten the pharmaceutical horizon, and elevate its status, are lost.

In order to remedy this state of affairs, would it not be advisable to appropriate the surplus (or a portion of the) funds of the Society towards the foundation and endowment of "Fellowships," tenable for a certain period, or for life in some instances, as may be thought expedient, and under certain conditions?

Thus men obtaining these distinctions would be free to pursue their investigations, and in their own way become real helpmates to their less favoured brethren, and would be the men of all others to select as public analysts, and also as teachers and demonstrators to the various provincial associations.

Of course these fellowships would be open to men already in business, and would not prevent young men, who may obtain one, entering business if they choose.

Trusting the suggestion may not prove entirely useless, I am, Sir, yours respectfully,

CHEMIST.

Rhyl, January 9th, 1873.

ASSOCIATION OF ASSISTANTS.

Sir,—I believe that not a few of the chemists' assistants in London have of late been considering how much their interests might be furthered, and their educational requirements advanced, by the formation of an association amongst them.

We hear of several being already instituted by assistants in some of the leading provincial towns, and surely there is no reason why we, so numerous a body, in London, should not be able to raise an association, and one, too, of considerable importance.

Our examinations, we have been informed, are to become more stringent than they now are, so that there is need of some exertion on our part if we would meet successfully the well-meaning advances of education, as well as the worthy Board of Examiners.

We know that the numbers are comparatively few who have the privilege or means of attending lectures, laboratories, or schools of medicine, but we may feel sure that the numbers would be very considerable who could attend evening classes, and practical instruction, if an association were founded where we might, at a moderate expense, have teachers for the different subjects. Much could be said on the advantages that would be derived by our having such a means of coming together, but this may suffice to introduce the subject.

What we require, then, is the kind assistance and suggestions of some of the leading gentlemen connected with the trade in town, who know how to set about the matter, and where to select a central place for the institution; and there are not a few who, I am sure, will consider it a pleasure to contribute their energies towards such a praiseworthy cause. I have no doubt, many intelligent and active assistants will also gladly give their services, as far as they can, in whatever way may be required, towards seeing established, ere long, an influential "Chemists' Assistants' Association" in London.

ROBERT THOMSON.

300, *Holborn, W.C., January 14th*, 1873.

A WORD OF CAUTION.

Sir,—We think it desirable to put chemists throughout the country on their guard, with respect to various wine and other agencies which are being hawked about.

The following case has just come under our notice:—A man called upon one of our customers, soliciting him to become an agent for one of these companies; he objected for some time, but was ultimately persuaded to undertake it. A paper was then produced for his signature, which he incautiously signed. Thinking next day he had not been sufficiently careful, he looked at the paper, a copy of which was left with him, and found he had agreed to take about £100 worth of wine and give a bill on receipt of the goods at four months. He wrote at once to the parties cancelling the order, but they would not consent, and after some correspondence, served a writ upon him. He placed the matter in the hands of some respectable solicitor, who eventually compromised it for £20.

As this is not the first instance of the kind which has come to our knowledge, one case involving the man in ruin, we think a word of caution to chemists and others is not out of place, urging them not to sign any paper until they thoroughly understand the purport of it, and to what it renders them liable.

PRESTON AND SONS.

88, *Leadenhall Street, January 15th*, 1873.

CURIOSITIES IN DISPENSING.

Sir,—I, in common with many of your correspondents who have written on the above subject, occasionally meet with remarkable formulæ brought to be dispensed.

The following, I think, may fairly claim a place in the first rank of "Curiosities in Dispensing":—

R.	Nitrous acid	2	drams.
	Dilute Phos. Acid	6	,,
	Chloroform	$\frac{1}{2}$	,,
	Paregoric Elixir	$1\frac{1}{2}$	,,
	Tinct. Cardam.	$1\frac{1}{2}$	,,
	Simple Syrup	1	,,
Mix.			

The verbal message given was to make it up with the strong acid and no water. The chloroform, of course, remained at the bottom, and there were no directions to shake the bottle, or, still worse, what dose was to be taken.

J. H. BALDOCK.

South Norwood, Jan. 14th, 1873.

ANALYSIS OF MILK.

Sir,—Allow me to call the attention of milk analysts to an adulterant which I have not yet seen mentioned,—anatto; it disguises the *sky-blue* tint, and enables skimmed or partially skimmed milk to be sold as new, and possibly might interfere with the use of the lactoscope.

J. SLADE.

Messrs. White and Chignell, J. Lofthouse and *Brothwood.*—The advertisements and post-office orders have been handed to the publisher. They should have been sent to Messrs. J. and A. Churchill, New Burlington Street. See the Notice to Advertisers, published every week on the second page of the advertising sheet.

Sydney Taylor.—We do not think the charges were high, considering that stoppered bottles were used; but may suggest that it would have been preferable to have used ordinary corked bottles, in which case a lower charge would have been sufficient.

An Associate.—The words quoted refer to the practical part of the examination.

M. Graham.—We thank you for your suggestion, but the plan is adopted more frequently than you appear to suspect.

"*Certus.*"—(1) An Associate becomes such by election by the Council, not by examination. (2) It would depend upon the terms of the agreement. Consult a solicitor.

"*Junior.*"—The limitation as to age does not come into operation until 1874.

"*Plumule.*"—McNicoll's Dictionary of Terms and Walker's Pronouncing Dictionary.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. E. Charlwood, T. Garside, Goldsworthy, J. Slade, J. R. Jackson, F. J. Barrett, H. B. H., T. C.

THE MICROSCOPE IN PHARMACY.

BY HENRY POCKLINGTON.

(*Continued from p.* 543.)

NECTANDRÆ CORTEX.—This most intractable of barks is so nearly related to those last named that it must come in here. It is an exceedingly interesting bark and complex in structure, and it is by no means easy to deal with; in fact, I do not know anything in the way of wood sectionising that is more difficult to manage. There is this to be said, that no ordinary amount of maceration will be too much for it, and I much question whether any amount, short of a destructive amount, would be sufficient to render it soft enough for the production of a perfect section. Grinding down may be resorted to, but is tedious and unsatisfactory. For the benefit of those who may be disposed to try the grinding-down plan I will give a short account of the process. As thin a slice as possible should be cut, and rubbed smooth on one side, by grinding first on a rough stone and then on a hone. This surface must be cemented on a glass slide by Canada balsam that has been hardened by exposure to the air. Great care must be taken that no air bubbles are included between the surface of the section and the glass slip, or the section will inevitably tear away in those places and spoil the section. The cementing balsam should be kept warm until the adhesion of bark to the slide is thoroughly secured, experience only will give the means of judging when this is, and then allow to cool. If it be in a proper condition the balsam will, when cold, be found hard enough to permit of indentation by the thumb nail; if less hard the section will slip, if harder it may chip off. Of the two faults that of too much hardness is the least objectionable. The section is now to be rubbed upon a piece of millstone grit until as thin as possible without risk of breach of continuity, and finished upon a Canada oil-stone and Turkey hone successively, and finally mounted in balsam. This plan, be it noted, will, with slight modifications, apply to all hard substances as bone, teeth, coal, nut-shells and the like; the harder the substance the better it answers. With nectandra bark it answers fairly well, as well as any plan—which, however, is not saying much—but the difference of hardness, shape and arrangements of the various constituents of the complicated tissue render its application difficult, and the results, excepting by rare good fortune, anything but satisfactory. Grinding down, however, will be the young microscopist's only chance. The other plan is prolonged maceration in warm water—several weeks will not be too long a period; so far as my experience goes, not long enough. A very strong, moderately sharp, and not too highly tempered razor (I find Mappin's shilling razor answer admirably) and plenty of patience may enable one to get one good section out of a hundred attempts, but hardly a complete one, that is one right through the bark. The most hopeful direction, and fortunately also the most useful one, in which to cut the wood is longitudinally and vertically, that is from the bark towards the tree, but downwards. When cut the sections will require special treatment, and this is another reason why grinding down is objectionable. One section should be boiled in alcohol for a few seconds. The only way of doing this is to place the section in a shallow excavated cell with a little alcohol, cover it with the usual thin glass, and boil it over a spirit lamp, adding another drop of alcohol when needed. The alcohol is then to be removed by blotting paper, and glycerine added. The slide is next to be heated to nearly the boiling-point of the glycerine, and retained at this temperature for a few minutes. It is then fit for mounting.

A second section is to be treated with spirit, with water, and finally with nitric acid for half a minute. The acid is to be removed, the section washed with water (on the slide), and mounted in glycerine. A third section is to be treated with spirit and liquor potassæ, and well washed from all traces of both; then thoroughly dried at a low temperature, and finally mounted in thick balsam, inclusion of air bubbles being entirely disregarded. Magenta and sulpho-chromic acid are the other most useful reagents, but I do not know that the results gained by their use will compensate for the trouble in preparing additional sections.

The structure of Nectandra bark, as I have said, is exceeding complex. It somewhat resembles that of cassia, but is even more complicated, and each point of structure, whilst of the same type as in cassia, is dissimilar from the cassia tissues, so that whilst there is an unmistakable family likeness, there is a strong dissimilarity. The first thing that strikes one is the extent to which consolidation by deposition of secondary matters has gone. Nearly the whole tissues are thickened, the only exceptions, excepting the exterior cells, being resin receptacula and a few liber or semi-liber cells. The whole of the cortical structure, in fact, being an aggregation of Hassall's stellate cells; very much thickened, and altogether abnormal liber cells; thickened, variously shaped parenchyma; and special receptacula for resin or colouring matter; these last also presenting novel features.

The so-called stellate cells may be grouped as follows, including herein all the ordinary cortical cells other than liber. There are, first, the oval, much thickened cells of the rays of the bark. These have a much larger cortical cavity than the other cells, are porous, and the successive layers of thickening substance are not easily distinguishable without the use of reagents. These cells are best seen in the balsam-mounted slide, as also are those next to be mentioned, and the resin receptacula. Secondly, there are cells of too varied a shape to be very well described; all forms except oval are represented amongst them. Some few have a very large central cavity, porous of course, and are very angular. The majority, however, are nearly filled with the sclerogenous deposits, of which the successive layers are usually very evident. The pores of these cells are very numerous; and sometimes so fine as to give rise to false appearance, unless carefully illuminated. Certain liber wood cells have been very peculiarly modified by the pressure of the hardened stellate cells, and when isolated are not unlike the longer spiculæ of some species of *Gorgonia*. They are thin-walled and not visibly porous. Other wood cells are very little thickened, are more or less fusiform, and minutely porous. The receptacula are usually oval, sub-cylindrical or sub-globose cells, thin-walled, the walls being little affected by the coloured contents of the cells, and are somewhat irregularly distributed.

In conclusion, the structure of Nectandra bark is so exceedingly characteristic that any ordinary adulterant could at once be detected by the use of the microscope. The botanical student will find it worthy of special study, and, save for the difficulty of preparation, even the ornamental microscopist, who only cares for pretty things, will find it an interesting object; so much indeed is this so, that it is rather surprising that sections are not currently sold by the professional mounter.

MILK TESTING.

BY THOMAS GARSIDE.

I wish to point out a fact, in connection with the estimation of cream in milk by means of the lactometer, which I have not hitherto seen noticed, namely, the great difference in the results which a slight variation in the temperature produces. In Dr. Hassall's article on the estimation of the cream, given in his work 'Adulteration Detected,' I do not observe that any account is taken of this; the only reference to temperature which I find being in the following terms:—"Cream forms more quickly in warm than cold weather; and in making comparative observations on a number of samples, it is proper that each should be set aside in lactometers at the same time, and for the same period" (p. 225). Provided that the lactometers were all maintained at the same temperature, this method would give accurate results for the samples operated upon; but, as the following experiments will show, no dependence could be placed upon them unless the latter condition were complied with, nor could any set of observations be of use for comparison with another set unless the temperature were maintained at the same point.

In each of the following cases two graduated tubes were filled with milk from the same pail, as supplied in the usual way by the dealer, and a uniform temperature was maintained during the time mentioned. I may also state that in several other experiments of which I kept no record, no increase in the quantity of cream was perceived after three or four hours:—

No.	Hours.	Temperature Fahr.	Apparent percentage of cream.
1.	4	43°	14.
		55°	$8\frac{1}{2}$.
2.	4.	45°	12.
		60°	8.
3.	2.	45°	14.
		60°	12.

EMULSIONS.*

BY P. W. BEDFORD.

Although much has been written on the subject of emulsions, and various methods recommended for the more perfect emulsifying of oils and balsams, the old method of making a solution of gum arabic (sometimes using with it a portion of sugar) of about the same consistence as the article to be emulsified, and gradually adding the remaining portion of water, is that usually adopted. The objection to this method is that frequently the oil or balsam separates almost in its original bulk and does not readily become admixed. To my assistant, Mr. A. W. Peck, I am indebted for the suggestions, and for a series of experiments in which glycerine was used in connection with gum arabic, and the result is very gratifying. The general rule adopted has been to employ for each ounce of the oil or balsam one-half ounce of gum arabic, in powder, and one-half ounce of glycerine. The glycerine is mixed with an equal bulk of water, the gum arabic is incorporated with this in the mortar, then the oil or balsam is added, with constant trituration, and finally the remainder of the water gradually added. The oil or balsam should not be over one-fourth of the whole mixture.

Emulsions made in this way, while presenting no novelty in method of admixture, certainly keep more miscible, with but scanty separation of the oil or balsam, which separation does not apparently increase by standing, and, as compared with emulsions made by the ordinary method (without glycerine), are much superior. A series of parallel experiments with cod-liver oil, castor oil, balsam copaiva and turpentine show the superiority of glycerine in making the emulsion. Even balsam of tolu can be readily incorporated and emulsified to the extent of one part in eight.

The antiseptic properties of glycerine are noticeable, from the fact that the emulsions are more stable, and, so far as the experiments have hitherto extended, the emulsions show no disposition to become sour by keeping.

* From the 'New York Druggists' Circular.'

OLEATE OF MERCURY AND MORPHIA.

BY CHARLES RICE.*

This combination, suggested by Professor John Marshall, F.R.S., and first prepared by Mr. Frank Clowes, has been in considerable demand in New York,† but its preparation offers some difficulties, which do not seem to have occurred to Mr. Clowes, owing to a difference either in the character or quality of the solvent, or in the manipulation.

In using pure oleic acid as a solvent for oxide of mercury no difficulty is encountered, the oxide—both the red and the yellow varieties—being completely soluble in it, without any, or with only a very slight reduction to the metallic state.‡ This is not the case, however, with the commercial oleic acid, at least that which I have been able to procure in New York. It is, like the English, a residuary product in the manufacture of stearin candles, commercially termed "Red Oil," has a deep sherry-wine colour and a peculiar greasy odour; exposure to moderate cold causes the separation of a considerable amount of solid acid, consisting chiefly of palmitic acid. Its sp. gr. is 0·895 at 62° F. This substance cer-

* From the 'American Journal of Pharmacy.'

† Nearly ten years ago, Professor Attfield, in a paper published in the PHARMACEUTICAL JOURNAL, 2nd Ser. vol. IV. page 389, on a method of dissolving alkaloids in oils, directed attention to the fact that oleic acid readily combines, not only with morphia, quinia and ten or twelve other alkaloids, but also with the oxides of lead, mercury, zinc and iron. The following sentence from his paper may prove suggestive to some of our readers:—"Doubtless all bases form oleates, thus affording means whereby such preparations may be administered internally or externally in a true state of solution in oils, ointments or liniments." The Professor states that one firm recently told him they annually sent out between one and two thousand bottles of cod-liver oil and quinine prepared by this process. A few years since he found a combination of this kind alluded to in an old volume of the 'Journal de Pharmacie.'—ED. PHARM. JOURN.

‡ The only objection to the employment of the pure acid is its high price.

tainly dissolves the oxide of mercury, but it requires a greater degree of heat than the pure acid to affect the solution, while at the same time some of the oxide is invariably reduced to the metallic state, owing to the presence of some readily oxidizable impurities in the acid, or perhaps due to the oxidation of the acid itself. The amount of reduction is in direct proportion to the degree of temperature employed, as might have been anticipated, and was proved by a number of experiments:

192 grains of oxide of mercury, corresponding to 177·7 grains of metallic mercury, heated with ten times the weight of oleic acid, gave the following reductions:—

At 300° F. amount of reduced Hg	.	175 grains.
At 280° F. ,, ,,	.	152 ,,
At 212° F. ,, ,,	.	69 ,,
At 200° F. ,, ,,	.	35 ,,

Between 200° and 180° F. the amount of reduction varied between 20 and 40 grains, according to shorter or longer exposure to heat; but I have been unsuccessful in effecting a solution unaccompanied by reduction. This makes it necessary to estimate the strength of each fresh lot of solution.

The strength of the preparation as prescribed by different physicians has varied from twenty per cent. to two per cent. of oxide of mercury, with variable quantities of morphia; but of late a uniform strength of six per cent. of oxide of mercury and two per cent. of morphia is deemed sufficient for most purposes, and the following is the process which I employ for its preparation:—

Expose the commercial oleic acid to a temperature of 40–50° F., and express the liquid portion, which is oleic acid, deprived of the greater portion of the accompanying solid acids. Take of oleic acid, prepared as above, 1536 grains; oxide of mercury, perfectly dry, 192 grains. Rub the oxide in a mortar with some of the oleic acid to a smooth paste; add the remainder of the acid; place the mortar on a water bath, and promote solution by frequently stirring, taking care not to allow the temperature to exceed 200° F.

As soon as all the oxide has disappeared, or rather as soon as the undissolved residue is of a pure grey colour, remove the mortar from the water bath and allow it to stand for twenty-four hours. Then pour off the clear solution into a tared capsule; wash the residue thoroughly with ether, and add the washing to the liquid in the capsule. Expose the latter to a very gentle heat, until all the ether has evaporated, and weigh. The residue, after being properly washed and carefully dried (without heat), may be weighed as metallic mercury, which is in practice sufficiently correct.

Supposing the weight of the obtained solution to be 1698 grains and the weight of the reduced mercury to be thirty grains (assuming therefore that there has been no loss incurred during heating and during the subsequent washing of the residue, whilst in practice a small loss always occurs), we first calculate the amount of HgO_2, to which the thirty grains Hg correspond:—

$$\begin{array}{cc} Hg & HgO_2 \\ 200 : 30 = & 216 : 32{\cdot}4 \end{array}$$

The solution, therefore, weighing 1698 grains, only contains 159·6 grains of HgO_2 or 9·4 per cent.

This solution is now to be reduced to the strength of six per cent. by the addition of more oleic acid, until it weighs 2660 grains, but we also want two per cent. of morphia. The balance wanting (2660 — 1698 = 962 grains) is obtained by dissolving fifty-three grains of morphia in 909 grains of oleic acid and adding it to the first obtained solution of 1698 grains, making a dark brownish-red liquid, of sp. gr. 0·975 at 60° F, and containing six per cent. (159·6 grains) of HgO_2, and two per cent. (53 grains) of morphia.

It is scarcely ever used for the purpose of producing the constitutional effects of mercury, but rather as a resolvent for articular anchylosis, and it has produced excellent effects in cases of chronic articular rheumatism and in gout, by removing the stiffness and producing flexibility of the joint.

After writing the above the author succeeded in obtaining a sample of oleic acid, which dissolved the oxide completely, and, if previously separated by cooling from the solid acids, did not produce the least reduction. He also found that a much lower degree of heat was sufficient to effect solution (160°–180° F.). A lot of oxide of mercury mixed with half its weight of carbonate was employed in a few instances, and gave even better results than the oxide alone. The resulting product, made with this kind of oleic acid, was of the consistence of thin cream and of a light brownish-yellow colour.

A sample of the English oleic acid, expressly imported by a friend, gave invariably a greater or lesser reduction, and so did all the other varieties tried, with the exception of the last.

THE MORE IMPORTANT SUBSTITUTES FOR GUNPOWDER.

BY F. A. ABEL, F.R.S.*

(*Continued from page* 569.)

Although gun-cotton and nitro-glycerine mixtures possess very important advantages over gunpowder in all applications where suddenness and violence of action are desirable, there are some directions in which they do not possess superiority over powder, and others in which they cannot replace it, irrespectively of its applications to projectile purposes. In soft rock, in earth mines, and in some blasting operations, when it is desired to *displace* large masses of earth, rock, or stone, the gradual action of gunpowder gives it decided superiority. The more violent explosive agents produce great local effects; the rock, if hard, is much shattered near the charge, and is also rent and fissured to considerable distances, but the *displacing* effect is generally inferior to that produced by the equivalent of powder, and always very much so in earth or soft rock. Decided advantages have arisen from a judiciously-combined application of gunpowder and gun-cotton or dynamite, the more violent explosive agent being used to prepare the way for gunpowder, which is afterwards applied to the removal of the material shattered by the first sudden explosion.

The degree of safety with which explosive agents may be manufactured is an important question connected with their extensive application. The fact that the manufacture of gun-cotton as now carried on involves not the slightest risk of explosion up to the final stage, when the material has to be dried, distinguishes it from most other explosive agents. In gunpowder-manufacture liability to explosion exists throughout all operations from the point when the ingredients are mixed, and with regard to nitro-glycerine it appears that up to the present time occasional severe accidents during manufacture

* Read at the Royal Institution of Great Britain, on Friday, May 17th, 1872.

have been inevitable. The immunity enjoyed by gun-cotton is due to its being wet, and therefore absolutely uninflammable, throughout all stages, even after it has been compressed into cakes or disks. At this point it contains 15 per cent. of water, the expulsion of which by desiccation is unattended by any liability to explosion, or even to ignition if very simple precautions are adopted. For storing large quantities with absolute safety it is very convenient to preserve the compressed gun-cotton damp, as it is delivered from the presses. It has been thus stored for very long periods without the slightest detriment, and its non-inflammability in this condition is aptly illustrated by the fact that the perforations required in some of the charges are produced by drilling the damp gun-cotton, the drill revolving at the rate of about 600 revolutions per minute. The gun-cotton employed in some extensive experiments recently made on the South Coast had been stored damp for nearly nine months, and was dried partly in the open air and partly in a hot-air chamber, when required for use. On that occasion 6 cwt. of damp gun-cotton, packed in twenty-four strong wooden boxes, were stacked in a wooden shed and surrounded by inflammable material. The building was then fired, and soon burned fiercely, which it continued to do for about half-an hour, when the fire gradually subsided, and the building and its contents were entirely consumed. The gun-cotton must have slowly burned away as the surfaces of the masses became sufficiently dry, but at no period of the experiment was there even any burst of flame, due to rapid ignition, perceptible.

Another very important consideration connected with the extensive employment of an explosive compound or mixture as a substitute for gunpowder is the question of its stability. Mixtures of saltpetre or potassium chlorate, with oxidizable substances of stable character, may be generally relied upon to equal gunpowder in their unalterable nature, under all conditions of storage and use in different climates; deterioration in explosive power by the absorption of moisture is the only prejudicial result which generally attends long-continued keeping of such mixtures. There are a few instances, however, in which absorption of moisture may in time establish slight chemical action between the components, and thus become, not only cause of more serious deterioriation, but also a source of danger; as chemical activity, once started in preparations of this kind, may gradually increase, being promoted by the heat developed, until it attains a violence resulting in the spontaneous ignition or explosion of the mass. Instances are on record of the spontaneous explosion from this cause of damp mixtures, well known to be perfectly stable when dry. Substances of organic origin, of uncertain stability, require application with much greater caution to the production of explosive mixtures, as it is possible that changes may occur spontaneously in them, or may be established by natural atmospheric fluctuations of temperature, eventually giving rise to chemical action between them and the oxidizing agent with which they are mixed. Although the stability of *compounds*, which are themselves endowed with explosive properties, may appear perfectly reliable when the substance is in a chemically pure condition, it is susceptible of being seriously affected by comparatively minute causes; hence the most scrupulous care in the production and purification of such substances is imperatively necessary; and in this respect they compare disadvantageously with gunpowder, as a want of care in its production, though it may lead to accident during manufacture, or to an inferiority of the product, will not affect the stability of the material.

Both nitro-glycerine and gun-cotton, when prepared in small quantities and carefully purified, have been long known by chemists to be subject to very gradual chemical change when exposed frequently to sunlight, and also to be liable to slow or rapid decomposition if exposed to temperatures very considerably higher than occur as extremes under natural conditions in any climate. Both substances are also well known to have exhibited great stability under normal conditions of preservation, and even when continually exposed to light; but though many specimens exist, which have remained unaltered almost since the first discovery of these bodies a quarter of a century ago, the instances are numerous in which laboratory specimens have undergone spontaneous change, with more or less rapidity.

The apparently variable nature of these substances, as regards stability, is due to the retention by them, in some instances, of small quantities of comparatively unstable impurities, derived from foreign matters contained in the cellulose or glycerine; exposure to heat or to sunlight developes changes in these, resulting in the production of acid substances; hence, if they exist in gun-cotton or nitro-glycerine, they may constitute the starting-point of decomposition when these are exposed to high temperatures or to the influence of sunlight. If they exist in gun-cotton, they will be, to some extent, enclosed in the hollow fibres, and are then only removed effectually by breaking up the latter, and long-continued washing. In nitro-glycerine, they are held obstinately dissolved by the liquid, and their removal can also only be effectually accomplished by a long-protracted washing of the very finely-divided substance. Alkaline agents are in both cases useful in accelerating purification.

For many years nitro-glycerine was universally regarded as specially liable to spontaneous change; even samples of different quantities of several pounds each, which, within the last four years, were produced at Woolwich in immediately successive operations, all apparently under the same conditions and with the special object in view of obtaining a thoroughly purified and stable material, have exhibited great differences in their keeping qualities. They have all been preserved in the dark, side by side; some are now in their originally pure condition, others have become more or less strongly acid, and two or three have undergone complete metamorphosis into oxalic acid and other products. The manufacturing and purifying processes, as perfected by Mr. Nobel, appear to furnish more reliably uniform products than those usually obtained on a small scale, and such specimens of these products as the lecturer has had an opportunity to examine have exhibited great stability. Yet, if it were possible to trace explosions to their cause more frequently than is the case, an accidental want of stability might perhaps have been found, in some instances at any rate, auxiliary in bringing about the violent nitro-glycerine explosions which have occurred. It has, however, been already established by very extensive experience during the last three years that nitro-glycerine is a far more reliable material than was formerly believed, and that if the most scrupulous attention is paid to its purification, and is combined with vigilance during storage and use of its preparations, and the adoption of certain precautions, which have already been proved important safeguards against chemical change in materials of this class, the risk of accident is so greatly reduced as to warrant the extensive manufacture and employment of nitro-glycerine preparations under restrictions similar to such as may be deemed sufficient in the case of other explosive agents.

The causes which led to the great uncertainty with regard to stability exhibited by gun-cotton, as manufactured in the earlier days of its history, have been discussed in former discourses. The very extensive experiments and observations which were set on foot nine years ago by the Government Committee, and have been continued to this day, on the keeping qualities of gun-cotton prepared by the Austrian process. have furnished most satisfactory results. Very considerable quantities of gun-cotton, in a great variety of forms, have been stored at Woolwich for several years, and their periodical examination has failed to afford any reason whatever for doubting the stability of gun-cotton under all conditions of storage which are likely to occur. The experience thus gained applies even more favourably to gun-cotton reduced to pulp according to the system lately in use, whereby the uniform purification of the gun-cotton is more effectually secured. Compressed gun-cotton has not only been stored extensively in different parts of Great Britain; it has also been exported in considerable quantities to Australia, India, the West Indies, South America, and other distant countries, and has been used under circumstances specially trying to any material of uncertain stability.

The explosions which occurred at Stowmarket nine months ago had the natural effect of dispelling from the public mind the great confidence which was becoming very generally entertained in the stability of gun-cotton. Fortunately the facts which were elicited in the course of the inquiry constituted so complete a chain of evidence as to place the first cause of the explosion beyond any reasonable doubt, and to demonstrate that it was quite independent of any want of stability of the properly-manufactured material. A supply of gun-cotton delivered from the works at Stowmarket, forming part of a quantity of which there remained a store in the magazines that exploded, was found to contain a proportion of disks in a highly impure condition. The proportion of free (sulphuric) acid existing in some of these was so considerable that it could not possibly have been left in the gun-cotton after the first rough washing which it receives immediately on removal from the acid, and *before* conversion into pulp in the rag-engines, where it is beaten up for several hours with a very large volume of water. Supposing, therefore, that the gun-cotton pulp composing these disks had been submitted to the compressing process without passing through the intermediate and principal purifying operation, it could not possibly have contained even a small proportion of the sulphuric acid discovered in the impure disks, and the same would have been the case even if the *un*-pulped gun-cotton, after the preliminary washing and ringing, could have been converted into compressed disks. It was indisputably established, therefore, that the sulphuric acid discovered in the impure gun-cotton, and which could not have been generated by any decomposition of the substance, must have found its way into the finished material in some manner totally unconnected with the process of manufacture, and that no amount of carelessness in manufacture, even to the extent of partial omission of the purifying processes, could have led to the existence of the acid found in the impure gun-cotton. That this impurity was sufficient to establish rapid change was sufficiently proved by the condition of some of the disks; and that this chemical change, accelerated as it was by the great heat of the weather at the time, gave rise to a development and accumulation of heat inevitably culminating in the ignition of some portion of the stored gun-cotton, was readily demonstrated by simple experiments with some of the impure disks themselves. But although the *ignition* of the store of gun-cotton in the lightly-built magazines at Stowmarket was completely accounted for, the very violent character of the explosions, and especially that of the second explosion of a small store, which was burning for a considerable time before its contents detonated, were results quite unexpected to those well acquainted with the properties of gun-cotton in the compressed form. Many practical experiments had demonstrated that it might be submitted to extremely rough treatment without any risk of explosion, and single packages of the closely-confined material had been repeatedly ignited, from within and without, no other result than an inflammation and a rapid burning of the gun-cotton having ever occurred. These demonstrations of the apparent immunity from explosive properties of compressed gun-cotton, unless very strongly confined or fired by detonation, appeared fully confirmed by the results of a somewhat extensive experiment made at Woolwich a year ago with gun-cotton packed in firmly-closed wooden boxes, of the kind which Government proposed to use for storing the material. Eight such packages, each containing 28 lb. of gun-cotton, were enclosed in a pile of similar boxes loaded to the same weight, and the contents of the centre box were ignited: no explosion resulted, and the contents of some of the boxes even escaped ignition A second experiment, in which the centre box was surrounded by inflammable matter, so that a fierce fire burned within the heap for many minutes before the gun-cotton ignited, was also unattended by any approach to an explosion. The apparently conclusive nature of these experiments undoubtedly encouraged a false confidence in the non-liability to explosion of stores of gun-cotton in the event of accidental ignition, and the Stowmarket catastrophe demonstrated the imperative necessity for a more extensive investigation of the subject. The results of some experiments recently instituted near Hastings by the Government Committee on gun-cotton have served to throw great light upon the manner in which the explosions at Stowmarket were brought about. In the first instance, twenty-four boxes (containing 6 cwt. of gun-cotton) of the kind used in the Woolwich experiment were stored upon tables in a small wooden shed of light structure, and a heap of shavings and light wood was kindled immediately beneath the boxes, two of which were left partly opened. After the fire had been burning for about seven minutes the gun-cotton inflamed and continued to burn with very rapidly-increasing violence for nine seconds, when a sharp explosion occurred; a very similar result was furnished by a second experiment, in which the same number of boxes of gun-cotton was stored in a small magazine of stout brickwork. By subsequent comparative experiments it was judged that a considerable proportion of the gun-cotton had been burned in both instances before the explosion occurred, but these were nevertheless of such violence as to produce large craters in the shingle on the site of the buildings and to project the *débris* with much force to considerable distances. Two repetitions were afterwards made of the first experiment, in wooden sheds of similar structure, and with corresponding quantities of gun-cotton similarly arranged in boxes of the same size, and fastened down just as securely as those in the former experiment, but the boxes were made of somewhat thinner wood and were constructed less strongly. In neither of these experiments did an explosion occur. In the one instance the fire was burning in the building for more than half an hour before the gun-cotton became ignited, and three minutes after the first great blaze had subsided there was a second blaze of gun-cotton. Although the latter must have been exposed to intense heat, no explosion was produced. In the second experiment the gun-cotton burned in three successive portions, the last having been exposed for many minutes to very fierce heat, yet burning non-explosively. The first two of these experiments demonstrated that if, in a store containing packages of gun-cotton in somewhat considerable number, the material became accidentally inflamed, the intense heat developed by the burning gun-cotton in the first instance might raise some portion, still confined in boxes, to the inflaming point, and that then, the mass of the confined gun-cotton being in a heated condition, the ignition would proceed with such rapidity as to develope the pressure essential to explosion while the gun-cotton was still confined, the resulting explosion being instantaneously transmitted to other boxes. When the magazines at Stowmarket exploded, a large volume of flame was observed to precede the explosion by a very distinct interval. The two other experiments described appear to demonstrate that *with such quantities* of gun-cotton as were stored in the experimental sheds, the fact of the material being confined in boxes of comparatively light structure constitutes a safeguard against explosion, the reason being that the weaker packages are opened up by comparatively feeble pressure from within, hence when the contents of a box become raised to the inflaming temperature, or become ignited by the penetration of flame to the interior, the pressure developed by the first ignition is not sustained by the box to a sufficient extent or for a sufficient time to bring about explosion.

On the occasion of the Stowmarket accident there were two storesheds containing gun-cotton packed in boxes of light construction, which were ignited by the first explosion and burned out without exploding, while a third, which contained gun-cotton packed in the strong Government boxes, exploded with great violence after having been in flames for some time.

Simple experiments demonstrate that if any explosive compound or mixture be ignited when in a heated condition, it will burn with a violence proportionate to the temperature to which it has been previously heated; if this be near the exploding point, explosion must ensue, which will be violent in proportion to the strength of confinement of the material. A practical demonstration of this was furnished by an explosion which occurred at Woolwich in 1866. Several very strong packages (metal lined-cases) filled with Von Lenk's gun-cotton, some of which had been purposely left impure, had been exposed for seven months to artificial heat in a strong brickwork chamber, heated by steam. The impure gun-cotton in some of the packages was then known to be in a decomposing state, but the experiment was continued, and eventually spontaneous ignition occurred and at a time when the boxes were heated to the maximum temperature. The result was a violent explosion of all the packages; the very strong confinement and the heated condition of the gun-cotton which ignited, added to its being at the time in a state of chemical activity, determined its explosion, and the explosion of the other packages was a necessary consequence of the violent concussion to which they were exposed.

There can be no doubt that the results of the recent experiments and of those made last year, as also the results of the Stowmarket accident, have to be considered in relation to the *quantities* of gun-cotton operated upon, as well as to its confinement. The confinement of the *eight* strong packages by the layers of boxes which surrounded them on all sides in the Woolwich experiment, was probably quite as great as that afforded by the light and roomy shed in which the twenty-four boxes of the same kind were placed in double layers, in the South Coast experiments; yet in the latter case an explosion was developed, and not in the former with the smaller quantity. In the South Coast experiments, with 6 cwt. of gun-cotton, the explosions occurred eight seconds and ten seconds after the ignition of the gun-cotton; in the Stowmarket magazine, where several tons of gun-cotton were stored, the explosion appears to have *almost* immediately followed ignition; it must be borne in mind, however, that in this case much of the gun-cotton was very closely confined by the large number of surrounding packages, and that the temperature of the gun-cotton was already raised considerably throughout by long-continued very hot weather. Both of these circumstances must have greatly favoured the very rapid development of explosion, independently of the much more intense heat generated by the rapid spreading of fire through a large proportion of the gun-cotton.

The satisfactory results obtained in the South Coast experiments with the lightly-constructed boxes, with employment of 6 cwt. of material, appear to have received confirmation from the result of an accident which occurred in 1869 at Penryn, when a magazine of brickwork containing 20 cwt. of compressed gun-cotton, packed in boxes of light structure, was burned down without any explosion. But it is nevertheless very possible that a similar result would not be furnished by several tons of gun-cotton similarly packed; the much higher temperature which would be developed in that case by the first spreading of the fire, and the additional confinement, due to the larger number of packages, might combine to develope conditions favourable to the violent explosion of some portion of the mass, though no doubt a much larger proportion would burn non-explosively than if strong boxes were used. While, therefore, in storing *dry* gun-cotton, the probability of violent explosions resulting from the accidental ignition of a magazine may be considerably diminished, or at any rate the violence of a possible explosion much reduced, by storing the material in packages of which some portions will yield readily to pressure from within, or by adopting any other storage arrangement whereby the rapid penetration of flame or heat between the compressed masses is promoted, it must be considered as conclusively established by the last twelve months' experience that such regulations as experience and prudence have rendered essential in connection with the storage of gunpowder and other explosive agents, must also apply to the storage of compressed gun-cotton when in the dry state.

The rapid development which has taken place within the last few years in the industrial applications of powerful explosive agents bids fair to continue. In illustration of this a brief reference may be made to some recent interesting results arrived at by Dr. Sprengel, who has observed that mixtures of liquid oxidizing agents (such as nitric acid) with liquid or solid oxidizable substances, may be made to detonate, as also mixtures of readily oxidizable liquids with solid oxidizing agents. Thus, mixtures of picric acid or of nitrobenzol with nitric acid, or of chlorate of potash with bisulphide of carbon, may be readily detonated, and are more or less violently destructive in their action.

Important advantages, in point of power in the one instance and of economy in the other, appear to be promised by the production, in compressed masses, of mixtures of gun-cotton pulp with *considerable* proportions of chlorate of potash or saltpetre. Even the efficiency of gunpowder itself as a mining agent has been decidedly augmented in some directions by the lecturer's observation that it is susceptible of violent explosion by detonation, like all other explosive preparations, and that strong confinement is consequently not essential to the development of its full explosive force. This observation has proved to be especially valuable in connection with submarine operations, for which the charges of gunpowder need no longer, as formerly, be confined in cases of great strength. There are several other directions in which the study of the behaviour of explosive agents, under conditions compatible with their practical application, promises to be fruitful of important results.

RETAIL TRADERS, BEWARE!

Mr. Punch begs to apprise the Retail Trade that its time has come. Up with all the Shutters! Announce Sale by Auction at any Sacrifice. Listen to the *Lancet*:—

"The fact is, that retail trade is gone mad. There are far more shopkeepers than the wants of the public require, and they think themselves entitled to all the luxuries and enjoyments of life. Their wives, glorious in sealskin-jackets and redundant jewellery, are to be seen everywhere; and the pretensions of the class are becoming a nuisance that it is high time to put down."

Put it down, then—pretensions, class, sealskin-jackets, and all! *Surge, carnifex!* The *Lancet* and the Profession have the matter in their own hands. If every Medical Man will undertake to exterminate—of course in a regular way—a single streetful of retailers and their families, the business may be done in the twinkling of a pestle and mortar.

"Charge for the golden guineas. Upon them with the—
Lancet."

The Pharmaceutical Journal.

SATURDAY, JANUARY 25, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE "CHARGE FOR DRUGS."

It is not surprising that the sensational lucubrations of the *Globe* on the Price of Drugs should exercise a sort of infectious influence on the general press, but we must confess our astonishment at finding this the case with a journal so generally well informed and judicial as the *Medical Times and Gazette*, which, in the number for last week, not only adopted and reiterated the unfounded assertion as to extortionate charges by druggists, but also accused us of affirming it to be "only just and right" that decent poor people should be driven to hospitals for medicine as well as advice. This is so contrary to what was said on the subject, that if we were mischievously disposed it might be called misrepresentation. And if the druggists' charges for dispensing were proved to be exorbitant, it might, perhaps, be worth while for a medical journal to inquire how far the prescriber is *particeps criminis* in the manner pointed to in the evidence of a physician in a case reported at page 595. The other comments of our contemporary are, to say the least, illiberal, and we trust it is not a general idea of those who write prescriptions, that so little skill as the amount now required by law is sufficient for performing the onerous work of dispensing them. If that were the case in practice, the extermination "in a regular way" suggested by *Punch* might be more general, and not always confined to surplus retailers and their families.

As regards the *Globe*, we did hope that the appearrance last Friday week of a quotation from the Pharmacy Act for the purpose of showing that it did not involve annihilation of all those who had been in the business before the Act passed, might be regarded as an indication that the labours of that "mountain" were at an end. But the estimation of chemists and druggists by the relics of the past was not enough for the *Globe* inquirer, and last Tuesday we were favoured with a scolding for meeting "criticism" with virulent abuse, etc., etc. However we need not follow this writer further, since he has become bewildered, no doubt inextricably, by the notion that the use of brains in dispensing is worth more than the material operated with. We dare not hope to help him and can only deplore his sad disability.

We have received from a correspondent a printed slip with the heading, "Measure for Measure," and we think that the reproduction of its contents may at least serve the purpose of illustrating the mischief that may be done by a bad example. The source of inspiration will, no doubt, be sufficiently apparent

"A contemporary of ours has lately been taking a practical method of determining the scale of doctors' fees, and has arrived at the conclusion that no Medicos are satisfied with a fair professional profit, and that the charges of most are so exorbitant as to render it useless for any moderately poor person to think of getting advice outside of a hospital.

"The course pursued in the inquiry was to seek advice in the treatment of simple catarrh, or cold in the head, requiring neither great attention nor elaborate surgical skill. The estimated value of such advice according to competent authority is, including pen, paper, and time, *five pence*—an estimate that probably errs on the side of excess.

"The case was taken and laid before a number of medical men from Billingsgate to Brook Street, and a reduction of fees was asked for, and in almost every instance obtained, on the score of the poverty of the sick person. Nevertheless, the fees actually varied from 2*s*. 6*d*. to 23*s*. 6*d*. (including 2*s*. 6*d*. for medicine).

"The medicine prescribed would, according to the directions, last only one-third of a week, and as one other consultation only would be given for the original fee, it would thus entail on the patient a weekly charge ranging from 7*s*. 6*d*. to 49*s*. 6*d*. Our contemporary justly remarks that even the first would, in many cases, be prohibitory, and the patient driven to a druggist or hospital.

"We regret that the test was not carried a step further, and that means were not taken to test the charges of the *élite* of the profession.

"It is possible under the circumstances no advance might have been made, and that a sort of average might have been struck by charging the rich extra, to pay for the poor. We, however, know of long illnesses which have been almost ruinous to patients in respectable but not affluent circumstances.

"Zealous for the interests of 'Enlightenment and Popkins,' we pushed our investigations somewhat beyond the limits observed by our contemporary and peeped through the surgery window and into the drawing-rooms. There the mystery was solved.

"The fact is medical men are gone mad, and there are far more of them than the wants of the public require, and they think themselves entitled to all the luxuries and enjoyments of life. Their wives, glorious in satins and real sables, and resplendent in jewellery, ride and drive the best horses, give the best dinners, have the best opera boxes, and take the best physic, while their children have nightly juvenile parties, with Conjurors, Punch and Judy, and the Magic Lantern, and other extravagant amusements; they eat the choicest bonbons, and jingle the most costly rattles.

"The pretensions of the class are becoming a nuisance that it is high time to put down."

This is all very well as a "squib," but the relations between medical prescribers and pharmacists deserve and require to be treated in a more serious mood, though it is evident that if disparagement is to be the rule, it is as applicable in one case as in the other.

The contemptuous tone in which the *Lancet* speaks of chemists indicates a jealousy of their rising importance unworthy a journal claiming to represent a class generally characterized by gentlemanly feeling. The vulgar abuse, which has been noticed by several of our correspondents, would, we are sure, be disavowed by the best members of the profession. Not so wise as its contemporary, the *Times*, which can mould itself to public opinion so as to do no violence to common sense, the *Lancet*, adhering to old views and manners, ignores the changes of time. The chemist of to-day, qualified by years of study, not less severe than that of the medical practitioner, and tested by as severe an examination,—the exact and careful dispenser, who understands the nature of the potent agencies he handles, now kept by law out of less skilful hands,—will not be deprived of the growing estimation of his services by unreasoning depreciation or contempt. We confidently believe also that the time is fast approaching, although the *Lancet* sees it not yet, when medical men themselves will abandon their slovenly methods of preparing medicines, and gladly avail themselves of the services of the best chemists, regardless of the furs and jewellery which their skilled labour may provide for their wives and daughters.

The public know perfectly well that chemists, entrusted with duties in which life and death are involved, are not to be remunerated by the mere profits of retail trade, any more than medical practitioners; and the writer in the *Globe* should, if he desired really to make his inquiry of any use, have gone further, and ascertained what would have been charged for his test pills and mixture by medical men who dispense and furnish their own medicine. We may safely affirm that the price would have gone still higher, and that the minimum instead of eightpence would have become, at least, four shillings and six pence in a doctor's bill.

The best hope for medical men and chemists lies in maintaining mutual good understanding. And it is to cultivate this more generally that the efforts of both classes should be directed. They can assist each other materially in many ways. It is, therefore, to be regretted that so important a journal as the *Lancet*, instead of endeavouring to promote good feeling between prescribers and dispensers, should use language which can only tend to engender animosity, and neutralize the good each could do the other. The mission of the *Lancet* is not to foster arrogance in medical men, nor to provoke chemists to imitate its own vulgarity, and say, "the pretensions of the class are becoming a nuisance that it is high time to put down."

PHARMACEUTICAL WOMEN.

When some months ago a correspondent inquired whether women were admissible to the examinations of the Pharmaceutical Society we felt constrained to state what seemed the natural consequence of legislative recognition of Mr. Stuart Mill's definition of the word "person." Since then the lecture classes of the Society's school have comprised several female students, and by the report of the examinations published in this Journal it appears that two of them have already passed through the first grade of probation for being registered as duly qualified chemists and druggists, one of them heading a list of 166 successful candidates. We are informed that both of these ladies are regularly engaged in dispensing medicine as the avocation by which they gain their living, and that they contemplate following out this career thoroughly may be anticipated from the fact that, in addition to seeking the bare legal qualification, they have indicated their desire to be associated with the Pharmaceutical Society by becoming registered as "Apprentices or Students of the Society. This step will have the effect of placing these ladies beyond the influence of the objection raised at the last Council meeting to the admission of women students to compete for the prizes and certificates given at the end of each Session.

Last week the *British Medical Journal*, in commenting on the decision not to allow the industry of female students the chance of reward offered to male students by the session prizes, said, somewhat irreverently, that it seemed "as though the old women of the Council had determined to keep the young ones back" by doing "their utmost to handicap and discourage them."

We may expect, therefore, that the subject will again come forward at the Council table, and those who voted against Mr. Hampson's motion will either withdraw their opposition or take such steps as will show that they are not open to the reproach of our contemporary.

Meanwhile, it may not be superfluous in regard to this subject, as well as others, to embrace any opportunity of the advantage so earnestly desired by Robert Burns of seeing ourselves as others see us, and for this reason we quote here the following article from the *Pall Mall Gazette*:—

"There has been something like precipitancy if not error in the good words which have been spoken of the Pharmaceutical Society of London for the liberality which appeared to mark the recent resolution of the Council not to exclude women from the lectures on chemistry and botany delivered at their house in Bloomsbury Square. It appears from their late proceedings that what they did was only from a sense of legal necessity, and that they are preparing by side-winds to prevent the concession which they could not easily withhold from affording any real facilities for women to enter upon a career which has been fully open to them until the last few years, and of which some hundreds have availed themselves. The means by which an apparent liberality is made really exclusive, and by which the half-opened doors have been chained so as to deny ingress to women, are in more than one way worthy of attention.

"Until recent legislation converted the business of selling and dispensing drugs into a close guild governed by the Pharmaceutical Society, it was open to all the world. There were many sufficient considerations for that measure. Free trade in poisons afforded facilities to the prisoner and the suicide; the hazards to life incidental to the manipulation and sale of drugs with or without medical prescription were increased by the want of education of the vendor and dispenser, which went sometimes to the extent of complete ignorance of the art of reading ordinary labels and directions involving technical terms, and by carelessness, which permitted the employment of mere children as assistants at the counter. It was not possible to apply educational tests to ordinary traders, nor to impose regulations on an unregistered and motley body of shopkeepers. The Pharmaceutical Society, a voluntary educational body called into existence chiefly by the exertions of the late Mr. Jacob Bell, was therefore erected into a State institution, acting under the authority of the Privy Council. It was invested with very extensive and unique privileges. It combines three functions. Its Council has the power of a guild, regulating the conduct and mode of business in some important particulars of the members of the trade; it is the proprietary owner of a large school, through which candidates for introduction to the pharmaceutical business are passed; and it is the sole examining body which possesses the privilege of examining such candidates and of giving them the right to enter upon the business of chemists and druggists.

"Thus the trade is hemmed in on all sides by a far-reaching monopoly. In granting these powers, certain duties were imposed of which some have been well observed while others have not. The existing rights of persons in business were reserved, and it was provided that no other than educational restrictions should be imposed upon those who were desirous of entering the business. That women, already largely engaged in it, might not be disqualified, the Act throughout employs the word "person" as including both men and women. The course which the Council recently took of admitting women to the lectures of the School of Pharmacy was therefore in accordance with the law. That which they have since taken, of excluding them from the practical teaching of the laboratory attached to it, through which the other students pass, is not in accordance with the law. The law contemplated that in this business men and women should have equal opportunities, and that as some hundred women were before enabled to earn their living in dispensing drugs they should not now be disqualified, provided they equally with men submitted to the required educational tests. The still more recent resolution of the Council to prohibit the women attending the laboratory classes from submitting themselves to the usual examinations or competing for the scholarships and prizes is not less unfair. Is was at first alleged that they had more time at their disposal, and would have a greater chance of acquiring a high degree of knowledge, and of surpassing the male students in examination. If that were so, they would not prove the less valuable dispensers or assistants because they were better informed than the average students; and students possessing greater facilities for reaching a high standard of instruction should in the interests of the public and in the best interests of the trade—precisely those which the Pharmaceutical Society was instituted to promote—be encouraged rather than rejected. But on investigation the statement was found to involve an entirely erroneous view of the facts. Of the three ladies attending the classes during the session two were engaged in extremely laborious work as dispensers holding engagements by which they were occupied from early morning till late at night; and the third, it was stated, was also largely occupied in other pursuits. Moreover, it was known that many of the male students were able to devote their whole time to their studies: and it had never been and is not proposed to exclude them on that ground from competition. Nor is such a course customary on grounds of this kind in any educational institution. The majority which carried the restrictive resolution was narrow, and it may be supposed that the whole consequences and character of the proceeding were not apparent to them.

"The Council of the Pharmaceutical Society consists wholly of tradesmen of a superior class, but not yet accustomed to the kind of responsibilities weighing upon a body entrusted with State powers. A private and voluntary association, such as it formerly was, is free to indulge its fantasies and its tastes. It may be liberal or illiberal within the range of its conceptions; equitable or inequitable according to its standard of judgment or the elasticity of its corporate conscience. They might reasonably resent criticism from without, and propose to do as they please with their own. But in directing public interests and fulfilling public functions they must rise above the considerations of the counter, and consent to consider justly the claims of the most inferior being who can muster knowledge enough to decipher the medical caeograms which pass as prescriptions, distinguish between aconite and horse-radish, sugar the powders and gild the pill for which suffering mortals credulously but impatiently wait. As shrewd tradesmen they may consider the advisability of narrowing the competition among chemists, but as the interpreters of an Act of Parliament they must exclude personal considerations in framing the regulations which guard the entrance to the chemist's shop."

THE CHEMISTS' BALL.

That the Chemists' Ball is now permanently established as an annual gathering, must have been evident to those who were present at the very pleasant reunion at WILLIS's Rooms on Wednesday evening last. We understand that about 340 persons were present, amongst whom were many whose names are familiar to pharmacists as household words.

At the supper, which was good and well served, Mr. Frederick BARRON took the chair, and in giving the customary toast of the evening, "Success to the Chemists' Ball," coupled with it "The Health of the Ladies," and expressed a hope that although he had now been connected with the drug trade five-and-forty years, he might nevertheless live long enough to see the time when a lady would take the chair at the Chemists' Ball. This was received so enthusiastically as to leave no doubt, on the one hand, of the satisfaction the arrangements had given to those assembled, and on the other of the sympathy of the company with the views expressed by the chairman as well as in other quarters. It was mentioned by the Chairman with regret, that two gentlemen, Messrs. BILLING and WARWICK, who had done so much to contribute to the success of the Ball, not only on this, but on previous occasions, were prevented by domestic circumstances from being present.

THE NEW AMERICAN PHARMACOPŒIA.

AMONGST the matters which just now interest the pharmacists of America, the issue of the new edition of the United States' Pharmacopœia will be of paramount importance. It will be seen by a notice on p. 596, which, through the kindness of Professor ATTFIELD, who had received an advance copy, we are enabled thus early to put before our readers, that it has its points of interest for the English pharmacist also. First, in the fact that it is the fifth that has been issued at intervals of ten years, a definite time being thus recognized at which the Pharmacopœia should be modified in accordance with the progress of medical and pharmaceutical science; to this has now been added a resolution authorizing the issue of a fresh edition at a shorter interval if necessary. Secondly, that it is the work of a convention in which delegates from pharmaceutical as well as medical colleges take part. Both these points are worthy of consideration in this country, where, on the one hand, as was recently pointed out by a contemporary, no satisfactory provision has been made for the addition of a new remedy, even when so well established as hydrate of chloral; and, on the other, the responsibility of producing a pharmacopœia is, by the terms of the Medical Act, confined to the General Medical Council. Another matter, which probably will not be without its influence upon a future British Pharmacopœia, is the adoption of the system of nomenclature advocated by Professor ATTFIELD. While on the subject of pharmacopœias it may be mentioned that, in referring to the statement respecting a Universal Pharmacopœia made by Dr. THUDICHUM at a recent evening meeting, the New York *Druggists' Circular* expresses a regret that America is not yet taking part in the discussion.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

January 14th, 1873.

Present—Messrs. Aitken, Buchanan, Gilmour, Kemp, Kinninmont and Young.

Major Examination.

Two candidates were examined. *One* failed. The following passed, and was declared duly qualified to be registered as a "Pharmaceutical Chemist":—

*Heppell, James..............Forest Hill.

Minor Examination.

Five candidates were examined. *Three* failed. The following *two* passed, and were declared duly qualified to be registered as "Chemists and Druggists":—

*Field, Alfred William........Edinburgh.
Beverley, George............Aberdeen.

Modified Examination.

Three candidates were examined, and failed.

Preliminary Examination.

The certificate of the University of Edinburgh was received from the undermentioned in lieu of this examination:—

Donaldson, James............Edinburgh.

EXAMINATIONS IN LONDON.

January 15th and 16th, 1873.

Present—Messrs. Allchin, Barnes, Carteighe, Cracknell, Davenport, Edwards, Gale, Haselden, Ince, Linford, Martindale. and Southall.

Dr. Greenhow was present on the 15th on behalf of of the Privy Council.

Major Examination.

Three candidates were examined, of whom *two* failed. The following passed, and was declared duly qualified to be registered as a "Pharmaceutical Chemist":—

Elliman, Samuel Francis......London.

Minor Examination.

Forty-two candidates were examined, of whom *twenty-five* failed. The following *seventeen* passed, and were declared duly qualified to be registered as "Chemists and Druggists":—

	*Andrews, William Leatham	Scarborough.
	*Bascombe, Frederick	Weymouth.
	*Dodds, William	Hull.
	*Bracher, Walter Phipps	Bath.
	Cooke, William Kendle	Brighton.
Equal.	Pidd, Arthur Joseph	Hulme.
	Rayson, Arthur John	Diss.
	Scott, Ebenezer	Chesterfield.
Equal.	Kirton, Christopher Henry	Hull.
	McKnight, John	Dalston.
Equal.	Adams, Andrew Henry	Montacute.
	Carlton, Thomas Wokes	Hull.
	Green, Edwin	Billinghay.
	Sargent, John Charles	Leamington.
	Harrold, Charles Jesser	Frome.
	Worthington, William	Preston.
	Francis, Charles Ernest	Wigan.

The above names are arranged in order of merit.

Preliminary Examination.

The Certificates of the University of Cambridge were received from the undermentioned in lieu of this examination:—

Smith, Charles Albert........Leeds.
Spence, John................North Shields.

* Passed with Honours.

PRELIMINARY EXAMINATION.

The following is the result of the Preliminary examination, held on the 6th instant:—

England and Wales.

Three hundred and thirteen candidates presented themselves for this examination, of whom *one hundred and forty-seven* failed. The following *one hundred and sixty-six* passed, and have been duly registered as Apprentices or Students:—

	Minshull, Rose Coombes	London.
	Newman, Frederic William	Falmouth.
Equal.	Smith, Peter	Runcorn.
	Wood, George Alfred	Bridgnorth.
	Tottle, Henry John	Bath.
	Pritchard, Samuel Evan	Bangor.
	Legat, William Henry	York.
	Fowler, Charles Henry	Boston.
Equal.	Parker, William Marris	Walcot.
	Trible, Edward	Launceston.
Equal.	Plumbe, Charles Marshall	Mansfield.
	Walton, Edward Bridges	London.
	French, Herbert Walter	Sydenham.
Equal.	Jones, George	Bedford.
	Servant, James	Thorne.
	Wing, William	Sheffield.
	Broadbent, Edwin Constantine	Douglas.
	Brown, Thomas	Birmingham.
	Locke, George	Aylesbury.
	Thomas, Frank	Boston.
Equal.	Jepson, Alfred	Swansea.
	Palmer, Tom Clifford	Grimsby.
Equal.	Green, James	Cheltenham.
	James, Richard	Camborne.
	Street, Walter Charles	Lincoln.
	Thompson, Leonard	Richmond, Yorks.
	Kemp, George	Birmingham.
	Duffus, Alexander	London.
	Stephens, Jonathan	Devonport.
Equal.	Jackson, Henry John	Bawtry.
	Ward, John	Derby.
Equal.	Francis, Frederick Tanton	Tavistock.
	Rees, Llewellyn Vosper	Swansea.
Equal.	Laurie, John	Ipswich.
	Williams, William	Saint Clears.
	Jenkins, Thomas	Swansea.
Equal.	Barrett, Josephus	Devonport.
	Harris, George Herbert	Woolwich.
	Park, Charles James	Devonport.
	Edwards, Frank Dunn	Usk.
	Baker, Matthias	Hanley.
Equal.	Balcombe, Charles	Hawkhurst.
	Beach, William Henry	Penkridge.
	Cleugh, Benjamin Sweeten	York.
	Herington, Joseph Henry	Leighton Buzzard.
	Watt, George Adam	Hartlepool.
	Weston, Matthew Frank	Bury.
Equal.	Nichols, Arthur F.	Leicester.
	Porter, Thomas	Fleetwood.
Equal.	Esam, Richard	Stamford.
	Parminter, Urban	Exeter.
	Wills, Andover Vincent	Blaenavon.
Equal.	Brown, Alfred Duncombe	Halstead.
	Evans, John Thomas Richard	Rhyl.
	Maxwell, James Ashworth	Altrincham.
Equal.	Catton, Frederic William	Knaresborough.
	Davies, Ivor Henry	Dowlais.
	Royse, John Frederick	Stockport.
Equal.	Brearey, Arthur William	Douglas.
	Greenwell, Alexander John	Newark.
	Kemp, Harry	Salford.
	Ellis, John William	Liverpool
Equal.	Peirson, Henry	Banbury.
	Roberts, William	London.
	Swindells, John Adam	Northwich.

Equal.
Churs, Robert ... Northwich.
Izod, William Henry ... Upper Norwood.

Equal.
Biddles, William Byron ... Reading.
Lucas, Joseph Michael Mark .. Gravesend.

Equal.
Evans, Thomas ... Cwmbach.
Shadford, Major ... Spalding.

Equal.
Arnold, Harry Shaw ... Cwm Avon.
Bailey, John Harvey ... Winchester.
Brunt, Edwin ... Grimsby.
Chipp, James ... Newport, I. of W.
Jones, Thomas ... Rhuddlan.
Swindlehurst, Thomas Newton Preston.
Tatam, S. B. C. ... Ottery St. Mary.

Equal.
Powell, Cuthbert ... Bristol.
Price, William Elliott ... Hereford.

Equal.
Jones, William ... Aberdare.
Nottingham, Thomas ... Streatham.

Equal.
Banks, James ... York.
Chalmers, John ... Newport, Salop.
Stammwitz, Louisa ... London.
Topliss, Walter George ... Wainfleet.

Equal.
Osborne, George Cooch ... Northampton.
Taylor, Frederick ... Exeter.

Equal.
Barnes, Nathaniel Morris ... Bolton le Moors.
Whiteside, Robert William .. Rhyl.

Equal.
Baker, Thomas ... Ryde.
Hoult, Joseph Emanuel ... West Bromwich.
Little, Joseph Arthur ... Sheffield.
Littlewood, John Oscroft ... Sutton-in-Ashfield.

Perkin, Thomas ... Stourbridge.

Equal.
Hatton, George Stokes ... Cheltenham.
Lunn, Alfred ... Spalding.

Stephenson, Robert ... Bradford, Yorks.

Equal.
Gray, William Henry ... Leicester.
Simpson, John George Povey .. Manchester.

Equal.
Asher, James ... Derby.
Gundry, John Adolphus ... Gosport.

Equal.
Challinor, Cedric ... Bolton.
Heyland, Charles ... London.
Horn, John ... Waterford.
Kindley, Angus ... Carlisle.
Swindle, Norman Vickers ... Carlisle.

Equal.
Chamberlain, Arthur Garratt .. Leicester.
Evans, Richard ... London.
Gilbert, William ... London.

Equa
Duggleby, Thomas Waldby .. London.
Evans, Thomas ... Swansea.
Greenhalgh, James ... Liverpool.
Jenkins, Evan Walter ... Lampeter.
Wyatt, Charles Frederic ... Old Brompton.

Equal.
Brumwell, Herbert ... Fleetwood.
Chapman, William John ... Bristol.
Fletcher, Thomas Henry ... Weston.
Gudgeon, Harry Atkins ... Northampton.
Slinger, Robert Thomas ... Manchester.

Withycombe, George ... Plymouth.
Wilcox, Ernest ... St. Neots.
Palmer, Thomas Edward ... Liverpool.
Williams, John Thomas Creswick, Dolgelly.

Equal.
Barlow, John ... Pendleton.
Moore, Jonathan Reuben ... Kettering.

Equal.
Crane, William Clifton ... Hallaton.
Denston, George Augustus .. Kettering.
Laing, Joseph Lythall Leigh .. Congleton.

Equal.
Barnes, James William ... Spalding.
Glover, Alfred Joseph ... Tunbridge Wells.
Oxley, Frederic Augustus ... Epsom.

Equal.
DeCarle, Horace Edward ... Norwich.
Illingworth, William Henry .. Halifax.
Jones, Willie Thomas ... Merthyr Tydvil.

Equal.
Arnfield, John Cash ... Ashton-under-Lyne.
Doughty, William ... Bridgnorth.
Garratt, Arthur ... Guildford.
Geldart, William ... Seacombe.
Naylor, Joshua ... Oldham.
Pritchard, Morris ... Liverpool.

Equal.
Eardley, James Furnival ... Manchester.
Glasbrooke, Thomas Guttery Kidderminster.
Griffith, Samuel ... Weston-super-Mare.

Equal.
Bailey, George Matthews ... Redditch.
Bray, William John ... Saffron Walden.
Garth, John ... Preston.
Steele, Samuel ... Plymouth.
Webb, Robert William ... Bristol.

Equal.
Boocock, Wm. Henry Asquith Adlington.
Hamlin, Frederick Pitt ... Great Ilford.
Morgan, Alfred William ... Rochester.
Simpson, William ... Sheffield.

Equal.
Beken, Alfred Edward ... Canterbury.
Binks, Burcham ... Lynn.
Chapelow, William ... Leeds.
Holt, William ... Blackburn.
Matthews, Thomas Averill ... Worcester.
Mitchell, Matthew ... Hartlepool.
Moon, George William ... Malton.
Richards, William ... Nottingham.
Simpson, Charles Alfred ... Stoke-on-Trent.
Ward, Matthew ... Leeds.
Welch, Charles ... Gosport.

Askew, John ... Grange-over-Sands.
Robinson, Thomas Dexter ... Bedford.

SCOTLAND.

Forty-two candidates presented themselves for examination; of these *eighteen* failed. The following *twenty-four* passed, and have been duly registered:—

Robertson, Andrew ... Markinch.
Ferguson, James Mitchell ... Edinburgh.
Ogilvie, John ... St. Andrews.
Ayre, George Martin ... Edinburgh.
Stewart, Duncan ... Crieff.
Tocher, William Francis ... Jedburgh.
Robbie, William ... Aberdeen.
Mackay, Henry ... Edinburgh.
McNicol, John ... Glasgow.
McDonald, Ewen ... Inverness.
Hill, John, Rutherford ... Lasswade.
Russell, William ... Aberdeen.
Bain, John ... Edinburgh.
Horton, James Alfred ... Aberdeen.
Lambie, Hugh ... Glasgow.
McIntyre, James ... Grantown.
Robertson, James Dolgety ... Arbroath.
Bell, John Armour ... Glasgow.
Maxton, William ... Edinburgh.
Young, Frank Watson ... Dundee.
Mill, George ... Edinburgh.
Borland, John ... Kilmarnock.

Equal.
Crowden, Samuel Graham ... Buckie.
McLellan, Albert Arthur Joseph, Dumfries.

The following is a list of the Towns at which the Examinations were held, with the numbers of Candidates annexed:—

England and Wales.

	Candidates.	Passed.	Failed.		Candidates.	Passed.	Failed.
Aberdare	1	1		Birkenhead	2	1	1
Altrincham	2	2		Birmingham	6	2	4
Ashton-under-				Blackburn	3	1	2
Lyne	1	1		Bolton	2	2	
Aylesbury	1	1		Boston	3	3	
Banbury	3	1	2	Bradford	1		1
Bangor	2	1	1	Bridgnorth	2	2	
Barnstaple	1		1	Brighton	3		3
Bath	1	1		Bristol	7	3	4
Bedford	2	2		Buxton	1		1
Belfast	1		1	Cambridge	3	1	2
Berwick	2		2	Canterbury	1	1	

	Candidates.	Passed.	Failed.
Cardiff	1		1
Carlisle	3	2	1
Carmarthen	4	1	3
Cheltenham	5	2	3
Chester	2		2
Chesterfield	1		1
Chippenham	1		1
Christchurch	1		1
Colchester	1	1	
Congleton	1	1	
Derby	4	2	2
Devonport	3	3	
Doncaster	4	2	2
Douglas	2	2	
Dudley	1		1
Durham	1		1
Exeter	3	3	
Eye	1		1
Goole	2		2
Gosport	2	2	
Grimsby	3	2	1
Guernsey	1		1
Guildford	1	1	
Halifax	1	1	
Hanley	1	1	
Harrogate	1		1
Hartlepool	3	2	1
Hereford	3	1	2
Hull	2		2
Huntingdon	1	1	
Ipswich	1	1	
Kendal	1	1	
Kidderminster	2	1	1
King's Lynn	1	1	
Knaresborough	1	1	
Knutsford	1		1
Launceston	1	1	
Leamington	1		1
Leeds	4	3	1
Leicester	6	4	2
Leighton Buzzard	1	1	
Lewes	1		1
Lincoln	3	2	1
Liverpool	6	4	2
Llandovery	1	1	
London	41	16	25
Louth	1		1
Macclesfield	1	1	
Manchester	15	6	9
Merthyr Tydvil	3	3	
Neath	1		1
Newcastle-on-Tyne	3		3
Newcastle-under-Lyne	1		1
Newport, Isle of Wight	1	1	
Newport, Mon.	2	2	
Northampton	2	2	
Norwich	4	1	3
Nottingham	5	3	2
Oldham	2	1	1
Plymouth	4	2	2
Portsmouth	1		1
Preston	7	4	3
Reading	2	1	1
Redditch	1	1	
Retford	1		1
Rhyl	3	3	
Richmond	1	1	
Rochester	3	2	1
Runcorn	3	3	
Ryde	1	1	
Scarborough	1		1
Sheffield	4	3	1
Shrewsbury	3		3
Sleaford	1	1	
South Shields	1		1
Spalding	4	4	
Stafford	2	1	1
Stamford	3	3	
Stockport	3	1	2
Stockton-on-Tees	1		1
Stourbridge	1	1	
Stoke-on-Trent	2	1	1
Sunderland	1		1
Swansea	4	4	
Sydenham	1	1	
Tavistock	1	1	
Thirsk	1		1
Truro	2	2	
Tunbridge Wells	2	2	
Wakefield	1		1
Walsall	1		1
Wednesbury	1		1
Welchpool	1		1
West Bromwich	1	1	
Weston-super-Mare	1	1	
Whitehaven	1		1
Wigan	1		1
Winchester	2	1	1
Windsor	1		1
Wolverhampton	1	1	
Worcester	1	1	
Wrexham	1	1	
Yarmouth	1		1
York	9	4	5

Scotland.

	Candidates.	Passed.	Failed.
Aberdeen	7	3	4
Banff	1	1	
Dumfries	2	1	1
Dundee	5	2	3
Dunfermline	1	1	
Edinburgh	13	8	5
Elgin	1	1	
Glasgow	6	3	3
Grantown	1	1	
Greenock	1		1
Kilmarnock	1	1	
Perth	1	1	
St. Andrews	1	1	
Stirling	1		1

The questions for the examination were as follows:—

Latin.

1. Translate into English two at least of the following sentences:—

a. Dum hæc in colloquio geruntur, Cæsari nunciatum est, equites Ariovisti propriùs tumulum accedere, et ad nostros adequitare, lapides telaque in nostros conjicere. Cæsar loquendi finem fecit, seque ad suos recepit, suisque imperavit, ne quod omnino telum in hostes rejicerent.

b. Cæsar singulis legionibus singulos legatos et quæstorem præfecit, uti eos testes suæ quisque virtutis haberet. Ipse a dextro cornu, quòd eam partem minimè firmam hostium esse animum adverterat, prælium commisit.

c. Macera per quatriduum dein cola et sepone ut fæces subsidant. Liquorem effunde cumque defæcatum ad idoneam crassitudinem consume.

d. Fiat haustus, cui, tempore capiendi, adde Succi Limonis recentis cochleare magnum unum et in effervescentiæ sumatur.

2. Give the degrees of comparison of the following words:—*Audax*, *vetus*, *pulcher*, *dignè*, *graviter*, and *diu*.

3. Decline *Tu*.

4. When the genders differ in a sentence, with which does the adjective agree? Give two examples.

5. Parse "Regibus exactis consules creati sunt."

6. Give the endings of the Present Tense, Conjunctive or Potential Mood of the four Conjugations, Active Voice.

Arithmetic.

1. A man had a journey of 298 miles to walk; the first day he walked 42 miles, the second 36 miles, the third 31 miles, the fourth 27 miles; how much farther had he to go?

2. Multiply £874. 12*s.* $10\frac{3}{4}$*d.* by $10\frac{3}{4}$.

3. If 12 horses in 5 days draw 44 tons of stone from a quarry, how many horses would it require to draw 132 tons in 18 days.

4. Reduce $\frac{3}{7}$ of $\frac{9}{17}$ of $\frac{29}{78}$ of 32 to a simple fraction.

5. Reduce ·375 to a vulgar fraction.

English.

1. Give several examples of compound pronouns, and state how such arise.

2. Into how many classes may adjectives be divided? and give examples.

3. What does a preposition show? Furnish two examples.

4. Explain the meaning of a noun sentence, and furnish an example.

5. Correct the following: Either I or thou am mistaken, neither poverty or riches was injurious.

6. Write from fifteen to twenty-five lines upon *one* only of the following subjects:—

a. Real pleasure.
b. Letter writing.
c. Saving money.

Provincial Transactions.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION.

An ordinary monthly meeting was held in the class room on Friday evening, January 17th; Mr. W. S. Brown, President, occupied the chair. There was an unusually large attendance of associates to hear Mr. Louis Siebold, who explained, at considerable length, his views on pharmaceutical education. Discussion of the subject was prevented by the lateness of the hour. We hope to publish an abstract of Mr. Siebold's address.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

A special meeting was held in the room in College Street, on January 20th, 1873; Mr. Hester, President, in the chair. He first alluded to the loss the association had sustained through the conductor of the chemistry class (Mr. Branson), and the materia medica class (Mr. Lester), leaving the town, both of whom had been indefatigable in the service of the association, and he was sure carried with them the best wishes of all the members. He then called attention to the new fume cupboard which had been filled up, and a Siebold's herbaria which had been purchased. He congratulated Messrs. Osborne and Gudgeon upon passing the Preliminary examination. Mr. Osborne had been chosen to conduct the materia medica class; the vacancy in the chemistry class had as yet been unfilled. He was very happy to say that the much talked of examinations would be held about the end of February, and he trusted that a spirited competition would ensue for the prizes.

The Secretary (Mr. Druce) having read a list of donations of prescriptions, etc., and called attention to a lifelike portrait of Professor Attfield, then said that their President, Mr. Hester, had offered a prize for chemistry and pharmacy in the coming examination, and their Vice-President, Mr. Sutton, another for botany and materia medica, and himself another in which the competition would be limited to apprentices.

Messrs. Osborne and Druce then exhibited two binocular microscopes; Mr. Osborne showing, among a large number of interesting objects, some good spiral vessels from rhubarb, and the glandular tissue of *Wellingtonia gigantea*, and various hairs, parasites, starches, which proved extremely interesting to the members. Mr. Druce confined himself to polariscope objects, the principal being the alkaloids strychnia, quinia, morphia, cinchonia, quinidia, santonine, atropia and salicine, and various salts of picric and chrysammic acid.

After the usual vote of thanks the meeting adjourned.

Proceedings of Scientific Societies.

SOCIÉTÉ DE PHARMACIE DE PARIS.

THE UNIVERSAL PHARMACOPŒIA.

This society met on Wednesday, December 4th, under the presidency of M. Stanislas Martin.

After some preliminary business, M. Adrian called attention to the project canvassed in other countries to draw up a universal pharmacopœia. He read a translation of the note of Professor Redwood upon this subject, taken from the report of the evening meeting of the Pharmaceutical Society of Great Britain in August last.

M. Boudet said that the idea of a Universal Codex originated in Paris at the meeting of the delegates to the Pharmaceutical Congress of 1866. Unforeseen circumstances had prevented the Paris Society from pursuing this question, but it ought, however, to be dealt with very shortly by the committee named for that purpose. The idea was entirely a French one, and it was important that it should be reclaimed and put into execution with as little delay as possible.

M. Planchon gave some explanations respecting the Pharmacopœia Europæa. In 1867, M. Phoebus had asked him to assist in compiling this pharmacopœia. He had thought such a work in which the articles prepared by each of the contributors would be revised by his colleagues belonging to other countries could not but be of great service to science; and, therefore, acting upon the advice of his friends he had accepted the proposition of M. Phoebus. But he did not think that the committee of the European Pharmacopœia could pretend to assume in any way a commission as the delegates of the various pharmaceutical societies to prepare a Universal Codex. The work in question was a private one performed by private individuals, which had no official character, and which, far from hindering the drawing up of a universal codex, would furnish for it some good materials.

M. Bussy said that a work compiled under the conditions indicated would not accomplish precisely the object proposed by the different pharmaceutical congresses, and particularly that of Paris in 1866, in promoting the publication of an international pharmacopœia. There were two ways which might be considered of carrying out the compilation of such a work. The first would be to unite all the official and general formulæ used in various countries; a work would be so produced analogous to the Pharmacopée Universelle of Jourdan. Such a work would, doubtless, be more complete, and more abreast of modern practice, but it would have no greater authority among pharmaceutists than any other work compiled by a single individual or association of pharmaceutists not specially commissioned for that purpose. The second plan, which seemed to him to be more in harmony with the wishes of the congress and the progress of medicine, would be to bring the composition of the most used and most active medicaments to a single type for each medicament, after discussion and examination of the various formulæ employed at the present time. Such a work would present fewer difficulties than is commonly supposed. All the pharmacopœias published during the past forty years have had a tendency to simplify the composition, and consequently to lessen the differences between the various medicaments contained in them. Another circumstance that would assist powerfully in the unification of the formulæ was the extended use at the present day of the alkaloids, or, more generally, the tendency which exists to substitute the active and well-defined principles of vegetables for the whole pharmaceutical prepreparations. A pharmacopœia drawn up under such conditions would be presented for acceptation to European and other States, and would become legal and obligatory within such limits as should be determined by those adopting it. The result would be that in all the States taking part in such a union all the compounds designated under the same name would have exactly the same composition, and a medical prescription dispensed at Paris or Berlin would be made up in exactly the same manner at London or St. Petersburg. But it must not be forgotten such a project presupposes an accord between competent and sufficiently authorized men, such as a body of delegates from the different countries of Europe would be.

M. Limousin did not think they could hope to obtain a Universal Pharmacopœia; there would be too many difficulties to overcome in securing its adoption by all the States of Europe.

M. Adrian having proposed that the number of members of the commission should be increased to nine, it was decided that M. Planchon should fill the place of M. Robinet so as to bring the number to five as originally decided, and the further increase was left to the consideration of the committee.

M. Grassi thought it would be useful now for the Society to put itself into communication with the English pharmaceutists upon the subject. This point also was remitted to the committee.

The society then elected officers for 1873 as follows:—M. Regnauld as vice-president, M. Vigier as secretary, M. Desnoix as treasurer.

CHEMICAL SOCIETY.

Thursday, 19th December, 1872, Professor Frankland, D.C.L., F.R.S., President, in the chair.

After the ordinary business of the society had been transacted several papers were read.

The first entitled "Notes on various Chemical Reactions," by Mr. Davies, contained observations on the formation of the sulphides of copper and barium, also some notes on the separation of cobalt and nickel.

Mr. H. Grimshaw communicated the results of his researches on ethyl-amyl and its derivatives.

After the President had made some remarks on the thoroughness with which this research had been carried out, a communication from Dr. Schorlemmer "On the Heptanes from Petroleum" was read. This paper contained among other matter an interesting account of the separation of isomeric heptylenes by means of hydrochloric acid.

A paper by Mr. T. Carnelley on the "Vanadates of Thallium" was then read. It contained descriptions of several new and complex vanadates of thallium.

Mr. Kingsett communicated to the society the results of his experiments on the conversion of sodium chloride into sodium sulphide by the action of hydrosulphuric acid; and finally Mr. P. Braham exhibited some ingenious arrangements which he had made for the prosecution of physical investigations under the microscope.

The meeting was then adjourned until Thursday, February 6th, when the following papers will be read:— "On Anthrapurpurin," by W. H. Perkin; "On the Solidification of Nitrous Oxide," by T. Wills, and on "Isomerism in the Terpene Family," by Dr. C. A. Wright.

PHILADELPHIA COLLEGE OF PHARMACY.

A meeting of this society was held December 17th, 1872; Professor Procter in the chair.

Professor Maisch read a paper on "Impurities in Ladies' Slipper-root," and exhibited preserved specimens of roots and flowering plants of *Cypripedium pubescens*, *C. parviflorum* and *C. acaule;* also commercial samples of pure cypripedium, and some admixed with hydrastis, senega and other dicotyledonous roots.

In answer to a question by Mr. Shinn, Professor Procter stated that there was considerable demand for cypripedium by eclectic physicians, who use it in such cases in which valerian is indicated.

Mr. Remington read a paper on "Ceresin," and exhibited a sample of simple cerate prepared from it. Nothing can be said as yet about its keeping qualities, the time being too short. It was remarked that cerate prepared from paraffin quickly spoils, while yellow wax and benzoinated lard preserve it for a long time.

Mr. Shinn remarked that emulsions of cod-liver oil containing phosphate of lime were being prescribed by physicians, and asked the experience of those present in making emulsions containing large quantities of fixed oils. He had samples from two makers, both of which separate and became rancid after some time; the quantity of lime salt in both is stated in ambiguous terms. The fair method would be to state the quantity of phosphate of lime, lactic acid and cod-liver oil in a certain measure.

Professor Procter had used a mixture of tragacanth and acacia in proportion of 1 to 6, and the product is rather thick.

Professor Maisch said one maker of this emulsion had lately obtained a patent, which, however, is probably of no value. As early as 1855 he prepared emulsions containing 50 per cent. of cod-liver oil, with alkalies and alkaline earths,* which may be sweetened and flavoured to taste. This is not a true emulsion, but a partial saponification.

Mr. Shinn had used lime water, 2 ounces to a pint, in conjunction with gum arabic; also sucrate of lime, by means of which a 75 per cent. emulsion can be prepared and mixed with syrup of phosphate of lime and lactic acid.

Mr. Remington remarked that he had seen a communication from an attorney threatening certain parties with prosecution for infringement of patent if they did not desist in the manufacture of this preparation; but apparently the threat would not be carried out.

Professor Maisch said a method is much needed whereby fixed oils can be emulsionized as readily as volatile oils, ether and chloroform are by the method of Mr. J. W. Forbes.*

Mr. Shinn had seen a patent churn in use as a labour-saving agent in making large quantities of emulsions.

Professor Maisch presented a well-made sample of benzoated oxide of zinc ointment, prepared by A. H. Bolton in a paint mill.

Mr. Boring exhibited cucumber ointment in good condition, made in 1868, by the method as modified from the French formula by Professor Procter,† who, having tried various methods, stated that with this one success depends upon time and patience properly expended upon it.

Professor Markoe, of Boston, who was present, at the suggestion of Mr. Shinn, addressed the meeting and spoke about his recent visit to England, describing several of what may be termed representative pharmaceutical establishments of Great Britain which he visited in Liverpool, Harrogate, Leeds, Newcastle, Edinburgh, London, etc. The proprietors, he said, rarely reside in the same building in which the business is carried on, but if the number of employés is sufficiently large a housekeeper is usually employed, the clerks residing and taking their meals on the premises. The current literature, especially scientific, and a well-selected library is not unfrequently met with, the clerks having access to it in the evening. In some stores apprentices are never employed, only qualified assistants, those acting as dispensers having their separate counters, each with complete apparatus and appurtenances, as for instance in Mr. Abraham's store, in Liverpool, where there are four dispensing counters. The precautions against mistakes with poisons, adopted by several British pharmacists, were mentioned, and a description was given of the alkali works at Newcastle-on-Tyne. The speaker then spoke about the Brighton Meeting of the British Pharmaceutical Conference, at which he was present, and said that the attendance was not as large as that at the meetings of the American Pharmaceutical Association, if the membership and the short distances which the British pharmacists have to travel is taken into consideration. Percolation, which is well understood and so indispensable in the United States, is little known and practised in England. The speaker's impression is that the British pharmacists, as a class, at least in the larger cities, are chemists and men of education, but that galenical pharmacy is better understood in America.

Parliamentary and Law Proceedings.

Sheriff Court of Lanarkshire, Glasgow.

Friday, 10*th January*, 1873.

(Before Mr. Sheriff Substitute Murray.)

THE PHARMACEUTICAL SOCIETY *v.* WILSON.

This was a complaint, under the Summary Procedure Act, 1864, at the instance of the Pharmaceutical Society of Great Britain, incorporated by Royal Charter, and Elias Bremridge, residing at 17, Bloomsbury Square, London, their Registrar, by authority of the Council of the said Society, Complainers, and Burns, Alison and Aiken, Writers, Glasgow, their Mandatories, against William L. Wilson, tenant of and carrying on business

* See 'American Journal of Pharmacy,' 1856, p. 1.

* See Pharm. Journ. [3] vol. ii. p. 747.

† See 'American Journal of Pharmacy,' 1853, 409.

as a retailer of drugs in the premises known as the Garscube Old Apothecaries' Hall, 142, Garscube Road, Glasgow. The complaint set forth that the respondent had contravened the Pharmacy Act, 1868, and particularly Section 15 thereof, in so far as, not being a duly registered Pharmaceutical Chemist or Chemist and Druggist under the said Act, he did, in the month of November last, keep open shop for the retailing, dispensing, or compounding poisons within the meaning of the said Act; and make two sales, which were specified, the one of laudanum and the other of oxalic acid, whereby he incurred a penalty of £5 for each of these contraventions. The penalties incurred were restricted in the complaint to a sum of £5 with expenses.

At the first diet of compearance Mr. Lucas appeared for the respondent, and stated, as preliminary objections, (1) that the complainers had not set forth any sufficient title to sue; and (2) that the Act of 1868 did not apply to Scotland.

Mr. Gill, who appeared for the complainers, referred the Sheriff to the 15th Section of the Act, which provides that the penalties thereby imposed may be sued for in the manner provided by the Pharmacy Act of 1852, and he read Section 12 of that Act, which lays the duty of recovering penalties on the Pharmaceutical Society, and provides for the mode to be followed in Scotland for the recovery of penalties, and he maintained that the complaint was entirely in conformity with the provisions of the Act. The Sheriff held that the Act undoubtedly applied to Scotland, and that the complaint was in proper form, and he accordingly repelled the objections. The respondent was then called upon to plead, when he recorded a plea of "not guilty," and the diet was adjourned to this date for the purpose of leading proof.

To-day, as at the former diet, the Society was represented by Mr. Gill, and the respondent by Mr. Lucas. The respondent having stated that he adhered to his former plea of not guilty, the following proof was adduced:—

William Logan, house-factor, Glasgow, gave evidence to the effect that the respondent had been tenant of the shop, No. 142, Garscube Road, since Whitsunday, 1870. It was the duty of the witness, as factor for the property, to fill up the returns required by the assessor for the valuation roll, and in the return for the current year he had inserted the respondent's name as tenant. Dr. Lawrie was the tenant of the shop prior to Whitsunday, 1870, and some time previous to that term he stated to witness that he had transferred the business to the respondent, and requested the witness to enter in his books the name of the respondent as tenant, and witness did so, on the condition that Dr. Lawrie should remain bound for payment of the rent, as the respondent's surety, which was agreed to by Dr. Lawrie. The witness understood that Dr. Lawrie was in the practice of attending daily at the shop for the purpose of meeting with patients. He could not say whether the name of any person was exhibited in the shop or over the door. There was on the signboard "Old Apothecaries' Hall."

Peter Scott said that on 12th November last he entered the shop, No. 142, Garscube Road, and asked for oxalic acid. He received and paid for a packet which he had sealed on the same day, and had retained in his possession ever since. He handed it to the judge. The label on the packet bore the name of the respondent as the seller.

James Angus said that on the 12th of November last he entered the respondent's shop and asked for twopence worth of laudanum. He received and paid for a bottle with its contents, which he now produced. He had sealed the bottle, and it had not been out of his possession since. The label on the bottle bore the name of the respondent as the seller.

Mr. Lucas admitted that the articles sold to the two preceding witnesses were truly oxalic acid and laudanum, which were poisons within the meaning of the Act, and that the respondent's name did not appear in the Register of pharmaceutical chemists and chemists and druggists. This concluded the complainers' proof, and the following evidence was led for the respondent:—

William L. Wilson, the respondent, stated that he had been in business as a chemist and druggist for more than eight years. Previous to the passing of the Pharmacy Act of 1868, he was as much in business as in November last. Some years ago he had entered into an agreement with Dr. Lawrie, whereby he was to receive a share of the profits of the business carried on at 142, Garscube Road. Dr. Lawrie was the former tenant of the shop. All goods purchased for the shop were bought and invoiced in Dr. Lawrie's name, and he produced a number of invoices, all of which were made out in the name of Dr. Lawrie.

In cross-examination the witness admitted that he had been tenant of the shop since 1870, and that one year he had put his name in the Glasgow Post Office Directory as chemist and druggist at the shop in question. The labels used in the shop all bore his name. The only name above the door was "Garscube Old Apothecaries' Hall." The arrangement with Dr. Lawrie was that Dr. Lawrie should get the whole profits derived from the sale of poisons, and that witness should have a share of the profits on prescriptions and the whole profits on perfumery. The arrangement was verbal; it was not in writing. Dr. Lawrie was in use to call at the shop twice a day, when he prepared prescriptions and sold articles if witness was busy.

Dr. James Lawrie, 191, St. George's Road, stated that he was a qualified medical practitioner and had been thirteen years in practice. For eight years he had been tenant of the Old Drug Hall in Garscube Road. In the year 1870 witness wished to give up the sale of drugs, and arranged with respondent that he should become a partner with him, taking the sale of the general drugs and chemicals, while witness should take all responsibility in point of law. There was no written agreement. Witness got the whole profits derived from the poisons sold in the shop and a share of profits on prescriptions. The respondent received the whole profits on the sale of other drugs and perfumery, which formed the main part of the business. Witness regarded himself as the seller of all poisons sold in the shop, and held himself responsible under the Pharmacy Act.

In cross-examination witness stated that he had asked the factor of the premises to accept the respondent as his tenant, and that the respondent's name was on the labels used in the shop. He repeated the terms of his arrangement with the respondent, and said that in making that arrangement he had in view the requirements of the Pharmacy Act. He recommended such patients as he visited and prescribed for at their own homes to take their prescriptions to the respondent's shop; and he said it was not uncommon for medical men to get a percentage of the profit on their prescriptions.

This concluded the proof.

Mr. Gill, in addressing the Sheriff, pointed out that the sales of articles in question had been proved, and that these articles were admitted to be poisons. It had also been proved that the respondent was tenant of the shop, and was not on the Register, and, therefore, could not sell poisons without contravening the Act of Parliament. That the respondent and not Dr. Lawrie was the seller of the poisons libelled was proved by the fact that the labels bore the name of the respondent as the seller. That the arrangement said to have been made between Dr. Lawrie and the respondent was only an attempt to evade the provisions of the Act, as there could be no doubt that the shop belonged to the respondent, and was kept open by him for the sale of poisons.

Mr. Lucas, on behalf of the respondent, maintained that his client was entitled to a judgment of absolvitor on the grounds (1) that under the Act persons who had been in business as chemists and druggists before it became law did not require to be registered, and he founded on the 3rd Section of the Act as providing that such persons were chemists and druggists within the meaning of the Act; and (2) that Dr. Lawrie was the seller of the poisons, the respondent being only his partner or assistant in business.

Mr. Gill read Sections 1, 5 and 15 of the Act to show that registration was necessary as a qualification to sell poisons.

The Sheriff held that registration under the Act was a requisite even in the case of a person who had been in business as chemist and druggist before it came into operation, the only advantage which such a person had, being that he was entitled to have his name placed on the Register on application, as provided in the 5th section of the Act. He found that the respondent had been proved to be the seller, and referred to his name appearing on the labels affixed to the articles sold as establishing that fact conclusively, and he accordingly convicted him of the contravention charged, and adjudged him to pay the penalty sued for, with expenses.

A Wrong Medicine Supplied at a Dispensary.

On Thursday, Jan. 16, Mr. Coroner Browne held an inquest at Nottingham on the body of a child named Elizabeth Ann Brown, aged eight years. It appeared from the evidence that the child had been for some weeks attended as an out-door patient by Mr. Richard Johnston, one of the surgeons at the Dispensary. On Sunday, the 22nd ult., the father went to the Dispensary for some medicine, when he received by mistake some opium and bismuth from Mr. Johnston, who mistook the child's father for another person, and gave him a liquid containing the above ingredients, which were intended for another patient. Mr. Johnston did not discover the mistake until after the medicine had been administered, when he at once sent on a request to have the medicine returned. The child, which had by this time taken two tablespoonfuls of the medicine, according to the directions given on the bottle, was brought to the Dispensary the same night, where an emetic was prescribed in addition to the application of the stomach pump. It had complained of not being well in about three quarters of an hour after the medicine had been administered. On the following Monday the child was somewhat recovered, but it thereafter became gradually worse up till its death last Sunday morning. Mr. Johnston had continued his attendance for rather more than a week after the mistake, but ceased to visit it on learning that Mr. Thompson, another surgeon, had been called in. On Monday, Jan. 13, the mother of the deceased had gone to the Dispensary, and there charged Mr. Johnston with having murdered her child, and requested him to give her some pecuniary consideration. Mr. Johnston, however, declined to do anything in the matter beyond providing medicine and attendance. Mrs. Brown thereafter went before the committee of the Dispensary, and stated her case to them. The committee gave her 10*s*., and asked her to come back next Monday, accompanying the request with an expression of sorrow that the mistake should have occurred. They had also remarked that it was a matter which ought to be looked into. The bottle had contained two and a half drachms of a liquid preparation of opium, and the quantity partaken of by the child had contained from twenty-five to twenty-eight drops.

In reply to a question it was stated that the names of patients were not put on the bottles issued from the Dispensary, but merely the directions.

Mr. Thompson, surgeon, said he had made a *post-mortem* examination on the body of the deceased, and expressed himself of opinion that the mistaken application of the medicine had had nothing to do with the child's death. There was nothing which he could at all connect with that beyond a slight inflammation of a part of the stomach. In his opinion death had been caused by inflammation of the membranes of the brain.

The Coroner in summing up said it was quite plain that there had been a mistake on the part of Mr. Johnston, but they had heard Mr. Thompson's evidence to the effect that death had resulted from the inflammation of the membranes covering the brain. They would have no difficulty, therefore, in arriving at a verdict. He could not let the case pass, however, without strongly expressing his opinions with regard to all the parties concerned. The mother had charged Mr. Johnston with murdering her child, and yet she was willing to receive money to hush the matter up. Then the conduct of the gentlemen of the Dispensary committee in giving the woman 10*s*. and sending her away without instituting further investigation at once, was disgraceful. For their own sakes, and for the sake of the institution, it was clearly their duty to have instituted a most rigid inquiry into the matter. Had it not been by a mere chance the child would have been buried on the previous day without his (the Coroner's) knowledge, and without the present inquiry, which he thought was a duty that plainly required to be done in the circumstances. A verdict of "Death from inflammation of the membranes covering the brain" was accordingly returned by the jury, and both the mother of the child and Mr. Johnston were reprimanded for the part they had taken.—*Nottingham Daily Journal.*

Obituary.

FRANCIS FLETCHER.

It is with deep regret we note the death of Mr. Francis Fletcher, who died at Cheltenham on the 6th of January, instant, in his sixty-first year.

His name is enrolled on the records of the Pharmaceutical Society from the year 1842 down to 1867, when, from continued pain and suffering, he relinquished business and thus severed his connection with the Society; but continued until his death a subscriber to the Benevolent Fund.

His career in Cheltenham dates from 1841, when he succeeded to the business previously started by Messrs. Knight and Wakeman, and in conjunction with his surviving partner he successfully carried on this business for a period of twenty-six years, under the title of "Fletcher and Palmer."

Francis Fletcher, though of a quiet and unobtrusive manner, was in his day and generation superior to most men of his class. With a cultivated mind, a genial manner, and an easy disposition, he has passed from this world, leaving an unsullied reputation and a large circle of loving and sorrowing friends.

Notice has also been received of the death of the following:—

On the 31st December, 1872, Mr. Henry Wake Allen, Chemist and Druggist, of King's Lynn, Norfolk.

Review.

The Pharmacopœia of the United States of America. Fifth decennial revision. By the authority of the National Convention for Revising the Pharmacopœia, held at Washington, A.D. 1870. Philadelphia: J. B. Lippincott and Co. 1873.*

The fifth of the decennial editions of the United States Pharmacopœia is now being published in Philadelphia. It is a handsome foolscap octavo of 383 pages, beautifully printed in sharp clear type on faintly-toned paper. In general style it is superior to the British

* The writer is indebted to the unexpected kindness of Dr. Carson, President of the National Convention, for an early complimentary copy.

Pharmacopœia of 1867, as that was to the fourth American Pharmacopœia.

As our readers already know, the task of producing a pharmacopœia in the United States is committed to delegates appointed by the incorporated colleges of pharmacy as well as medicine. In the present case eighteen medical colleges, associations or universities each sent one, two or three delegates, while eight colleges of pharmacy contributed representatives, as seen in the following list:—From the Maryland College of Pharmacy, Messrs. Thompson, Faris Moore and Dohme; from the St. Louis College of Pharmacy, Drs. Potter and Pruin, and Mr. Massott; from the Chicago College of Pharmacy, Messrs. Ebert, Biroth and Diehl; from the Massachusetts College of Pharmacy, Messrs. Markoe and Colcord; from the New York College of Pharmacy, Messrs. Hegeman, Neergaard and Bedford, Drs. Squibb and Manlius Smith representing the medical interests; from the Philadelphia College of Pharmacy, Messrs. William Proctor, jun., J. M. Maisch and A. B. Taylor, Drs. G. B. Wood, Bridges, and Horatio C. Wood being medical delegates; from the College of Pharmacy of Baldwin University, Drs. Clarke and Murray; and from the Pharmaceutical College of Harvard University, Drs. Loomis and Purves. The Convention first met in May, 1870, under the Presidency of Dr. Joseph Carson; manuscript contributions in furtherance of revision were presented from four pharmaceutical and two medical colleges, the plan of revision discussed, and a Committee of Revision appointed, consisting of fifteen gentlemen, including such well-known names in pharmacy as Alfred B. Taylor, John M. Maisch, Robert Bridges, Manlius Smith, Albert E. Ebert, J. Faris Moore, and G. F. H. Markoe. In June, 1870, the Committee commenced its labours, and, we are assured in the preface, continuously worked until the recent completion of the volume. Besides attending the meetings, individual members of the Committee seem to have given much time to personal experiment and research, and a recommendation is appended that reports contributed by pharmaceutical and medical bodies to the Convention should in future be made full and explicit in details, and to the Committee be left the task of verifying and testing rather than that of original investigation. Some such course is, no doubt, desirable, for although the expenses of the Committee are paid from the income of the copyright, much delay must occur when the necessary experimental work has to be done after instead of before the meeting of the Convention. Would not a permanent paid small sub-committee best do such work during the intervals of issue of the pharmacopœia?

Among the resolutions adopted by the Convention for the guidance of the Revising Committee was one of quite a new character, and such as is likely to influence considerably the character of future pharmacopœias: "*Resolved*, that if, in the judgment of the Committee of Revision, it should become necessary before the meeting of the Convention of 1880 to revise its labours, it is hereby authorized to publish a new edition." This course has, obviously, advantages and disadvantages. Hitherto the medical men and pharmacists of America have associated a new pharmacopœia with a new decade. Having accomplished the not always pleasant, but inevitable, task of mastering the novelties and changes of a new pharmacopœia, their minds have been at rest in respect of such matters for at least ten years, but under the present arrangement, omissions, additions or alterations of more or less importance are liable to be made at any time, resulting in the possible production of undesirable variations in the practice of medicine and pharmacy. On the other hand, it is advantageous that additions to the materia medica of a country should receive official recognition as soon as they have become generally accepted, and that in other ways a pharmacopœia should follow not closely, but not too remotely, in the path of pharmaceutical progress.

Another capital resolution of the Convention was to the effect that, in the revision of the official list and formulæ, the wants of the medical profession in all parts of the United States should be considered in reference to local peculiarities in climate and population, and that for these reasons the scope of the work should be extended rather than abridged. Accordingly, twenty-seven articles have been added to the materia medica, while only five have been omitted. Again, eighty-two new preparations have been included, and only seven dismissed. The action of the Committee in this matter foreshadows difficulties that would attend the production of a true Universal Pharmacopœia—one that should meet the requirements of medical practitioners in all countries. "Local peculiarities in climate and population" would probably prevent the exclusion of more than a very few official articles, or the alteration in strength of compounds to any useful extent. Hence the volume would become little more than a mere reprint of pharmacopœias of all ages of their brief existence, and would probably not be worth translation from the Latin or other original into the vernacular.

Among the additions to the materia medica are carbolic acid, nitrate of ammonium, hypophosphites of calcium, of iron, of potassium and of sodium, Indian hemp, oxalate of cerium, chloral, iodoform and Calabar bean. Also "*Cinchona.* The bark of all species of the genus Cinchona, containing at least two per cent. of the proper cinchona alkaloids, which yield crystallizable salts:" this is in addition to *Cinchona flava*, *Cinchona pallida*, and *Cinchona rubra.* The five articles dismissed are neatsfoot oil, star grass, angelica, Indian turnip and cotton-root. The new preparations include the benzoate, bromide, and iodide of ammonium, digitalin, citrate of iron and strychnia, oxalate of iron; cantharides paper and mustard paper (*chartæ*); glycerites (*glycerita*) of carbolic acid, gallic acid, tannic acid, tar, and borax; various suppositories and juices; and twenty-two new fluid extracts, in the manufacture of the majority of which glycerine is employed as well as alcohol, and the latter thus economized.

Respecting weights and measures, the Convention resolved that measures of capacity be abandoned in the Pharmacopœia, and that quantities be expressed both in weights and in parts by weight. The Committee, however, objected that the execution of such directions entailed the use of a metrical system not employed in the United States or England, and that therefore, especially as the plan was not anticipated in the revisions handed to the Committee, such an expenditure of time, labour and cost would be involved in applying the system to the whole ground covered by the Pharmacopœia as to render the plan impracticable.

Both measures and weights are therefore retained. The measures are derived, as heretofore, from the *wine* gallon of eight pints, each pint containing sixteen fluid ounces, each fluid ounce eight fluid drachms, or nearly 456 grains, and each fluid drachm sixty minims.

The weights are derived from the troy pound of twelve ounces, each ounce containing eight drachms, each drachm three scruples, each scruple twenty grains. It is greatly to be regretted that the unity of character of the Pharmacopœias of the United States and Great Britain, elsewhere strongly apparent in this elegant addition to the pharmaceutical literature of these two English-speaking countries, could not be extended in some way by mutual concessions to the weights and measures. When will these great peoples face the difficulties of application and accept the enormous advantages of the metric decimal system? At present the relation of weights to measures and of these to coins and numbers are, if possible, more complicated in America than in this country. Thus the pound contains 5760 grains or 6067 minims; the ounce weight is equal to 1·053 fluid ounces or 505 minims, or 480 grains. (Mercifully the grain, and only the grain, is the same weight on either side of the Atlantic, thus rendering comparisons not absolutely hopeless.) The drachm weight is heavier than the fluid drachm, for it contains 63·2 minims; the scruple of 20 grains weight contains 21 minims, and one grain has the volume of 1·0533 minims. On the other hand, the gallon of eight wine pints weighs a trifle over ten troy pounds, or 58,329 grains; the pint is rather more than one troy pound and a quarter or 7291 grains; the fluid ounce is nearly ·95 of an ounce weight, or 455·6944 grain; the fluid drachm weighs not quite 57 grains; the weight-equivalent of 1 minim being 0·9493 grain. "It is highly important that persons engaged in preparing medicines should be provided with troy weights. But those who are not so provided can make their avoirdupois weights available as substitutes for troy weights, by bearing in mind that 42·5 grains, added to the avoirdupois ounce, will make it equal to the troy ounce; and that 1240 grains, deducted from the avoirdupois pound, will reduce it to the troy pound."

Following, indeed heading, the lead of the British Pharmacopœia the weights and measures of the metric decimal system are set forth in appended tables, their relation to the weights of the U. S. Pharmacopœia and the relation of the latter to the former being very fully given. Also the relation of measures of the U. S. Pharmacopœia to cubic measure.

The galenical nomenclature of this fifth edition of the Pharmacopœia has scarcely been altered. The term *alcoholicum* has been dismissed in all cases where there is but a single extract of a medicinal substance, and this is specified by the term *extractum*, as "*extractum nucis vomicæ*" instead of "*extractum nucis vomicæ alcoholicum.*"

The chemical nomenclature has been altered considerably "to place the work in accord with the progress of chemical science." The particular variety of modern nomenclature adopted is that which, five years ago, was strongly advocated for use in pharmacy, by the writer of this notice, in a paper which had the support of all the leading chemical, medical, and pharmaceutical authorities in this country. He may, perhaps, be pardoned for regarding with much satisfaction the very practical support his advocacy has now received at the hands of the compilers of the important Pharmacopœia under review. It is unnecessary to recapitulate the many advantages of the system, its simplicity, or the ease with which it may be understood and employed; but inasmuch, to use the words of the preface of the new U. S. P., "the modifications thus made will probably soon be the language of pharmacy," it may be desirable to give a list of the old and new names now first officially sanctioned.

OLD NAMES.	OLD NAMES.	NEW NAMES.	NEW NAMES.
Latin.	*English.*	*Latin.*	*English.*
Ammoniæ carbonas	Carbonate of ammonia.	Ammonii carbonas	Carbonate of ammonium.
Ammoniæ murias	Muriate of ammonia.	Ammonii chloridum	Chloride of ammonium.
Ammoniæ sulphas	Sulphate of ammonia.	Ammonii sulphas	Sulphate of ammonium.
Ammoniæ valerianas	Valerianate of ammonia.	Ammonii valerianas	Valerianate of ammonium.
Barytæ carbonas	Carbonate of baryta.	Barii carbonas	Carbonate of barium.
Calcis carbonas ppt.	Ppt. carbonate of lime.	Calcii carbonas ppt.	Ppt. carbonate of calcium.
Calcis phosphas ppt.	Ppt. phosphate of lime.	Calcii phosphas ppt.	Ppt. phosphate of calcium.
Ferri et ammoniæ citras	Citrate of iron and ammonia.	Ferri et ammonii citras	Citrate of iron and ammonium.
Ferri et ammoniæ sulphas	Sulphate of iron and ammonia.	Ferri et ammonii sulphas	Sulphate of iron and ammonium.
Ferri et ammoniæ tartras	Tartrate of iron and ammonia.	Ferri et ammonii tartras	Tartrate of iron and ammonium.
Ferri et potassæ tartras	Tartrate of iron and potassa.	Ferri et potassii tartras	Tartrate of iron and potassium.
Liquor ammoniæ acetatis	Solution of acetate of ammonia.	Liquor ammonii acetatis	Solution of acetate of ammonium.
Liquor magnesiæ citratis	Solution of citrate of magnesia.	Liquor magnesii citratis	Solution of citrate of magnesium.
Liquor potassæ arsenitis	Solution of arsenite of potassa.	Liquor potassii arsenitis	Solution of arsenite of potassium.
Lithiæ carbonas	Carbonate of lithia.	Lithii carbonas	Carbonate of lithium.
Magnesiæ carbonas	Carbonate of magnesia.	Magnesii carbonas	Carbonate of magnesium.
Magnesiæ sulphas	Sulphate of magnesia.	Magnesii sulphas	Sulphate of magnesium.
Potassæ acetas	Acetate of potassa.	Potassii acetas	Acetate of potassium.
Potassæ bicarbonas	Bicarbonate of potassa.	Potassii bicarbonas	Bicarbonate of potassium.
Potassæ bichromas	Bichromate of potassa.	Potassii bichromas	Bichromate of potassium.
Potassæ bitartras	Bitartrate of potassa.	Potassii bitartras	Bitartrate of potassium.
Potassæ carbonas	Carbonate of potassa.	Potassii carbonas	Carbonate of potassium.
Potassæ chloras	Chlorate of potassa.	Potassii chloras	Chlorate of potassium.
Potassæ citras	Citrate of potassa.	Potassii citras	Citrate of potassium.
Potassæ et sodæ tartras	Tartrate of potassa and soda.	Potassii et sodii tartras	Tartrate of potassium and sodium.
Potassæ nitras	Nitrate of potassa.	Potassii nitras	Nitrate of potassium.
Potassæ permanganas	Permanganate of potassa	Potassii permanganas	Permanganate of potassium.
Potassæ sulphas	Sulphate of potassa.	Potassii sulphas	Sulphate of potassium.
Potassæ tartras	Tartrate of potassa.	Potassii tartras	Tartrate of potassium.
Sodæ acetas	Acetate of soda.	Sodii acetas	Acetate of sodium.
Sodæ bicarbonas	Bicarbonate of soda.	Sodii bicarbonas	Bicarbonate of sodium.
Sodæ boras	Borate of soda.	Sodii boras	Borate of sodium.
Sodæ carbonas	Carbonate of soda	Sodii carbonas	Carbonate of sodium.
Sodæ phosphas	Phosphate of soda	Sodii phosphas	Phosphate of sodium.
Sodæ sulphas	Sulphate of soda.	Sodii sulphas	Sulphate of sodium.
Sodæ sulphis	Sulphite of soda.	Sodii sulphis	Sulphite of sodium.

Correspondence.

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

Vermin Killers.

Sir,—It has been my intention for some time to write a few words in reference to the sale of poisons, especially vermin killers, but I have deferred in hopes that some abler person would take the subject in hand. To every chemist throughout the kingdom it is a subject of the highest consideration. That it is not thoroughly understood is, I think, evident from the cases that are constantly appearing in the Journal. The question, then, naturally arises, "Who is to blame that it is not better understood?" With all due deference to the Pharmaceutical Society, I think a little more might be done by them to render the law rather more intelligible than it is at present.

I will take my own case as a sample. In August of last year I sold a woman two packets of Battle's Vermin Killer labelled with my name and address and the word "Poison." She took one herself and gave the other to her child. The child died, but she recovered, and was committed for wilful murder. Of course, I had to attend the inquest (two days), and the Assizes (three days), and employed a solicitor to show that I had done what I deemed necessary. To the best of my knowledge I had done everything that the 17th Section of the Pharmacy Act, 1868, required of me. I took a list of the poisons to the inquest to point out that the last name on the list in part II. was "Vermin killers, and all poisons sold for the destruction of vermin." But I was told by the coroner that it contained strychnine, and, doing so, I should have had a witness to the sale. I came away with the idea that I was in the right, and, at some little trouble to myself, inquired of a many chemists, and found that they were all of the same opinion. Imagine my astonishment when the case appeared in the Journal, with a note appended (August 3rd, 1872), stating that I was in the wrong, and that a list appeared in the *London Gazette*, December 21st, 1869, of articles that ought to be deemed poisons, in the first part of schedule A to the said Pharmacy Act, 1868, which list contained, among other articles, "Vermin Killers, etc." Now, I simply ask, "Would it not have been better to have sent a notice to the trade, instead of publishing it in the *London Gazette*?" for what percentage of chemists would see it in such a paper? but had a notice been sent to the trade, much trouble and uncertainty might have been saved. In your leading article on Saturday last you say, "that it was recently resolved that a copy of the revised regulations should be issued to every chemist and druggist, and that it appears to be one of those copies which the defendant had received that morning?" May I ask how it is that I have not received any such notice? You also say how desirable it is that chemists should comply with the conditions prescribed for regulating the sale of poisons in the Pharmacy Act, 1868. But I contend that, if we are kept in ignorance of alterations, we certainly are not blameable; for how can we comply with the law if we do not know what the law is? and who are more likely to tell us than the Pharmaceutical Society, who have the framing of them? I consider it an injustice to us all that it is not made known when any alterations take place in those Acts which so materially affect us. Had notice been sent out earlier, in all probability Messrs. Gillett and Moses would have been on the safe side, and registered the articles. There cannot be two opinions upon the point that the greatest confusion exists upon the question, which is a disgrace to those who have to administer the law, and an injustice to those who fall under its lash. Why, then, cannot we have something decisive done in the matter? Month after month passes away, case after case appears, the Journal has teemed with letters, but still there remains an uncertainty as to what is right to do in the matter. Something appears to have been done as far as the two cases are concerned mentioned last week, for the defendants say they had received notice that morning, but it has not extended as far as Leeds I think, for I have not heard of any one receiving such circular, and certainly I have not received one. In a letter, about twelve months ago, I proposed that a copy of the amended regulations and conditions be forwarded to every chemist in the kingdom, and the Society, at the same time, said that they had suggested it a few months before; but I think now that it really should be done, not only to chemists, but to every coroner and magistrate in the kingdom. If any abler person would propose some plan whereby to throw a light on the matter, I am sure he would receive the thanks of the greater part of the chemists throughout the country. If the law was better understood I feel convinced it would be better carried out, for, in the case of vermin killers, there can be no inducement to break it, and in the majority of cases it is broken in ignorance.

John Wm. Longley.

Leeds.

Lancet Amenities.

Sir,—I think it is quite time that not only protestation against such statements as have lately appeared in sundry journals should be made, but also a correct representation of the actual condition of the pharmacist compared with that of the medical profession, a representative journal of the latter having deemed it policy, sound or otherwise, to take up the hue and cry, originating from a source of lamentable ignorance. However, it must not be assumed, from the fact of a certain member of the medical profession having made an assault on pharmacists, and been ungallant enough to attack the ladies, and having ignominiously incited the public "to put down the pretensions of this class," that such conduct is endorsed by the medical profession generally.

It is an old adage that chemists make enormous profits, and that their chief article of commerce is the indispensable (though dispensed with every day) aqua pura, but, as your correspondent T. C. avers, such a state of affairs is not rampant in the present day; and if it were, it would not be unfair, considering the qualifications demanded by the public and enforced by law, and the expenses to be incurred in their attainment before a person can enter the business. But I am quite prepared to refute the statements made respecting the voluptuousness of the pharmacist, and I may safely state that where one man can afford a sealskin jacket for his wife, ninety-nine scarcely know how to get their bread and cheese. The following style of prescribing is too fashionable to admit of any very large margin for profit, and the patients having got their advice cheap, think when they have to pay more for their medicine that there is something wrong:—

℞. Tinct. Cinchonæ Co.
Sp. Ammoniæ Aromat. a a ℥j.
Potassii Iodidi ʒj.
Sig. coch. min. j. bis in die ex aquâ.

This is a very fair specimen, and hundreds of a more expensive nature and less profitable could be exhibited. The public also have acquired a habit of inquiring the cost of dispensing a certain prescription at various shops, and when they find a man—perhaps one of those surgeons with an open retail—who will do it exceedingly cheap, or possibly one who is glad to take the bare cost of the drugs in return for the sake of a customer, they are satisfied with their bargain; but, at the same time, think the man a swindler who demanded a reasonable profit for skilled labour and guaranteed drugs, and vow never to go near his shop again.

With regard to enormous profits, what does the note paper, ink, etc., used by the physician to write his prescription cost? or what does the actual operation of the surgeon cost? literally nothing; then what is it they charge so excessively for? They have no capital which they are obliged to invest in stock and to keep renewed to supply the wants of the public, nor does it cost them more when they are called out than it does when the patients go to them, and yet they charge more, if it is only across the way. If this question can be answered satisfactorily, our case is stronger, for besides incurring the previous outlay for qualification, we have to find capital afterwards, to invest in and keep the business floating.

One of the "Hornets" from the Nest Attacked.

Prices: A Problem for the 'Globe.'

Sir,—Having occasion to doubt the value, as charged, of two picture frames sent to me from a distance, I was reduced to the unpleasant alternative, much against my inclination, of inquiring the price of similar frames at various establishments from St. Paul's Churchyard to the Marble Arch. The following is the result, stating the localities near which the inquiries were made:—

Fleet Street	30s. each frame.
Drury Lane	32s. „
Temple Bar	36s. „
Charing Cross	42s. „
Holborn	50s. „
Pall Mall	55s. „
Oxford Street West	62s. „

Will the *Globe* solve the problem, and enlighten me as to the real value of my frames? If this range of prices is common to other trades, I ask, shall not the charm and logic of variety be conceded to ours?

W. W.

London, January 22nd, 1873.

Co-operative Stores.

Sir,—The letter in the Journal of 4th inst. from Messrs. Sanger and Son, shows how we as a body neglect one of the most powerful means of checking the Co-operative Stores. We do not as we ought resolutely refuse to do business with these houses supplying them (directly or indirectly.)

Of course if they prefer the support of the Stores to that of the trade, let them have it by all means; but let it be thoroughly understood that as a matter of policy we decline to have any business transactions with such firms, and let us make it our business to find out who they are, and close our accounts with them without delay. If the wholesale houses and manufacturers were on the alert, they could in almost every case discover if their goods were being bought for the Stores; but the fact is they don't want to, and will not so long as the retailers show such indifference.

It is well known that many of them sell to the managers of the different Stores in their own private names, and thus think to escape the charge of supplying the Stores. Let all those who wish for the welfare of the trade, act as Messrs. Sanger and Son have done, and they will be doing us a good turn.

E.

Milk Testing.

Sir,—On referring to Pereira's 'Materia Medica' and Fownes's 'Chemistry,' as quoted by Mr. Ekin, I find it stated that cows' milk when recently drawn from the cow is slightly alkaline; Mr. Ekin also says that if I examine milk directly it is drawn from the cow, I shall find that he is correct.

In opposition to Mr. Ekin and the above authorities I beg to subjoin the following facts:—

On Wednesday, January 15th, I went to a dairy in this town and tested the milk from six cows, in every case I obtained an acid reaction; from four cows the milk was drawn direct from the cow on to the test-paper, with the other two I dipped the paper into the milk contained in a tin pail.

On Thursday, January 16th, at another dairy in Boston, I took the reaction of the milk of six cows (one an Alderney); again, in every case, I obtained an acid reaction.

Mr. Ekin also states that chalk is really never met with in milk: I do not suppose that either Mr. Ekin or I shall find milk in our districts adulterated with chalk, but the case may be very different in London. I should like to know Mr. Ekin's authority for saying that "it really *never* is met with in milk."*

With regard to Vogel's lactoscope, I think Mr. Ekin is mistaken as to the use of it; in his letter he says, "I think no one would venture to rely upon the lactoscope alone to give a decided opinion in a court of law as to whether milk is adulterated or not." Vogel's lactoscope is not to detect adulteration, but to estimate the amount of fat in milk.

The system of estimating the percentage of water in milk by specific gravity is certainly open to many objections, the variable amount of cream and fat, still for want of a better method may be of use.

Chas. H. Southwell.

Boston, January 16th, 1873.

* The authority for this statement is Mr. Wanklyn, who has sought for chalk in hundreds of cases, and proved its entire absence in every one of those instances. Official investigation in the United States has also led to a like result. We think that recourse should be had to the taking of milk residues, and that the lactometer should be abandoned.—Ed. Pharm. Journ.

Erratum.—By a printer's error the name of the sculptor of the Priestley memorial was last week given as "Williams" instead of "Williamson."

Messrs. A. Payne, G. W. Thomas, J. Winn.—The advertisements and post-office orders have been handed over to the publisher. They should have been sent to Messrs. J. and A. Churchill, New Burlington Street. See the Notice to Advertisers, published every week on the second page of the advertising sheet.

Renovator.—We do not imagine that filtration through animal charcoal would injure the properties of either of the compounds mentioned, unless perhaps it removed some of the alkaloids.

J. W. B.—Recipes for making Cherry Tooth Paste will be found in the first volume of the present series of the Pharmaceutical Journal, pp. 557 and 577.

"Ph. C."—We do not know of the existence of any proprietary right in the name mentioned.

"Perseverando Vinces."—(1) Candidates who fail to pass either of the examinations cannot present themselves again for three months. (2) Yes.

"Inquisitive."—(1) The questions are put *vivâ voce*, and a knowledge of what they are can only be obtained by presenting yourself for examination. (2) The prescriptions in the book mentioned are only intended as examples. (3) Apply to the Secretary, 17, Bloomsbury Square.

"One who will Suffer."—Your letter appears to have been written under some misapprehension. The suggested increase in the Minor examination fee would not necessarily affect the assistant commencing at "£30 a year," since that examination is at present only compulsory before commencing business as a registered chemist and druggist, although assistants would probably find it to their own interest to pass it as soon as possible. As to the preliminary expense incurred in a course of instruction at Bloomsbury Square, it has been repeatedly stated that the Minor examination only requires an intelligent knowledge of the things daily met with in a pharmacy, which you yourself suggest could be obtained more economically elsewhere. At any rate, after the expenditure of the large sum specified by you, it would not be unreasonable to expect a man to go on for the "Major" qualification, in which case the gross total of the fees would remain the same.

A. W. Postans.—It would be quite justifiable to use an equivalent quantity of the strong acid, *i.e.*, ♏ v. to the thirty pills, adding it direct to the quinine, then mixing in the extract and a little absorbent powder if necessary. It has probably been an oversight of the prescriber, but not such a one as the dispenser might get over without troubling the writer.

W. W. Lindley.—We quite agree with the opinions contained in your letter, but we think the form in which they are expressed is rather too much like the article complained of.

"Scientific."—(1) Brough's 'Fairy Tales of Science' is published by Griffith and Farran, St. Paul's Churchyard, price 5s. (2) A lecture was delivered under the title mentioned at Exeter, by Professor Huxley, we believe, but we do not know whether it has been published.

Communications, Letters, etc., have been received from Messrs. R. Shepperley, J. L. Holmes, Shaply, W. Gunn, M. C. Cooke, N. Smith, W. Lindley, F. R. Bell, Stathers, R. O. Fitch., T. M., E. A. G., A Major before the Passing of the Pharmacy Act.

The following journals have been received:—The 'British Medical Journal,' January 18; the 'Medical Times and Gazette,' January 18; the 'Lancet,' January 18; the 'Medical Press and Circular,' January 18; 'Nature,' January 18; the 'Chemical News,' January 18; 'English Mechanic,' January 18; 'Gardeners' Chronicle,' January 18; the 'Grocer,' January 18; the 'Journal of the Society of Arts,' January 18; 'Grocery News,' January 18; 'Medical Record,' January 15 & 22; 'L'Union Pharmaceutique' for January; 'Journal de Pharmacie et de Chimie' for January; 'Anti-Adulteration Review' for January; 'Michigan University Medical Journal' for December; 'Western Lancet' for November; 'Photographic Journal,' January 16; 'Dublin Journal of Medical Science' for January.

PERCOLATION.

BY ERNEST C. SAUNDERS, A.P.S.

My attention has recently been drawn to several papers appearing in the Journal on percolation, and different processes of maceration. The subject may seem almost overdone, but I think that a process of such importance is worth all the attention that can be paid to it, especially as I think that it is hardly used as much among druggists, in preparing their tinctures, infusions, etc., as the great advantages it offers demands.

In Mr. Schweitzer's article, which appeared in the number of December 21st, there are several statements which seem to me hardly calculated to increase the efficiency of the process in inexperienced hands, and I should like to mention a few points which, in my own experience, appear to me most important. I must premise that I have rarely operated on larger quantities than fifty pounds at a time, but I have had to do with almost every drug in general use; and those who operate with larger quantities are comparatively few.

With regard to the form of percolator, I think it is too much to make the sweeping assertion that the cylindrical form is the best. For resinous substances and for anything percolated with strong alcohol it undoubtedly is, but for such articles as orange-peel, gentian root, and cinchona bark the conical form is preferable. It is said that the conical percolator does not exhaust the species at the junction with the sides, in consequence of the loose attachment to them, and of the slight pressure of the liquid at the top. I think that any one who has had much experience in percolating with glass apparatus must have noticed the gradual saturation of the menstruum equally as much in passing down the sides of a conical percolator as in a cylindrical one; while, after carefully watching and several experiments, I have come to the conclusion that pressure has nothing to do with the solvent power of the liquid, and that in some instances it acts injuriously by causing the operation to go on more rapidly than is advisable. In percolating with either form of percolator, I never allow of more than one to two inches of menstruum on the surface of the drug, arranging that it shall be supplied so as to be of a uniform depth throughout the operation.

Drugs ought in all cases to be of a uniform degree of fineness, according to their quality, and should be thoroughly moistened before being packed in the percolator. This is one of the most important points in the whole operation, as on it depends the possibility of successful packing in the case of all roots and dried herbs that will absorb much water. The amount of moisture should be only sufficient to form a slightly coherent powder, capable of being pressed into a mass, but not, under any circumstances, of forming a paste. The directions of the U.S. Pharmacopœia are distinct and of great practical value in this respect. Such drugs as gentian, calumba, etc., should be left in a covered vessel from six to twelve hours after being moistened, to allow them to thoroughly absorb the liquid and expand to their full amount.

In packing, it is always best to use the hand, and the occasions are very few where this cannot be done. I am surprised to see Mr. Schweitzer advocate the use of whole chaff and straw mixed with the drug to increase the bulk. Such articles are among those most likely to cause a failure in the attempt to exhaust any drug, forming channels down which the menstruum will run, instead of being gradually drawn through the whole body of the mass, and equably penetrating every part. Also, when the drug is properly moistened and packed, it will never rise to the top of the liquid, and such clumsy expedients as weighting down the top with glass stoppers are entirely unnecessary. After properly packing (an operation that nothing but actual experience can teach), all that is necessary is to cover the surface with filter-paper, not to keep the drug from rising, but to prevent the menstruum, as it is added, from stirring up the surface. If any of the drug should rise to the top, the operator may be certain that it is owing to its having been insufficiently or improperly moistened.

In conclusion, I must enter my protest against such preparations as Mr. Schweitzer recommends. There are many objections, but I will only mention the three principal ones. I will leave altogether out of the question the use of water as a menstruum, both on account of its inability to preserve the delicate active principles from decomposition, and of the impossibility of exhausting such drugs as orange-peel, cinchona bark, etc., with it. The objections to such concentrated solutions, made with ordinary menstruum, are these:—First. The difficulty of preserving such strong solutions without change, owing to the gradual deposition of a sediment, carrying with it frequently a large share of the active principles. This is not a hypothetical objection, but one which actually arises frequently, as in this country many fluid extracts are in use made practically in the manner suggested by Mr. Schweitzer, in which this change has often been noticed. Second. The impossibility, in many cases, of exhausting the species with so small a quantity of menstruum. It is needless for me to give any instances, as any one can see this at once on looking at the B.P. forms, and calculating to what bulk they would have to be reduced. Third. The increased facilities for adulteration and purposed diminution of strength; for were such extracts in general use, their manufacture would speedily fall into the hands of large makers, and competition would produce the inevitable results of lower prices and inferior qualities. Such preparations are largely in use in this country, and the above are the chief objections to be urged against their use.

I think the difficulties of percolation have been very much overrated. In large quantities the difficulties are great, and only to be surmounted by much care and some skill; but in working with small quantities the difficulties are very slight, while the results are so superior to those produced by the old process of maceration in general use, that I am sure any pharmacist having once tried it will never return to the old way.

Detroit, Michigan.

MILD ACONITES.

BY M. C. COOKE, M.A.

Supplementary to the observations already made on the Acrid Aconites of the East, some remarks may not be out of place on the milder forms, of which the "Atis" is the type. Before doing this, one cannot help remarking that up to the present this drug has not been fairly tested, in fact not tested at all in this country, although it promises enough value to repay amply a careful investigation.

The root of *Aconitum heterophyllum* has long been known in India as a valuable febrifuge and tonic, and may be obtained in all the bazaars, although it is not uncommon for the inert and insipid *Asparagus sarmentosus* to be substituted for it. Moodeen Sheriff gives the following as the synonyms for this root in the languages of India, '*Atis*' (often written *Atees*) in Hindustani; *Atvika* and *Vajje-turki*, Dukhanee; *Ati-vadayam*, Tamul; and *Ati-vasa*, Telugu. This drug is classed as officinal in the Pharmacopœia of India, and is thus described:—Ovoid tuberous roots, tapering downwards to a point, from one to one and a half inches or more in length, and from three-eighths to half an inch in thickness. The surface, which is covered with a thin greyish epidermis, is slightly wrinkled longitudinally, and marked here and there with rootlet scars. A transverse section shows it to consist of a pure white friable amylaceous substance, marked by five or six concentrically arranged dots, the terminations of threads of woody fibre traversing the root longitudinally, It is inodorous, and of a bitter taste, devoid of acridity. Does not contain aconitia. It may be readily distinguished from other roots sold in the bazaars under the same vernacular name by its characteristic bitterness. Tonic and antiperiodic. The plant is found in western temperate Himalaya, at 8000 to 13,000 feet elevation, from the Indus to Kumaon. In all examinations of this root, to ascertain whether genuine or not, the presence of starch, the five or six concentrically arranged dots towards the centre, as shown in a transverse fracture, and the bitter taste, devoid of all acridity, should be regarded.

Dr. Balfour, in the Indian 'Annals of Medical Science' for 1858, states that for two years he had this drug in constant use, and found it a most useful febrifuge, given in doses of half a drachm mixed with a little water every four or six hours during the intermissions, commencing its use during or towards the termination of the sweating stage. Of 66 cases of intermittent fever treated by it, of which notes were kept, it proved fully successful in 37, and comparatively so in 18; in 11 it failed. He directs that every root should be broken across, and all which are not pure white, with a short starchy fracture, should be discarded.

Of the value of "Atis" in India there can be little doubt. Subassistant-Surgeon Henning states that so steady and certain is it in its operation, that he never thinks of using quinine by any chance, and he adds, "Surely if I can do without quinine in a district where fever of a severe character is very prevalent, other medical men could easily do without it also." Similar testimony is given by Dr. Balfour, then civil surgeon at Delhi. "I think my prisoners more healthy than usual this year, partly from the season, partly from the effect of the *Atis*."*

The testimony as to the efficacy of this drug as a febrifuge is so contradictory that some systematic trials should be made. Some have asserted that it is quite valueless. The probabilities are greatly in favour of the assumption that the genuine drug has not always been used, but some almost inert substitute. Two kinds are mentioned in the Taleef Shereef, a white and a black variety, but both are said to partake of the same qualities, bitter, astringent, pungent, heating, aiding digestion, and useful in dysentery, vomiting and piles. O'Shaughnessy also mentions two varieties, one of which he considers wholly inert, and refers to the tubers of *Asparagus sarmentosus*. It is probable that of these two kinds, one only is the genuine *Atis*, and the other some substitute, or other substance passing under the same name. The Pharmacopœia of India gives no note of a second kind, or variety, differing at all from the officinal article therein described; but in the 'Supplement' Mr. Moodeen Sheriff has called attention to a root found in the bazaars of Southern India, under the name of *Ati-vasa*, which he considers a variety of *Aconitum heterophyllum*. "It is a small tuberous root, from one to two inches in length and circumference, conical or ovoid, with a tapering point towards one end; grey externally, and white internally, with more or less white scars of rootlets on the surface; inodorous, and bitter in taste without any acridity or astringency."* He compared this root with specimens of *Atis* from Calcutta and other places, and found it to correspond with them exactly in the appearance of their substance internally, and in taste, but it differed from some of them in shape and external colour. "In one of the specimens, the epidermis was of a brown colour, the roots were smaller and almost oblong, and in some of these the tendency to be divided into two tubers, as described in some books, was more distinctly marked than in the roots of any other specimen. In another specimen most of the roots were thin and cylindrical, with longitudinal wrinkles and with little or no point at either end. All these specimens agreed in three characters which were invariable, viz., the whiteness of the substance internally, the pure bitter taste, and the farinaceous nature."

Another root found in the bazaars of Southern India by Moodeen Sheriff is called *Nat-ki-vajje-turki* in Dukhanee; *Nattu-ati-vadayam* in Tamul; *Nattu-ati-vasa* in Telugu. This he describes as "a very small root, and bears more resemblance externally to the root of ipecacuanha than any other. It is generally about the thickness of a small quill, from half to one and a half inches long, annulated, of grey or dark grey colour externally and white internally, inodorous, and acrid in taste. It is clear from this description that it is not a variety of *Aconitum heterophyllum*, but probably another species of *Aconitum*."†

The roots of one or more species of Aconite of a similar character to *A. heterophyllum* are met with in the Bazaars of India under the Arabic name of *Jadvar*, and the Hindustani *Nirbisi*. Three or four well marked varieties may be distinguished, and these are enumerated in the Supplement to the Indian Pharmacopœia. Of these are the *Jadvar-hindi*, the *Jadvar-Khatai*, and the Round Jadvar. All these resemble each other in being either bitter or sweet without the least acridity, irritation, tingling, or any other unnatural sensation; and in being more or less brown, both externally and internally. The present communication is already

* Proceedings Agri. Hort. Society of India (1857) vol. ix. part iii. p. 271.

* Supplement to Pharmacopœia of India, p. 28.

† Supplement to Pharmacopœia of India, p. 28.

of sufficient length so that any further details that might be given of the different varieties of *Jadvar* or *Nirbisi* must be reserved for another occasion.

In China the prepared roots of *Aconitum variegatum* would appear to be employed in a similar manner, and for a like purpose to the *Atis* in India, under the names of *Fu-tsze* and *Heh-fu-tsze*. Dr. Porter Smith writes of this species of Aconite as cultivated on a large scale at Chang-ming-hien, etc. The roots are prepared by steeping in vinegar and salting them. The *Tien-hiung* is considered by the same authority to be a variety of the same species of *Aconitum* which is cultivated in Sechuen, etc. The prepared tubers are top shaped, ovoid, measuring one inch and three-quarters long by one inch and a half in breadth, of a black colour externally, and often encrusted with a saline efflorescence. Several tubercles emboss the outer surface, more especially at the upper part. The interior is of a a blackish-brown colour, moist and greasy. The *Fu-pien* is said to be merely the tubers of the same species, stripped of the cuticle after soaking in vinegar, dried thoroughly, and cut into thin slices, which are brittle, curled, translucent, white, and exhibit the concentric arrangement of the vascular bundles which traverse the root lengthwise. It is but very slightly acrid.

Tseh-tsze is another drug supposed to be derived from the small side tubers of the same *Aconitum variegatum*. All these forms are more or less employed in fevers, ague, apoplexy, rheumatism, leprosy, neuralgia, headache, dysuria, dropsy, cholera, and dysmenorrhœa. The preparation by salt and vinegar in order to correct the natural acrid properties of the plant is one of the disadvantages which the Chinese possesses in comparison with the Indian *Atis*.

BLUE MOUNTAIN TEA.

BY JOHN R. JACKSON, A.L.S.

Curator of the Kew Museums.

In a recent number of the 'Garden' we read that thirteen bales of Blue Mountain tea, weighing 1920 lb., lately arrived in Chicago from Lower Hill Schuylkill county. This so-called tea has some interest attached to it in a pharmaceutical point of view, inasmuch as the plant yielding it is an officinal plant in the United States, its use simply as a tea being hitherto considered of a secondary nature. The account in the 'Garden' proceeds as follows:—"This tea is composed of the leaves of a variety of the golden rod family, botanically known as *Solidago*. It is gathered in large quantities on the Blue Mountains, and the mountains to the north of that range. The tea matures in the latter part of September, and is gathered until late in October. It is then cured and put up in packages, selling on the mountains at from twenty cents to thirty cents per pound, but retailing in villages and towns at one dollar per pound. The tea has a very pleasant aromatic flavour, and is held by many persons in great esteem."

The plant referred to here is evidently *Solidago odora*, Ait., called the Sweet-scented Golden-rod. It grows in woods and fields, more or less abundantly, in all parts of the United States, and is described as having a slender erect pubescent stem, growing two or three feet in height, linear-lanceolate leaves, entire, acute, rough at the margin, and covered with pellucid dots, deep golden-yellow flowers, arranged in a terminal, compound, panicled raceme, the branches of which spread almost horizontally; the ray florets are ligulate, oblong and obtuse, the disk florets, funnel-shaped, with acute segments; the leaves have an agreeable, warm, aromatic taste, and a fragrant odour; when subjected to distillation an aromatic, volatile oil is produced, and by dissolving this in proof spirits an essence may be made. This, it is said, will stop vomiting, and correct the taste of medicines, even laudanum and castor oil. Applied externally it is a valuable remedy for allaying pain arising from headache. The oil is of a pale, greenish-yellow colour.

Wood and Bache thus speak of the medical properties and uses of this species of *Solidago*:—"Aromatic, moderately stimulant and carminative, and like other substances of the same class, diaphoretic when given in warm infusion. It may be used to relieve pain arising from flatulence, to allay nausea and to cover the taste or correct the operation of unpleasant or irritating medicines. For these purposes it may be given in infusion. The volatile oil dissolved in alcohol is employed in the Eastern States. According to Pursh, the dried flowers are used as of a pleasant and wholesome substitute for common tea." From this it will be gathered that though the plant has been long known in America for its medicinal properties, the application of its leaves as of substitute for tea has some novelty in it.

Another species of *Solidago* (*S. sempervirens*, L.), called the narrow-leaved golden-rod, which grows in moist situations in North America, is by some considered very valuable for the cure of wounds.

The common golden-rod of our woods and thickets (*S. virgaurea*, L.), which also grows in the United States, was at one time used with us as a diuretic and vulnerary.

THE EUCALYPTUS GLOBULUS IN CALIFORNIA.*

The annual report of the Board of Directors of the California Pharmaceutical Society, in referring to the *Eucalyptus globulus*, quotes a letter from Dr. A. B. Stout, contained in a paper read by Mr. R. E. C. Stearns before the California Academy of Sciences in July last, from which we abstract the following:—

"I am happy to contribute to your important article on the culture and uses of the Eucalyptus in California, my experience of the medical properties of that valuable plant. The Eucalyptus is not less precious for its medicinal virtues than it is ornamental in arboriculture and useful in the arts. Several months ago, incited by information derived from the 'Practitioner' and other sources of knowledge, I collected and dried the leaves. The agreeable empyreumatic oil of the leaves in evaporating, diffused a balmy odour through the house. I therefore considered that as this oil, as well as the catechu gum and kino, and the cajeput oil, are all similar hydrocarbons, their qualities must resemble the creasote, pyroligneous and carbolic acids in their disinfectant and hygienic properties. I have no doubt that Eucalyptus has these properties in a milder or weaker degree, only differing in being accompanied with an agreeable perfume, wanting to creasote and carbolic acid. As a purifier, therefore, of the musty atmosphere and unpleasant emanations in basements and cellars, I have recommended the scattering of the dried leaves in

* 'The Western Lancet,' vol. i. p. 696.

such places. The powder of the dried leaves scattered in trunks and among clothes will no doubt be as useful and more agreeable than tobacco or camphor to prevent the growth of moths or other insects. Its chief value is, however, as a sedative and antiseptic in asthma, and throat diseases, nasal catarrhs, and affections of the mucous membranes. To utilize these properties I had a concentrated tincture with alcohol at 95° prepared, and also contrived an inhaler with which to introduce the vapour of the essential oil to the throat and lungs. I can testify to the excellent effect of this mode of medication. The paroxysms of chronic asthma are relieved and shortened, and acute attacks are quickly allayed. The inhaler is a simple instrument made of tin. It is a cup of a capacity of 4 fluid ounces; the lid, attached by a hinge, has a tube from the centre about three inches high, bent near the end at a right angle, and terminated with a mouth-piece like that of a speaking trumpet. The cup is on legs so that a spirit lamp may be placed underneath, and has a wooden handle to move it about when heated. Put two ounces of boiling water (4 tablespoonfuls) in the cup; add one tablespoonful of the tincture; and inhale the vapour while the fluid is kept gently boiling with the spirit lamp. Again, I had prepared cigarettes with the coarsely powdered leaves. These produce a decidedly anodyne and antispasmodic effect. An agreeable syrup may also be prepared, useful in infantile maladies.

"There can be little doubt but that the oil of Eucalyptus, and Eucalyptine, when it can be procured, will be available remedies against malarious diseases of all types, and that the presence of the trees, cultivated in gardens, contribute to sanify the atmosphere from those emanations which give origin to epidemic diseases. That the parasitic insects which infest other plants do not relish the Eucalyptus, is evident from the general cleanness of the leaves and the fact that the hydrocarbon oils are fatal to animal life. The balmy perfume, therefore, that exhales from them must have an influence in destroying the parasites which frequent shrubs growing in their vicinity, tending to diminish if not suppress them.

"However obnoxious to parasites in general this tree may be, it appears it nevertheless has its own species in the *Psylla Eucalypti*. This insect is an Hemipteron, and appears on the Eu. dumosa. It deposits a species of manna, called in Australia *Lerp* or *Laap*. It is a white substance, 53·1 per cent. of sugar-syrup and 46·9 per cent. of a special modification of starch. This is prized by the inhabitants as a manna; and is greatly sought for by the bees, who convert it into honey. Dobson (entomology) describes it as the cup-like coverings of the Psyllidæ, but Wittstein mentions six varieties of *Psylla*, and that one species produces a coloured Lerp handsomer than the white, but as a deposit beneath the cup-like shields of the insect.

"If this insect derives its lerp from the aromatic and balmy oil of the Eucalyptus, and furnishes an agreeable aliment for the inhabitants, and a Mt. Hymettus-like honey stuff for the bees, certainly the busy little insect manufacturer, parasite as he is, may be freely pardoned."

Mr. Stearns says, "From experiments recently made upon myself, I find that small doses, ʒij to ʒiij, of the infusion of the leaves (of young trees) drank when cold, quiet the nerves and induce sleep; quite likely, in ordinary cases of wakefulness, a pillow stuffed with the leaves would produce the same result. My friend, Dr. Kellogg, has prescribed the infusion in dyspepsia, and reports favourably. In addition to the many valuable properties of the blue gum herein recited, I have no doubt but camphor in considerable quantity can be obtained from it."

The powers of the Eucalyptus in the treatment of intermittents, we sincerely hope, are rather under- than over-rated, as the discovery of an efficient substitute for cinchona would be an inestimable boon, in view of the high price and scarcity of that agent; to which hope may be attributed this extended notice of this new remedy.

HYDRASTIS CANADENSIS, OR GOLDEN SEAL, AND ITS ALKALOIDS.*

Dr. Van der Espt has recently presented to the Royal Society of Medical and Natural Sciences at Brussels an interesting memoir upon the *Hydrastis canadensis*. This plant, known also under the name of Golden Seal, is as its name indicates, a native of Canada, and belongs to the order Ranunculaceæ. It is the rhizome, which is yellow, lactescent when freshly fractured, tortuous, and composed of nodose, fleshy tubercles, furnished with numerous long fibres, that is employed in medicine. Two alkaloids have been found in it: one yellow, berberine; the other white, hydrastine.

Berberine, which is also found in the barberry, calumba root and elsewhere, appears in the form of small concentrically grouped prisms, or clear yellow silky needles. It is inodorous, but possesses a persistent bitter taste; it is slightly soluble in cold alcohol or distilled water, and perfectly insoluble in ether. With hydrochloric acid it forms a salt which crystallizes in slender yellow needles.

Hydrastine crystallizes in white shining four-sided prisms, which lose their transparence upon desiccation. It is very bitter and pungent, and provokes in the mouth a feeling of numbness which causes it to be employed in America as a local anæsthetic. Nearly insoluble in water, it is freely soluble in alcohol, ether, chloroform and benzine. As the last three do not dissolve berberine, the hydrastine may be easily extracted by treating the powdered root in a displacement apparatus with either of those solvents. The proportion so obtained is about 1½ per cent.

In America neither berberine nor hydrastine is prescribed, but a crystalline substance known under the name of hydrastin, which is said to be a mixture of hydrochlorate of berberine and hydrastine. The purity of this product depends upon its mode of extraction. Among the processes indicated, that of Professor Wayne is the most simple. It consists in the maceration of the powdered root of the golden seal and displacement by cold water. The product is treated with hydrochloric acid, the precipitate separated by filtration, and washed, treated with alcohol and left to crystallize.

The hydrastin appears under the form of yellow acicular crystals, without acid or alkaline reaction, and yielding upon trituration a clear yellow powder. It is soluble in boiling alcohol, insoluble in cold alcohol, ether, chloroform, spirit of turpentine and distilled water; but these various liquids acquire a yellow tint and contain hydrastine.

The rhizome of the golden seal is a bitter tonic analogous to calumba. It is administered in the form of powder, in doses from half a gram to a gram and a half. The hydrastin is prescribed in doses of from five to fifty centigrams. In larger doses these substances act as laxatives, similarly to rhubarb. This latter effect, in the absence of any cathartic or irritant principle, M. Van der Corput thinks would be due to a kind of indigestion, or the stimulation of the mechanical action of the digestive organs under the influence of large doses of the drug. The affections for which it is stated hydrastin may be beneficially employed are those connected closely with atony and increased secretion of the mucous surfaces. A decoction for external use is prepared by boiling thirty parts of the bruised root in five hundred parts of water.

* 'L'Union Pharmaceutique,' vol. xiii., p. 321, from 'L'Union Médicale.'

THE CHEMISTRY OF THE GREAT FIRE.*

A conflagration so extensive and destructive as that which laid waste a considerable portion of the city of Boston in November must be interesting and instructive in its chemical aspects, and we design to briefly direct attention to some of these. The process of combustion, whether it involves immense structures, or is confined to the narrow limits of a candle or common friction match, is strictly a chemical process. The burning of Boston was a chemical experiment on a vast scale, and withal so costly that the spectators hardly wish to see it repeated. To burn a substance is simply to change its condition; the matter involved is not destroyed, but from chemical action it is forced into new relationships, or into new forms of matter. There was nothing whatever actually *destroyed* by fire in this city on the night of November 9th, but an immense amount of material was changed from a valuable or marketable condition into one having no value. The sugar, coffee, tea and spices of the grocer; the prints, flannels, laces and silks of the dry goods dealer; the opium, gums, oils, and extracts of the druggist; the salts, acids, alkaloids and reagents of the chemist, consumed on that night, were but common and valueless elements thrown into complex combinations by nature or art, so as to meet or supply human wants. In the condition in which the hydrogen, carbon, oxygen, nitrogen, the metals, etc., existed, of which these diversified substances were composed, they were needful to feed us, keep us warm, or relieve us when ill; they, therefore, as related to our wants, had value; we were willing to exchange gold for them, a metal of such noble characteristics and so sparsely disseminated upon our planet that we find it to be a convenient representative of value. We had toiled for months or years to form these chemical substances and fabrics, or we had sent our ships to every point of the globe to gather them up, and we had stored them safely, as we supposed, in our warehouses. But the fire came, and in sixteen hours the whole was resolved into carbonic oxide, carbonic acid, water and a few tons of ash; products which we can neither eat, wear, nor utilize in any way to advantage. We do not need the forms of matter which the fire left for us, but we did need the same elements in the other forms, as we had them before the conflagration.

Combustion is a wonderful process. It may go on rapidly, as it did in November, and lay waste a city in a single night, or it may proceed slowly, and require centuries to effect the same changes. Our immense stores of merchandise, which were resolved so rapidly into invisible forms, would have passed through the same changes—in short, would have been burned—if no fire had come nigh them. This result would have been inevitable, if we had consumed them as food, worn them as clothing, or allowed them to waste from neglect. The burning would have been as actual as that of which we were eye-witnesses. The same amount of heat would have been developed, and the resultant products the same. All organized bodies are constantly undergoing a process of decay, which is slow combustion, and although we do not see the light or feel the heat, it is accompanied by them. The world of organized matter is certainly destined to be burned, but we prefer the slow form to the rapid, as we have had a notable example of the latter which will suffice for a lifetime.

It is quite easy to understand that wood and other organized bodies can burn; but the combustion of buildings constructed of brick, stone, and iron presents a problem not a little puzzling to many. A fire, sweeping through the streets of a city, lays low whole blocks of buildings, into which nothing combustible enters, save the wooden partitions, floors, and stair-cases, and these while burning afford combustible material enough to expand and topple over our thin walls, and render the ruin complete. Buildings considered fire-proof, that is, those constructed without wood, can be destroyed by fire, if any ignitible material is burned within them. The Palace of the Tuileries and the Hotel de Ville, in Paris, burned by the wretched Commune, were fire-proof buildings, and without the aid of our American kerosene oil or some similar inflammable material, they could not have been ruined as they were. It required nearly three hundred barrels of kerosene oil to destroy the Tuileries. The miscreants hoisted a barrel or more into each room, and knocking out the heads, allowed it to flow over the building, and when it was thoroughly saturated, they set it on fire. The metal and stone used in the structure were rapidly expanded by the intense heat, the walls were pushed outwards, the roof fell in, and the destruction was complete.

Our Boston fire has demonstrated the influence which extreme heat has upon granite structures. They do not withstand its influence so well as those built of brick, and therefore are not as safe buildings in time of large conflagrations. Pearl Street was lined with granite buildings, and after the fire the work of disintegration was so thoroughly accomplished that fine granitic sand covered the pavement several inches deep. Water we recognize as the antagonist of fire, and it was most liberally supplied in our great conflagration. It seems a little paradoxical at first view, the act of pouring an agent on to a fire with the design of arresting it, when we remember that the fluid itself is composed of two elements, one of which is highly combustible, and the other the grand supporter of combustion. It has been stated in several journals, that water thrown upon the fire in the form of spray was decomposed into its gaseous condition, and therefore actually fed the flames. Now this is not correct. We doubt if a single one of the millions of gallons employed was thus decomposed. It requires a most intense heat, equal to that of a blast-furnace, to decompose water, and it must also be accomplished under peculiar conditions. Water thrown upon buildings is often dissipated in steam by contact with flame before it reaches the burning body. Most of that used in this city was thus rendered ineffective, as the buildings were high, and the water was sub-divided into mist before reaching the point upon which it was directed. Water quenches fire by physical contact with the burning body, covering it, and thereby excluding the contact with atmospheric oxygen; also, it instantly reduces the temperature of ignited substances, by vaporization. By the sudden change from a liquid to vapour, it robs the substance of the heat necessary to keep up combustion, which is thus extinguished.

It is certain that we must seek new devices for subduing fires in large cities, and we will describe a plan which we think would prove practicable and effective. The plan is based upon the idea that every building must depend upon its own apparatus, and not upon that belonging to any municipality. Twenty years ago we employed carbonic acid water for quenching fires, long before any of the so-called fire-annihilators were used, and it is an agent so effective, and so easily and cheaply produced, that it must come into general use. Our plan is to place in the basement of every warehouse or store an iron vessel resembling a steam boiler, the capacity to depend upon the size of the building. This is to be kept two-thirds full of water, the chamber above the water to hold two glass vessels, one of which is filled with acid, the other with bicarbonate of soda. By a very simple device these glass vessels may be broken at any moment, so that the substances will instantly develope carbonic acid, which being absorbed by the water changes it into aerated, or carbonic acid water. The gas over the water affords immense pressure, and by pipes leading from the strong iron fountain, the gas-impregnated water may be directed at once upon the fire in its incipient stages, in any portion of the building. One gallon of this water is as effective as ten of common water, and therefore can be used to extinguish a fire without the great water damage to goods which often

* From the 'Boston Journal of Chemistry.'

results. The time is not far distant when apparatus of this kind will be regarded as much of an essential appendage to buildings which contain large quantities of valuable merchandise, as are gas pipes, or water closets.

The burning of our warehouse, at the time of the great fire, filled with chemical products, was in one sense an interesting exhibition. We cannot say that it was calculated to awaken much enthusiasm so far as we were personally concerned, as the spectacle was a little too costly for that. It was paying too high for the pyrotechny, no matter how grand the display. The nature of the substances burned was peculiar, affording intense heat and flames of divers and gorgeous colours. Numerous packages of the salts of strontium, calcium, magnesium, potassium, copper, barium, etc., were consumed, which produced a variety of brilliant illuminations, and these, with alcoholic preparations, carbolic acid, nitrate of ammonia, and hundreds of other highly combustible bodies, gave to the flames a fierceness and colouring not observed elsewhere. The brick vault in which were deposited our account-books and valuable papers, was in the midst of the fiery furnace, and subjected to the full fury of the flames. Owing to the great heat, it could not be reached until five days afer the fire, and when opened, the contents were found to be in a most perfect condition. The safe was a brick structure, carried up from the ground through the basement, having two iron doors, the space between the outer and inner being fourteen inches. The doors were about three-eighths of an inch in thickness, and without transverse bars or bolts, or other fastening, save one common lock. Apprehensive that these frail iron doors would not withstand intense heat in case of fire, we directed the American Steam Safe Company, two years ago, to put upon the inside of both twelve copper reservoirs of water, each holding about a gallon. These were constructed after their pattern, being sealed with a fusible plug. On the night of the fire, just before the store was burned, several of the young men employed in the counting-room gained access to the vault, opened it, and placed three wooden pails, filled with water, upon the floor; they then closed the inner door, and before locking the outer, placed two more pails full of water in the space betwen the two. This was indeed a thoughtful act in a time of so much excitement. We expected not only that the wooden pails behind the first door would be burned, but those in the interior of the vault; and therefore great was our surprise to find upon examination that they were entirely unharmed, and each contained a little water. Those in the interior contained nearly the same amount as when placed there. The copper reservoirs attached to the interior surface of the first door were entirely empty; those upon the second held about one-third of their contents. It is clear that we are indebted to the agency of *steam* for the preservation of the valuable contents of our safe. The reservoirs upon the first door held water sufficient to maintain an atmosphere of steam in the space, during the time the fire was most intense; afterwards, the heat was conducted through to the second, when the boiling water filled the vault itself with steam, and prevented the papers from igniting. Without the reservoirs upon the outer door, the two water pails would have been burned before their contents could have been evaporated, and the flames would have found access to the vault through the inner door, had it not been protected. We used an iron safe of an approved pattern, in the counting-room, as a matter of convenience, not trusting, however, any papers of value in it. This safe was taken from the ruins burned through and through. It afforded no more protection than would a wooden box. The plan adopted by the American Steam Safe Company of this city, of using water reservoirs as a lining, is an excellent one. So long as the water lasts, steam is present in the cavity, and the temperature cannot rise high enough to ignite or char paper. Every bank vault in the country, and every brick or stone chamber, in which valuables are kept, should have the doors covered on the inside with water reservoirs.

There are so many interesting points connected with the chemistry of the great fire, that we have not room to allude to them. At a future time we may present another article upon the subject.

SUPPOSITORY MOULDS OF PLASTER OF PARIS.*

BY CHARLES E. DWIGHT.

Pharmacists who have had many suppositories to make with the old moulds have undoubtedly often hurt their fingers by pounding in trying to remove the suppositories. I have been for some time using a mould which parts through the centre and is made of plaster of paris, which gives so much satisfaction that I can but wish for others to try it; it may have been used by others, but is entirely original with myself.

The expense of buying moulds of metal which part through the centre has probably been detrimental to their universal use, while they are undoubtedly superior to those old finger smashers in being easily cleaned and oiled, and also facilitating the extraction of the suppositories when cold. For the benefit of those unused to the manipulation with plaster, I will give a general plan for preparing the moulds.

Into a vessel of about six inches long by two wide and one deep (a pasteboard box will do), pour in plaster mixed to the consistency of thick cream, until half full; have ready six suppositories, moulded of wax, from other moulds of good shape, and while the plaster is yet soft immerse them to half their diameter, with their large end close to the edge of the box, all in a row and a uniform distance apart. When the plaster has set, gently remove the wax, and with a knife smooth off the surface and trim the edges of each mould sharp, and between each depression made by the wax suppository dig a small cavity about the size and shape of a small pea cut through the centre. Now we have half of our mould. When the face has become hard, oil or grease with linseed oil or lard, replace the wax suppositories and raise the edges of the box by wrapping heavy paper around, which will extend about another inch above the surface of the face; mix another portion of the plaster equal to the first, and in the same way, and gently pour over the greased surface until it will be about one inch deep above the other or lower half. When hard, the two parts can be easily pulled apart, the edges trimmed off and each part boiled for about an hour in linseed oil, which will prevent the adhesion of the substance to be moulded. The plaster must be mixed thin *and well stirred* to be substantial.

By following the above plan almost any number of sizes can be made at small expense, and will, I think, be found to answer admirably. If this will in any way alleviate the frown which comes over the face of the pharmacist when he finds he has to make suppositories, the object of the writer will be fully attained.

SOLANIA IN SOLANUM LYCOPERSICUM.*

BY GEORGE W. KENNEDY.

Having had a strong desire to know whether or not the common tomato plant (*Solanum lycopersicum*) contained any solania, and never having seen any analysis of the plant, I was induced to make a series of experiments. The fruit of the plant has been examined by several pharmacists, but I believe there was no solania discovered. The amount of citric acid obtained by the experimenters has varied very considerably, thus suggesting that the fruit of different varieties has been examined, or that the fruit was collected at different periods of the year.

* From the 'American Journal of Pharmacy.'

In giving the result of my examination I hope it may throw a little more light on a plant of some importance, which I have found to contain the alkaloid solania. The process for extracting the alkaloid was similar to that of Wackenroder, except a slight change in the maceration and in using ammonia instead of hydrated lime for precipitation.

I took a quantity of the living plant, leaves and stems, and bruised them with water into a pulp in a mortar. This pulpy mass was next macerated for forty-eight hours with water enough to cover it, previously acidulated with sulphuric acid so as to have a strong acid reaction. The liquid was then expressed, and the residue treated again with sulphuric acid and water, as in the first maceration. It was now expressed as before, the two liquids were mixed, and after standing for some days, filtered and treated with water of ammonia, sp. gr. 0·960, in excess. The precipitate that formed was separated by straining dried in heated air at 120° Fah., and then boiled several times with alcohol. The alcoholic solution, having been filtered while hot, upon cooling, deposited the solania in small feathery-like crystals, resembling quinine in appearance, having a smell like that of potatoes, and a taste rather nauseous, bitter, and somewhat sweetish. With sulphuric acid, it gave a bright red colour, passing into reddish brown. With iodine a characteristic yellowish brown colour was produced. Besides solania, I also found in the herb some fixed oil, gum, chlorophyll and inorganic salts.

OLIVE CULTIVATION IN SYRIA.

In a recent report on some of the chief products of Syria, Mr. Vice-Consul Jago remarks that olive oil is produced throughout Syria, but chiefly in the plains of Safet, Nazareth, and Nablous. The average produce is estimated at 6,000,000 of okes under favourable circumstances. That of 1871 amounted to between 5,500,000 to 6,000,000, of which about 1800 tons were exported. Prices ranged from 8 to 5½ piastres per oke.* The production of this article has increased of late years, and it promises to become, with the growing demand for exportation, one of the most important articles of Syrian produce.

The olive tree, like the mulberry, requires but little care, which is limited to ploughing the land two or three times a year. The crop takes place in September and October, according to situation. The fruit is knocked off with sticks, and the injury thus caused to the branches is probably the reason of the short yield of every second year.

The plantations are being extended principally on the coast line, between Lattakia and Jaffa, the climate of which seems to be peculiarly adapted. Nearly half a million of new trees are said to be annually planted throughout the country. This is perhaps an exaggeration, but the increase is very large.

The quality of the finer sorts of oil is equal to that of Italian, while that produced near Sidon is said to rival the finest qualities that Europe can produce.

About one-half of the crop is consumed in soap-making, one quarter in eating and burning, and the remaining quarter is exported, chiefly to France. The now extensive use of American petroleum oil for burning, of which 101,800 gallons were imported into Syria in 1871, has made a larger quantity of olive oil available for export.

The oil press used is the rude native one of bye-gone ages, and Mr. Jago believes there is but one European press in the country.

* Oke = 1200 grams. £1 = 110 piastres.

THE AGUE-PLANT.*

Dr. Bartlett, of Chicago, has forwarded to the editor of *Grevillea* (No. 6, 1872) specimens of the palmelloid plant, in which Dr. Salisbury believed himself to have discovered the germs of the ague. He says, "Desiring to investigate the subject, I sought for the plants described by Dr. Salisbury in the ague bottom of the Mississippi river, opposite Keokuk, Iowa, lat. 10° 25′. Not being provided with a suitable microscope, I was unable to discover the microscopic algæ described by the doctor. I was pleased, however, to find the fungi, samples of which I send you. Generally, it answers Salisbury's description." He adds, "By placing the cake of earth sent you in a plate, and adding water enough to make it of about the consistence of potter's clay, and keeping it at a temperature of above 60 deg., you will find a fresh crop of the plant to develope, and you will thus have an opportunity of studying them. Should you allow them to flourish and remain uncovered in your room, you might have the satisfaction of demonstrating the 'cause of ague.' This fungus was first found, so far as I know, by Dr. J. P. Safford, of Keokuk, who was kind enough to search for me while I visited an ague patient. In the locality of their growth they are to be seen in myriads, and near them, even on elevations of over one hundred feet, everybody had the ague. The course of this disease seemed *pari passu* with that of the plant."

CEMENTS.†

A good rubber cement may be prepared by dissolving one part india-rubber in two parts linseed oil, and adding to the solution a sufficient quantity of bole, say about three parts.

For amber and tortoiseshell, a cement is made by mixing together equal parts of mastic and linseed oil, and warming gently. This cement should be used warm.

To unite wood to wood, a thick solution of shellac in alcohol may be used. It is well to put a piece of fine gauze or crape between the broken surfaces of wood, and then press them tightly together until the cement becomes perfectly firm. Another good, durable cement for woodwork is made by fusing together shellac, mastic and common turpentine, and adding some broken isinglass.

For attaching small objects to anything turned, a mixture of colophonium, turpentine and yellow wax, with the addition of a little pulverized sealing wax, answers nicely. The cement sets quickly and holds well.

To fasten knives and forks in silver handles, a mixture of 2 parts of melted black pitch and 1 part of fine brick dust may be used. It must be used warm.

A varnish or cement to protect wood from the action of mineral acids, alkalies and corrosive gases like chlorine, is made from 6 parts of colophonium and 3 parts of wood tar by heating together in an iron kettle on a furnace in the open air, and then stirring in 4 parts of fine brick dust. The varnish is applied with a brush while warm.

An excellent cement for glass is made by dissolving 1 part india-rubber in 60 parts of choloroform, then adding 34 of mastic, and letting it digest for a week at a gentle heat. This cement is also applied with a brush, and is especially distinguished by its transparency.

Another cement for glass and porcelain is made by digesting small pieces of isinglass in 16 times their weight of water for 24 hours. The solution is evaporated to one-half, strained, and, while still hot, 8 parts of alcohol added, and at the same time a solution of 1 part mastic in 6 parts warm alcohol. One-half part of finely-powdered gum ammoniac is triturated in the warm solution until the whole mass is homogeneous. When used, both the cement and the object to be mended are warmed.

* From the 'British Medical Journal.'

† From the 'Journal of Applied Chemistry.'

This cement is highly recommended for its adhesive qualities.

GLUE AND GUM CEMENTS.

These are very tender and well adapted to mending ornaments. They resist the action of water and atmosphere. There are various kinds of these cements for bone, ivory, whalebone, mother-of-pearl and precious stones.

One of these is made by dissolving 2 parts isinglass and 4 parts colourless glue in 60 parts water, evaporating to half its volume, then adding 1–15 part mastic dissolved in 1 part alcohol, and stirring in 2 parts zinc white. The surfaces are warmed when the cement is applied to them. This cement holds well, dries easily, and may be kept a long time in tightly-corked bottles.

For bone, ivory, whalebone, mother-of-pearl, etc., a cement with a beautiful gloss may be prepared as follows:—Soak common cabinetmakers' glue in hot water, warm the jelly formed, add enough pulverulent slaked lime to give it consistency. Warm the object to be cemented, clean the surfaces carefully, apply the cement and tie the parts firmly together. In a few days it gets very hard. Even common glue, with pulverized chalk stirred in, makes an excellent cement for wood and metals.

For fastening leather to metal, the metal should be coated with a hot solution of glue, and the leather with a hot extract of nut-galls. Allow them to dry quietly, and they adhere well.

For porcelain, the well-known white-of-egg cement is best. To prepare this it is only necessary to stir the white of eggs into quite a stiff solution of glue, and then apply to the fracture.

A cement of gum for porcelain is made by pulverizing 4 parts of oyster shells and mixing intimately with 2 parts pulverized gum arabic. The powder is kept in a well-stoppered bottle, and when needed for use is rubbed up with white of egg, or warm water, to a thick dough, applied to the object and dried by a gentle heat. Another cement for glass and porcelain is made from 8 parts well-burnt pulverized alabaster gypsum and 2 parts fine gum arabic, mixed with water to a thick paste, and 40 to 50 drops of oil of turpentine added to an ounce of the cement.

CEMENTS FROM CASEIN.

For glass, porcelain, stone and wood, the very best cement is made of a suitable quantity of old cheese rubbed fine and mixed with water to a thick magma, and a fourth part of pulverized lime added.

A still stronger cement for the same purpose is made by slaking 1 pound of quicklime in water, and mixing with $\frac{3}{4}$ pound pulverized lime or sandstone and 1 pound pulverized cheese. Before using, it is well to moisten the fracture or edges with warm water.

A so-called casein waterglass is made as follows:—The casein of skimmed milk is separated from it by the addition of acetic acid, filtered, and the acid washed out with water. The pure caseine thus obtained is mixed with six times its volume of concentrated waterglass. This cement is thoroughly commendable, and well repays the trouble taken to make it.

An excellent cement for artificial meerschaum, and one that may be used to give consistency to silk goods or to coat artificial flowers and court plaster, to give more adhesiveness and firmness, is made by rubbing two to four parts of the above casein with cold borax solution till a thick liquid is obtained that becomes clear on standing. This also renders goods waterproof.

WATERGLASS CEMENTS.

For glass, earthenware, porcelain, and all kinds of stoneware, these cements are excellent. A cement for glass and marble is prepared by rubbing together one part of fine pulverized glass and two parts of pulverized fluorspar, and then adding enough waterglass solution to give it the consistency necessary in a cement.

Waterglass mixed with hydraulic cement to a thick dough makes a good cement for the edges and joints of stone and marble slabs. It is well to mix but little at a time, as it hardens very quickly.

LIME, GYPSUM, CLAY AND CEMENT, MIXED WITH WATER, OIL OR BLOOD.

For cementing stone and for filling crevices in buildings, before they are painted, the masons use a cement made of fresh blood, slaked lime, brick dust, broken up coal ashes, hammerslag and sand in all proportions. This excellent cement hardens quickly, and offers great resistance to the action of the weather.

A lime cement for connecting water pipes, bathing tubs, etc.; a mixture of two-thirds fine brick dust, two-thirds unslaked lime, and two-thirds hammerslag, is made and stirred up with lye or hot oil to a stiff dough.

Another cement, intended to render Hessian clay retorts impenetrable, is obtained by rubbing freshly slaked lime into a concentrated solution of borax. The solution is applied with a stiff brush and allowed to dry, after which it is heated until the glazing begins to fuse.

Clay mixed with water and fresh warm blood, containing some unslaked lime, is used in Germany to close joints in stoves. The cement is applied while the stove is hot. Wood ashes, fire clay and salt mixed with water is used for the same purpose. Fat and burnt clay, in equal proportions, moulded with water into a dough, is also used.

Plaster of paris mixed with water and a cold solution of alum is an excellent cement for stoneware. It sets slowly, but becomes as hard as stone.

IRON CEMENTS.

Their essential constituents are iron filings or borings. By the addition of some common salt or sal-ammoniac they are rapidly oxidized, and the cement being thereby increased in volume completely fills the crevices where it is put. An excellent luting or cement for the joints and crevices in iron surfaces, and for rendering tight cast-iron steam and water pipes and water tanks is made of filings of cast iron. The filings are sifted to obtain those of the size of a grain of rice, and then rubbed with horse urine and one-half part salt ammoniac, well worked together, and an equal quantity of flowers of sulphur added. The mass is hammered until it gets warm, and then cold, and, finally, it begins to be brittle. In this condition it is put in the joints, and soon hardens. The surfaces where it is applied must be free from rust. Greasy and oily substances are most readily removed by rubbing with cotton dipped in benzine. The cement keeps best under water.

Another good iron cement is made by stirring 5 parts clay, 1 part salt, and 15 parts iron filings together with vinegar to a magma. It will stand heat, and is used for bellows and air pipes.

OIL CEMENTS.

An excellent oil cement for porcelain and for luting of retorts, flasks and porcelain evaporating dishes is obtained when ordinary brick dust is powdered, sifted and mixed with an equal quantity of red lead, and then rubbed, under great pressure, into old boiled linseed oil to a thick paste, which is mixed with coarse sand to the stiffness of cement. When a dish is to be covered with it, paste is applied before the sand is put in, and the sand then strewn upon it. The dish is afterward exposed to a steady heat for a long time.

For larger vessels take 6 parts litharge, 4 parts fresh-burnt pulverized lime and 2 parts white bole, and mix with cold linseed oil.

To fasten metallic letters to a smooth surface a cement is made as follows:—30 parts copal varnish, 10 parts linseed oil varnish, 6 parts crude oil of turpentine, 10 parts glue dissolved in a little warm water, and 20 parts pulverulent slaked lime. It is very pliant and soon hardens.

To unite copper and sandstone, take $3\frac{1}{2}$ parts white lead, 3 parts litharge, 3 parts bole, 2 parts broken glass, and rub up with two parts linseed oil varnish.

As a polish for gravestones, basins, etc., a paint is made of 9 parts of finely sifted and burnt brick clay and 1 part litharge, mixed with a sufficient quantity of linseed oil.

For connecting cast-iron water pipes, 12 parts Roman cement, 4 parts white lead, 1 part litharge, and $\frac{1}{2}$ part colophonium are pulverized and mixed; from $2\frac{1}{2}$ to 3 pounds of it is triturated with old linseed oil, in which is boiled 2 ounces of colophonium.

Another for the same purpose is made of equal parts of burnt lime, Roman cement, potters' clay and clay, separately well dried, finely ground, sifted, well mixed and triturated with linseed oil. Common lead lute for stopping openings in apparatus is best made from litharge and red lead mixed with old boiled oil. In all cases the surfaces must be clean. They stand well under water.

As lead lutings are somewhat expensive, the following is recommended:—Take 2 parts red lead, 5 parts white lead, and 5 parts of the finest clay, and mix with boiled linseed oil.

A good oil cement for wood, especially for antique carvings, is made of 1 part pulverized slaked lime and 2 parts rye flour, mixed with linseed oil varnish. It takes any desired color and polish.

To make water holders tight we may use pulverized slaked lime and cod-liver oil.

A cement to make chemical apparatus tight can be prepared from oil cake or pressed almond cake rubbed with water.

MISCELLANEOUS CEMENTS, ETC.

Furniture polish:—Moisten 120 parts beeswax with oil of turpentine, and add 7·5 parts finely pulverized resin, and enough aniline red to give the desired mahogany colour.

Oil cement:—100 parts red lead, 250 parts white lead, 200 parts pipe clay: mixed with boiled oil.

Water cement:—100 parts slaked lime, 190 parts brick dust, 160 parts sand, 50 parts blacksmiths' dross, 50 parts powdered lime; mix with water.

Another:—600 parts iron filings, 100 parts ignited sand, 100 parts powdered slaked lime; mix with water.

Iron and blood cement:—100 parts pulverized lime, triturated with bullock's blood, 290 parts cement, and from 5 to 10 parts iron filings.

FORMULAS FOR POULTICES.*

The article "Cataplasm" in the new *Dictionnaire des Sciences Médicales* has been worked up by M. Brochin as completely as possible to the actual state of our knowledge of this ancient method of treatment. Amongst the opinions of authors and the modern modes of compounding cataplasms, M. Brochin cites those of Cayol, Broussais, Réveillé-Parise, and especially Velpeau and Trousseau. The editor of the *Journal de Médecine*, from whom we quote this article, observes that he has had the opportunity of following the last-named illustrious physician for some years, and never heard him order either a bath or a cataplasm; occasionally, however, and with a certain air of solemnity, he would order the poultice. This was made nearly as follows:—

Extract of Stramonium, or
Extract of Belladonna;
Extract of Opium;
Camphor in Powder;
Water. Of each 10 parts. Mix.

A bread poultice having been made, some camphorated alcohol is to be boiled with it; the paste should then be enclosed in a little muslin or tarletan, and the surface watered with the above mixture. It is then to be applied, and covered with some impervious cloth and a large piece of flannel. M. Brochin leaves out the camphor in powder, and replaces it with ten parts of ether. This topical application, which is rather expensive, can be retained in place several days. Trousseau only employed it in grave cases, such as mono-articular arthritis with acute osteitis and puerperal arthritis. He prescribed calomel simultaneously, and insisted on perfect immobility of the limb. The following is a narcotic poultice prescribed by MM. Bouchat and Desprès:—

Powdered Hyoscyamus Leaves;
" Conium Leaves;
" Belladonna Leaves;
" Solanum Tuberosum Leaves;
Linseed Meal. Of each 20 parts.
Decoction of Poppyheads, q. s.

Conium is also used in poultices specially intended for the relief of superficial cancers:—

Bruised Carrots, 500 grains;
Powdered Conium Leaves, 30 grains;
Powdered Opium, $\frac{1}{20}$ grain.

The following is intended to act as a diuretic poultice:—

Bruised Squill, 100 parts;
Nitrate of Potash, 10 parts.

And this to render the emission of urine less painful:—

Bruised White Onions, 6 in number;
Leaves of Parietaria, 50 parts;
Decoction of Marshmallow, q. s.

Both may be applied over the pubis.

* Practitioner, from the 'Journal de Médecine.'

THE ADULTERATION OF FOOD ACT.

The Local Government Board has officially announced its approval of the appointment of Dr. Whitmore, the medical officer of health, as public analyst of food, drink, and drugs, for the parish of St. Marylebone. The Bethnal Green Vestry have elected Dr. Sarvis as analyst for the district under the provisions of the Adulteration of Food Act; and at the last meeting of the Board that officer submitted a list of apparatus required for the duties of his office, and suggested that the room occupied as his office should be fitted up as a laboratory, and that a vote should be passed empowering him to spend a sum not exceeding £100. He estimated that the fittings and apparatus would cost about £50, the chief requisite being a microscope, which would cost £22. The mention of the cost of the last-named item was received with much laughter, and Mr. Jackson, a vestryman, intimated that he possessed a laboratory wherewith he could do almost anything, and which only cost 20*s*. Mr. Paterson, another vestryman, remarked that the microscope of Dr. Quekett, a man who attained the highest eminence for his analytical researches, cost only £2. The Vestry then appointed a committee of seven to ascertain Dr. Sarvis's requirements.—*Times, Jan.* 28.

The Local Boards and Vestries of the parishes and districts within the metropolis, have now with two exceptions, complied with the provisions of the Adulteration of Food Act, by the appointment of official analysts. The Act gives the local authorities the option of making the appointment by fixed salaries, by allowances for each analysis, or partly by salary and partly by allowance; and all these alternatives have been adopted by the various boards. In Mile-end Old Town, Dr. Corner, the medical officer of health, has been appointed analyst, the question of salary being left in abeyance. In St. Pancras, Dr. Stevens has been nominated. In Hackney, Dr. Tripe, the medical officer, has been elected, the point of salary being left open for future consideration. In St.

George's, Hanover Square, and Chelsea, it has also been resolved to include the office of analyst in the duties of officer of health. The Whitechapel Board have appointed Dr. Meymott Tidy, professor of chemistry at the London Hospital, at a fee of one guinea for the first hundred analyses, and a decreasing scale for cases beyond that number. Dr. Hardwicke has been elected for Paddington, Dr. Vinen for St. Olave, Dr. Muter for Wandsworth, and in St. Saviour's the office was voluntarily undertaken by the medical officer of health. In Poplar the appointment has been given to Dr. Woodforde, one of the medical officers of health, payment being made for each analysis on a fixed scale. Dr. Letheby has been appointed analyst for the City; Dr. Bernays, professor of chemistry at St. Thomas's Hospital, has been appointed for Camberwell, Dr. Whitmore for Marylebone, Dr. Pavey for St. Luke's, Dr. Rogers for Limehouse, Dr. Muter for Lambeth and St. George's, Southwark. With three exceptions the local authorities of each district have elected their own medical officers of health as analysts, and in Whitechapel the office was refused by Dr. Liddle, the medical officer, on the ground that medical officers were generally not competent to undertake the duties contemplated by the Act.—*Times*, Jan. 29.

CONVERSAZIONE OF THE MELBOURNE PHARMACEUTICAL SOCIETY.

The second annual conversazione of the above Society was held on Thursday, November 28th, at the residence of the president, Mr. Johnson, at St. Kilda. About 150 persons were present, including many of the leading medical practitioners of Melbourne and suburbs, together with a number of ladies. The rooms and garden were very tastefully decorated and illuminated. The President, in a few remarks, opened the proceedings, and announced the programme of the evening, which consisted of short lectures, of some ten minutes' duration (interspersed with music), from Baron Von Mueller and Messrs. Sydney Gibbons, R. L. J. Ellery, Government astronomer, and J. Bosisto, hon. secretary. Dr. Ralph and others exhibited microscopes, and during the evening the company had the opportunity of inspecting a number of valuable instruments, medical and chemical, and some rare preparations. In one of the rooms which forms part of the suite Mr. Pritchard highly delighted the visitors by the exhibition of the kaleidograph, an instrument invented by himself, intended to fix permanently pictures for patterns, being an adaptation of Sir David Brewster's discovery. During his remarks, Baron von Mueller showed that pharmacy had in different parts of the world, and in all ages, produced some of the most eminent philosophers the world has seen. A great number were mentioned who had passed away, and a goodly few of those living, such as Liebig, Rose, Wittstein, etc. Baron von Mueller also dwelt upon the aid pharmacy had rendered to medical science generally. Mr. Sydney Gibbons lectured upon the character of the water supply, illustrating his subject with some beautiful drawings. Mr. Ellery followed upon "Light, and the Nature of the Different Varieties and Effects upon Colours," and illustrated the subject with some marked experiments. Mr. Bosisto followed upon "The Sources of Perfume," showing that all plants had a perfume *sui generis*. The processes adopted for extracting these were explained very lucidly, and a number were exhibited obtained from Victorian plants, some of remarkable fragrance. Other gentlemen, including Messrs. Newberry, Blackett, Glover, Hill, Grimwade, Kennedy, Johnson, Wragge, etc., assisted greatly by contributions and explanations in filling up the time till supper, which was substantially and abundantly provided. During the interval the hall was cleared, and the entertainment terminated with a ball, which was kept up with great spirit and heartiness till three o'clock.

ANNUAL SOIREE OF THE MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

This event took place on the evening of Thursday week, the 23rd of January. As on the similar occasion last year, it was held in the spacious Assembly Room of the Royal Hotel, Birmingham, and it proved a most successful and enjoyable evening. About 250 guests assembled, composed of chemists and a few leading medical and scientific men, with a large number of ladies. An attractive display of objects of scientific, chemical and pharmaceutical interest, occupied several tables in the room during the earlier hours of the evening. Amongst these Messrs. Southall, Son and Dymond, exhibited several new and rare pharmaceutical products; Messrs. P. Harris and Co., a number of chemicals and a variety of Giessler's vacuum tubes in operation; Messrs. Hopkins and Williams some interesting and rare chemicals: Messrs. John Wright and Co., a series of models of Wallace's patent gas burners, heat regulators of novel construction, a small laboratory boiler heated by gas, a portable Turkish bath, etc. Mr. O. Sargent, experiments with yellow flame on a variety of colours. A number of microscopes, stereographs, photographs, pictures, with a variety of other objects, were also supplied by several gentlemen, forming altogether a display of much interest. Mr. Alfred Bird exhibited a fine cabinet of harmonized glass bowls, on which he played several tunes. At half-past nine o'clock, Mr. C. J. Woodward, B.Sc. of the Midland Institute, delivered a short and brilliant lecture on "Flame," which was highly appreciated. Dancing commenced about ten o'clock, and was kept up with great spirit and zest until after two o'clock, when the company separated after a most hearty re-union, which will class as one of the best of those which have distinguished the growing interests of chemistry and pharmacy in the Midland Counties.

THE BROUGH FUND.

For the Maintenance and Education of the Five Children who have been left unprovided for, by the untimely death,—at the age of thirty-eight—of

JOHN CARGILL BROUGH,

For Ten Years Editor of the 'Chemist and Druggist,' and the First appointed Editor of the 'Year Book of Pharmacy.'

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Amount previously published	374	3	6
Proceeds of a Lecture delivered by Mr. Charles Sharp, formerly Librarian of the Pharmaceutical Society, assisted by Mr. Charles Dyall, at the Liverpool Institute, December 6th, 1872	14	3	3
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The Pharmaceutical Journal.

SATURDAY, FEBRUARY 1, 1873.

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

VERMIN KILLERS.

THE recent prosecutions of chemists and druggists for the sale of vermin killers will, of course, attract considerable attention from the trade, and consequently it seems desirable to revert to the subject here, for the purpose of reiterating the suggestions we have previously offered in the interests of the trade respecting the sale of these preparations.

In the first instance, however, we may point out that the chief practical difficulty in this matter arises from a supposed ambiguity in the terms of the additions made in December, 1869, to Schedule A of the Pharmacy Act, by which vermin killers were comprised among the poisons within the meaning of the Act. Perhaps it should rather be said that this difficulty is due to differences of opinion as to the meaning of the provisions respecting "vermin killers." Thus it has been argued that inasmuch as only four out of the ten additions to the schedule are specifically directed "to be deemed a poison in the first part of the Schedule A," and since "vermin killers" are not among these four, the sale of vermin killers does not involve the precautions required with poisons in the first part of Schedule A.

This argument has been met on the other hand by reference to the fact that, among the four additions which are to be deemed poisons in the first part of the schedule, "preparations of strychnine" are comprised, while preparations of arsenic were originally included in the first part of the schedule, and since certain vermin killers are notoriously preparations of arsenic or of strychnine, it has consequently been urged that they should be dealt with as such in the selling of them.

Then again it is argued that those additions were made without a knowledge that "vermin killers" contained or were preparations of arsenic or strychnine, but this contention has never been much insisted upon, and rightly so, for it would not be complimentary to the framers of the additions. The same perhaps may be said of the idea that the term "preparations" refers only to articles intended for medicinal use, for it must be borne in mind that the regulations apply only to the "sale" of poisons, and not to dispensing, or even to storage.

But individual members of the trade have at times endeavoured to maintain that they were under no obligation to know that a "vermin killer" contained arsenic or strychnine; that there was no reason why they should know this; that they sold these preparations as "proprietary articles," and that for these reasons the precautions directed for poisons in the first part of the schedule should not be required in the sale of "vermin killers." Some have even gone so far as to urge that in a shop full of customers, the time requisite for registering the sale of "vermin killers" could only be given to the detriment of the vendor.

We must confess that we cannot sympathize with those who hold these views, nor is it easy to understand the negation of the universal instinct of self-protection which they seem to involve. Looking at the matter merely from this point of view it appears inconceivable that the possibility of being charged with the infringement of the law should not induce greater caution. If the chemist and druggist is not under an obligation to know that "vermin killers" contain strychnine or arsenic, surely it would be to his interest to ascertain. Even the sale of such articles as "proprietary" does not in any degree lessen the need for this, for they are sold without the stamp which entitles them to be regarded (as "patent medicines") exempt from the provisions of the Pharmacy Act. As regards Battle's Vermin Killer the suggestion of our Warrington correspondent, that the proprietors should, when sending it out, mark on the wrapper of each packet the quantity of the potent poison it contains, is one which in the light of recent fatal cases of poisoning by means of this article seems desirable for every one dealing in it to adopt, in order to avoid the risk of being placed in the same unenviable position as Mr. MOSES and Mr. GILLETT.

We heartily endorse also the proposal that chemists should agree to sell these articles only in such a manner as would remunerate them for the trouble of registration, and we may add that this course was recommended in this Journal last September. The public claim to be protected against accidental poisoning and from the consequences of the too easy obtaining of poison, but they are not so unreasonable as to require that protection at the cost of chemists and druggists. In regard to this point, Mr. SLIPPER well remarks in his letter that it behoves chemists and druggists to show by their careful manner of dealing with poisons that it is a gain to the community to have an educated, well regulated body to store and distribute poisonous articles when they are required. This is an object much more worth securing than exemption from the necessity of registering sales, which after all, by Mr. SLIPPER'S account, does not seem to be a very troublesome matter.

To judge from some of the statements made at the recent trials relating to this subject there seems to be a great deal of misapprehension as to the position of chemists and druggists in regard to it, and from numerous letters lately received it seems that while there is a general disposition to comply with the law there are many who, to use the words of one correspondent, "are ignorant of the present list of poisons which require registering."

The subject, however, has been so frequently referred to in this Journal that it is not easy to understand why that should be, especially since it was last August brought forward as matter for discussion at the Council, and the proceedings then and on several subsequent occasions were fully reported.

"MAJOR ASSOCIATES."

One of the existing bye-laws of the Society, made immediately after the passing of the Pharmacy Act, sec. xi., clause 4, provides that "the names of persons registered as Associates or Assistants shall, upon their registration as Pharmaceutical Chemists, be removed from the Register of Associates or the Register of Assistants, as the case may be." The effect of this is that when an Associate of the Society passes the Major examination, and thus becomes eligible as a Member of the Society, he ceases to be an Associate; in fact, his connection with the Society is thereby terminated unless he presents himself for election as a Member.

By some unaccountable oversight, however, the bye-law has hitherto been disregarded, and by reason of this oversight some of those who passed the Major examination have been from time to time registered as Associates forming the class of Major Associates. Of course, when the true state of the case became apparent it also became imperative for the Registrar to discontinue the illegal practice that had crept in. According to the Act his duty is clear and cannot be avoided, and, consequently, he has given notice to those already registered as Major Associates that by reason of the bye-law above referred to their names must be removed from the Register of Associates, and that they must either take up the Membership for which they are eligible or cease to be connected with the Society.

To this course there was indeed no alternative, for there is really no such grade as that of Major Associate, and it is not even in the power of the Council effectively to alter the bye-law. Consequently some 149 persons have been removed from the Society's Register. We are glad to learn, however, that nearly one-half of the number have already sent in applications for Membership, but there seems to be on the part of some an idea that an injustice has been inflicted on them; and in our correspondence columns will be found two letters on this subject, to which, as they are mainly interrogative, it is desirable to refer here in order to point out the erroneous impressions under which the writers labour.

In addition to what has already been said as to the imperative necessity of the step that has been taken, it must be noted that so far from there being any hardship as regards those affected, the fact is, that for such time as they have been improperly registered they have enjoyed the advantages of connection with the Society for only half the amount of subscription that should have been paid. They have been, in this respect, actual gainers by the oversight of the bye-law in question. It is, therefore, unjustifiable that they should entertain any feeling of being "done;" and as regards the suggestion that they should have received fair warning, it must be remembered that they have still less ground for dissatisfaction, and are really in as good a position as if they had been warned five years ago.

It is equally unreasonable to speak of the Society having any motive for the course taken; and the view that it was prompted by the idea of a probable increase in the annual revenue is, at least, inconsistent with the history and policy of the Society as an educational body.

As regards the possible effect of the recent action we cannot share our correspondents' anticipation of consequences disadvantageous to the Society or to the higher qualification of those entering the business. In the first place the large proportion of applications to be placed in the grade of Members is sufficient to prove that connection with the Society is estimated more highly than to be prevented by a necessity for the payment of an additional half-guinea a year, and we venture to believe that this view will yet prevail with the majority, if not with all those who have been perhaps somewhat startled at receiving the Registrar's notice as to their position.

Again, there is no ground for supposing that the operation of the bye-law will in any degree depreciate or interfere with the desire to obtain the "Major" qualification, for this eminently desirable step does not by any means involve "an extra half-guinea yearly," and does not even require connection with the Society as an indispensable thing this being entirely optional.

It may here be remarked incidentally with regard to the Major qualification, conferring a right to the title of Pharmaceutical Chemist, that although it may not, at the present time be valued so highly as it should, yet we do not hesitate to say that it has even now a very appreciable value to those seeking engagements, especially in the position of managers, and there is every reason to believe that this will augment. It has always been the aim of the Society to promote the idea that the Major qualification was the proper standard of competence, and it is only by the support of those who acquire that qualification, whether they become Members or not, that we can hope for the attainment of the Society's original purpose of raising the status and condition of the trade.

We would suggest, therefore, that immediate advantages should not be dwelt upon so much as the measure by which the value of the Major qualification is to be gauged, but that its possession should be regarded as affording evidence that the holder is engaged in carrying out the good work of pharmaceutical improvement inaugurated by the founders of the Society, and is thereby entitled to the goodwill and esteem of his brother pharmacists, as well as to the respect of the medical profession and the public.

LANCET CHEMISTRY.

In the *Lancet* of last week we read of a wonderful chemical discovery. Another new ether! "Light ether"—*par excellence*, as the *Lancet* says—"consists of four atoms of carbon, ten of hydrogen, and one of oxygen." Our learned contemporary adds, "as compared with hydrogen, its vapour-density is 36."

Persons who are familiar with the *Lancet* will not be very much surprised to note that the ether consisting of "four atoms of carbon, ten of hydrogen, and one of oxygen," is our very old acquaintance the common sulphuric ether $(C_2H_5)_2O$ (ethylic ether). Nor need they be much astonished to learn that the vapour-density as compared with hydrogen is 36, inasmuch as the correct number is only 37. Respecting the wonderful compound in question, our worthy contemporary further remarks, "the temperature of the human body suffices to make it boil violently, as may easily be tested by putting a small quantity of it on the head." Our contemporary had evidently done so.

THE CALENDAR FOR 1873.

An advertisement in another part of this Journal announces that the new Calendar of the Pharmaceutical Society is now ready. Many of our readers are acquainted with the nature of the matter contained in editions of former years, and to them it will be sufficient to say that the Calendar for 1873 has been carefully corrected and modified so as to supply information of the most recent date. To those who are not familiar with the Calendar, we may say that, besides the lists of persons connected with the Society, it contains the Amended Regulations of the Board of Examiners, which are to come into force in 1874; the new regulations for the Jacob Bell Memorial Scholarships after the next competition; and extracts from all Acts of Parliament and other regulations in which chemists and druggists are specially and practically interested. An investment of the small sum annually charged for this publication would often save much anxiety and doubt, and frequently avoid the more lengthy process of appealing to our correspondence column.

THE CHARGE FOR DRUGS.

In pursuance of the principle on which we have before published quotations from the daily newspapers, we have much pleasure in directing the attention of our readers to the following extract from a recent number of the *Echo*, as affording evidence that although the dictates of common sense and British love of fairness are, in some exceptional instances, disregarded and sacrificed to the desire for producing sensation at any cost, those qualities still prevail among the conductors of the public press:—

"A great deal has been made lately of the very simple fact that you can buy a simple bottle of physic at a lower price in one part of the town than in another, and the chemists and druggists have been held up almost as rogues because of this well-known circumstance. A correspondent reproaches us for taking no part in the outcry. We will state generally our reasons for not doing so. In the first place, we think, as a rule that tradesmen have a right to make what charges they find for their own advantage. The proper and sufficient check against a system of over-charge is free trade and unrestricted competition. If we found the chemists adulterating drugs, our anger against them would be far more severe than any that has been exhibited. But to treat the members of this highly-skilled and intellectual trade as mere dealers in drugs is very absurd. A chemist who lives in a neighbourhood where the poor get all or nearly all their medicines from public hospitals and dispensaries, who is not called upon to keep the most costly drugs, nor those of the best quality, or in the best condition, where the resident doctors dispense their own medicines, of course, does a business very different in character, and requiring far less skill, than one whose whole time, as is the case with most of the leading chemists in the West End, is in great part occupied in acting, we may say, as the physician's assistant in the nicest possible operations with drugs, when life or death is but the matter of a half grain. To regard men who have such duties continually in hand as mere retail dealers in rhubarb and castor oil is only less ridiculous than to complain of Sir W. Gull for charging fifty guineas for a visit when the parish doctor can be had for as many pence."

We have also especial pleasure in coupling with the foregoing another extract, from the *British Medical Journal*, inasmuch as it realizes our anticipation that the representatives of the medical profession would not fail to repudiate and condemn the abusive, inconsiderate and unfounded charges in which the *Lancet* has recently indulged, and against which we regret having had occasion to protest:—

"It is not surprising that persons who have no technical knowledge of the subject should fall into absurd errors in discussing such a question as the charges of druggists for dispensing medicines; but it is unfortunate that those who have better information, and should be able to frame a more trustworthy judgment, should follow them in their errors. A writer in a daily paper has discovered that he can get a prescription dispensed far more cheaply in Mile End than in Mayfair; and a medical paper follows the popular lead in exclaiming that this is very sad and a proof of extortion. In the first place, the same may be said of herrings or potatoes, or of boots or trousers. The expenditure of a West End druggist to meet the requirements of a more wealthy and fastidious *clientèle*, is on a very different scale from that of the small druggist of the back streets. Even on the ground of ordinary trade-differences of price depending on the differences between the East and West, the poor and rich, a considerable difference in price is to be expected for articles much more delicately chosen, more carefully prepared and issued. But the fact which medical writers may be expected to bear in mind is, that there is the best reason for desiring to remove the position of a pharmacist from that of a person bound to merely trade considerations. Patients and physicians have a common interest in encouraging the higher education of pharmacists—in offering the rewards of higher remuneration and higher social standing for better education, professional trustworthiness, the cultivation of nice skill, and a professional standard of decorum. These are things which are to be encouraged by being paid for. The skill of the chemist, and his professional self-respect and knowledge, are appreciable elements in his value and in the value of his drugs. The extra sixpence or so on the bottle of medicine or the box of pills represents not only the return for the larger capital needed for a high-class business, but the tax which we are willing, within reasonable limits, to pay for greater neatness and elegance, promptitude, security, freshness of drugs, a large and well drilled staff, and a known reputation, won slowly, and scrupulously preserved. We are willing to pay for these immaterial elements in our dispensing, even more than for the material. It is absurd and mischievous for medical writers to ignore these considerations. A dead level of low prices is incompatible with the constant progress of pharmaceutical education and practice, which it is an important object to promote."

WOMEN AS PHARMACISTS.

The *Répertoire de Pharmacie* for the present month refers to the recent decision of the Council to admit female students to the lectures at the London School of Pharmacy, and also to the two other questions raised before the Council, viz., the admission of women as members of the Pharmaceutical Society, and their admission to compete for prizes at the end of the session, remarking that when these questions came before the Council they were rejected by the less gallant members, who would not admit the possibility of a woman taking part in the Council, or perhaps one day presiding over its deliberations. England, however, is not the only country where this question is being agitated. According to the *Gazette d'Augsbourg*, the President of a Society established at Bremen for providing women with a means of subsistence has proposed that all similar societies in Germany should join in a petition to the Federal Council of the Empire, asking that the calling of pharmacist, —or at least, that of assistant-pharmacist,—should be opened to women. The Prussian regulations are opposed to the adoption of this measure, since they require compliance with certain conditions before entering a pharmacy; but these conditions might be replaced by a certificate of a course in a superior female school recognized by the State, and proof of a knowledge of Latin sufficient to understand the pharmacopœia and medical prescriptions. The question has also been considered in Pomerania, especially at Koeslin, and it has been determined in Holland. In fact, the industrial school for women, established at Amsterdam in 1869, has already trained five young women for the profession of pharmacy, and it is training at the present time seven others for the same destination.

A CHEMIST AND DRUGGISTS' SOCIETY IN IRELAND.

The first meeting of the Chemists and Druggists' Society of Ireland, established "with a view to obtain a status similar to that secured by Act of Parliament to the Pharmaceutical Society of England," was held in Grafton Street, Dublin, on Monday, January 6th. Amongst the objects set forth in the prospectus are the regulation of prices, the raising the standard of the trade by making it compulsory that youths should pass examinations before being received as apprentices, and the promotion of friendly intercourse between chemists and druggists.

The next Evening Meeting of the Pharmaceutical Society will be held on Wednesday, February 5th, when a paper will be read by Dr. Arthur Leared upon "Some Drugs from Morocco." The chair will be taken at half-past eight o'clock.

We learn from the *Brighton Gazette* that a vacancy on the bench of magistrates for the Borough of Brighton has recently been filled by the appointment to that honourable office of Mr. William Dawson Savage.

According to a recent consular report from Guayaquil, so great has been the falling off in the demand for cundurango that, instead of that drug fetching 100 dollars per quintal, as it did for a time, several commercial firms in New York have declined to receive consignments of it unless the freight is prepaid, since they cannot sell it for enough to cover the cost of its carriage from Guayaquil to New York.

Two important cases relative to the sale of drugs in France have recently been decided. On the 11th of June, 1872, the Ninth Chamber condemned a wine merchant to a fine of 500 francs and 50 francs costs for having sold quinine wine, he not being a pharmacien. The wine merchant having appealed against this judgment, it came before the tribunal on the 5th of December, when not only was the judgment confirmed, but a second penalty of 500 francs with 100 francs costs was imposed upon him for having sold quinine wine at the Exposition of Domestic Economy.

On the 29th of November, also, the Ninth Chamber condemned a female herbalist to a penalty of 500 francs for having sold cod-liver oil; and to 50 francs penalty and 300 francs costs for a sale of extract of cod-liver oil capsules. Upon appeal this judgment was confirmed a few days since.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The sixth general meeting of the session was held at the Royal Institution on January 16th; the President, Mr. Edward Davies, F.C.S., in the chair.

Mr. Mason exhibited several interesting specimens of Indian drugs, etc., and explained their characteristics and uses.

Mr. Shaw called attention to the alteration of the schedule of poisons.* Vermin killers known to contain any of the poisons classed in Part 1 of Schedule A required to be registered accordingly; those which did not contain any of the poisons classed in Part 1 remained as hitherto in Part 2.

A paper "On Lead and its Preparation" was read by Mr. Thomas Williams, F.C.S. The author, after describing the different varieties of lead ores, their sources, geological characteristics, mines, etc., exhibited fine specimens of galena (sulphide of lead), anglesite (sulphate of lead), etc, and fully explained what is known as "the Flintshire process" for melting galena in its various stages. He also described Pattison's process for desilverization of lead. Mr. Williams stated that in the United Kingdom alone the production of lead ore is on the average 96,000 tons per annum, which yields about 72,700 tons of metallic lead and 792,700 ounces of silver. The author then described the manufacture of white lead, red lead, litharge, and mentioned some of its applications in pharmacy. The paper was illustrated throughout with some fine specimens of the products alluded to, and after a short discussion, in which the President, Messrs. Parnell, Rigby and others took part, a unanimous vote of thanks was voted to Mr. Williams for his paper, and the meeting adjourned.

BRADFORD CHEMISTS' ASSOCIATION.

The annual meeting of this society was held on the evening of the 28th January. The President, in reviewing the past year, regretted that it had passed with such slight evidence of progress. The only class that had been formed, for a course of Botanical lectures, was poorly attended by the young men in the trade, and gave little ground for hope in the future. After the routine business of the meeting, and the election of the new council, it was proposed by Mr. Rogerson, and seconded by Mr. Harrison, that Mr. Hicks be the President for the ensuing year. Dr. Parkinson moved, and Mr. Rogerson seconded, that Mr. Bell be the vice-president.

The best thanks of the meeting were then given to Mr. Harrison, the treasurer, and to Mr. Newsholme, the honorary secretary, for the valuable services they had rendered the society, accompanied with a request that they would continue their offices for another year. After a few complimentary remarks from Mr. Rogerson to the retiring president, the meeting terminated.

Parliamentary and Law Proceedings.

Prosecution under the Pharmacy Act with reference to the Sale of Vermin Killers.

A case of great importance to chemists and druggists has been brought before the Wolverhampton Police Court, in consequence of the death from poisoning by vermin killer, which was reported at p. 574; Mr. Henson Moses, chemist and druggist, Snow Hill, having been summoned for unlawfully selling certain poisons, to wit, Battle's Vermin Killer, containing strychnine, to Thomas Woodward, deceased, he not having been personally introduced to Mr. Moses, as required by Act of Parliament. Mr. J. E. Underhill appeared to prosecute, and Mr. Thorne defended. Mr. Thorne, on behalf of the defendant, pleaded guilty.

Mr. Underhill said he had little to say respecting the case, but he wished to state that it was one in which they were bound by law to take proceedings against the defendant. A compound, known as Battle's Vermin Killer, had been sold to a person, but he (Mr. Underhill) believed that the defendant, when he sold the article, had no intention of infringing the Act. The defence was that Mr. Moses acted in ignorance of the law, and the prosecution were simply desirous of showing to the defendant and others engaged in the same business that they were obliged to comply with the provisions of the Act of Parliament.

Mr. Walker (magistrate): Is it within the view of the Act that any person being ignorant of the fact that a substance contains poison, they shall be obliged to follow the provisions of the Act?

Mr. Underhill said he would show the Bench why it should be so; the vermin killer was sold as a poison.

Mr. Thorne said the proceedings were instituted at the request of the Borough Coroner, who inquired into the death of the man Woodward, and there seemed to have been some misapprehension about the state of the law on the matter. He (Mr. Thorne) found from the report of the proceedings at the inquest that the Coroner stated that all poisons were within the meaning of the Act, and that Battle's Vermin Killer was included in the schedule. All poisons were not included in the Act, nor was Battle's Vermin Killer mentioned in the schedule; therefore, as far as the Act itself was concerned, his client pleaded not guilty; but in the second section of the Act power had been given to the Pharmaceutical Society of Great Britain to add to the schedule in the Act any poisons which they might think fit, and, in accordance with the power given, a resolution was passed, and submitted to the Privy Council, containing a schedule of poisons, amongst which was Battle's Vermin Killer, which contained a proportion of strychnine. That fact was unknown to his client at the time of the inquest, and was not discovered until the matter had been further investigated. He might state that it was not generally known amongst the chemists and druggists of the district that they were required by the recent regulation to treat that poison in the same way as pure strychnine. He had seen several chemists and druggists with reference to the matter, but he was not at liberty to state their names, they having disregarded the new regulation, being unaware of the poisons which were added to the schedule by the Pharmaceutical Society. His client was in no way accountable for the death of the man Woodward, which was occasioned by poison. No doubt, if his client had asked the question of either the man who bought the compound, or any person who might have introduced him, "What do you want with this vermin killer?" they would have answered that it was required for the ordinary purpose of destroying vermin. That would not in any way have prevented the disastrous effects which followed.

Mr. Walker: Do you plead guilty or not? If not, it will be necessary to prove that the Pharmaceutical Society have included this poison in the schedule.

Mr. Underhill said his friend sent word to say that his client would plead guilty, otherwise he (Mr. Underhill) would have quoted a case bearing upon the point.

Mr. Thorne said his client did not dispute being guilty, but there was nothing in the case to which Mr. Underhill had referred.

Mr. Underhill replied that the case was one which had been tried at the Court of Queen's Bench.

Mr. Thorne: There is nothing in it.

Mr. Walker said if the defendant pleaded guilty it

* The alteration consists merely in the addition of explanatory words.

was sufficient, otherwise the case must be proved in the ordinary way.

Mr. Thorne said his client pleaded guilty, but, having regard to the whole of the circumstances, he hoped that a nominal fine of 1*s*. and the costs would meet the case. He believed the only desire of the prosecution was to give the case publicity, in order that it might be known that Battle's Vermin Killer was included in the poisons mentioned in the schedule.

Mr. Walker asked if the package was labelled poison?

Mr. Thorne replied that it was.

Mr. Walker remarked that he had been under the impression that the chemist himself was ignorant that the packet contained poison. The case seemed to be worse when it was patent by the label on the packet that the compound contained poison.

Mr. Thorne said all poisons were not included in the Act.

Mr. Walker asked if there were any poisons which could be sold without taking the address of the buyer?

Mr. Thorne replied in the affirmative, stating that it was quite sufficient, as far as some poisons were concerned, simply to put down the name and address of the seller; his client supposed that the packet contained one of those poisons. It was a patent medicine containing a compound. There were other things containing poisons in connection with which chemists were not obliged to follow the instructions of the Act, such as chlorodyne, for instance.

Mr. Walker said it was evident that Battle's Vermin Killer was added to the schedule.

Mr. Thorne replied yes, but at the same time chemists and druggists were in perfect ignorance of the fact.

Mr. John Ford (magistrate) observed that the person who sold poisons ought to know the state of the law under which he sold them.

Mr. Thorne said, as far as the Act of Parliament was concerned, there could be no doubt that he had adhered to the same, but the schedule referred to had only been sent round to chemists and druggists since the case had occurred.

Mr. Walker remarked that a chemist was a licensed person, and he ought to know the provisions of his license.

Mr. Thorne contended that his client could not tell what patent medicines were composed of, he not being an analytical chemist. With reference to all poisons which he sold, he was very careful indeed, as might be seen by his books if the Bench thought proper to examine the same.

Mr. Walker said the defendant was entirely guiltless of the death of the man Woodward, but no doubt he sold the vermin killer in ignorance of the law. It was plain that the Act must be obeyed, and that persons who sold the vermin killer ought to take the usual precautions required by the Act. The defendant would be fined 5*s*. and the costs, that being the first offence; for a second offence he would be much more severely dealt with.

Tartar Emetic administered in a Joke.

At the Bradford Borough Court on Tuesday, January 21st, John Wright was charged with administering a poisonous drug to Annie Slater and another in a dramshop in Iregate. It was proved in evidence that the prisoner was seen to take a packet out of his pocket and put part of the contents into two glasses of beer that were standing on the counter. A policeman was called in, and the prisoner given into custody, the beer and the powder remaining in the pocket being sent to an analytical chemist for examination. The prisoner said it was jalap, and that he only did it for a "lark."

Mr. Rimmington, analytical chemist, said he had examined the glasses of ale and the powder. It was tartar emetic, which would poison a person if taken in a large quantity. The powder would not make any difference either in the taste or appearance of the beer. It would depend upon the amount administered whether it would prove fatal or not. The powder was often used as an emetic for the purpose of making persons vomit.

Annie Slater, a young woman residing in Great Cross Street, said she went in with a friend to have a glass in the dramshop on Monday night, and the prisoner, who was there, asked her to have a glass with him. She declined to do so, and he then asked her to drink with him. She had no objection to that, and drank out of a glass which he handed to her. She remarked that it was "very funny beer," and the prisoner said it was old beer. Witness went out directly afterwards, and when she got outside she turned quite dizzy and felt a burning in her stomach. She had never seen the prisoner previously. Her companion also drank of the ale.

Mr. Rimmington, recalled, said that he could not account for the powder producing a burning sensation. It might nauseate the woman and make her feel sick and poorly for many hours.

The witness Slater said that after she had drank the prisoner did so, but only put the glass to his lips and tasted.

Mr. Rimmington, in answer to the Bench, said that half an ounce of the powder would poison a person, and possibly a drachm would. The label on the packet bore the name of a chemist at Eccleshill who was registered. The powder ought not to be sold without a witness being taken to the shop by the purchaser who knew the purchaser and the purpose for which it was required. The book of the chemist ought to show under what circumstances it was sold.

Mr. Berry, for the defence, urged that the prisoner might have felt unwell and got the powder for himself. He had been foolish enough to ask somebody else to drink, which was a very improper thing to do; but as to putting it into two or three glasses, that was not done. He did not think that the prisoner intended to hurt anybody, and the fact that the prisoner had not known the woman before was sufficient to warrant the conclusion that there could not have been any animus on his part in administering the powder. It was a stupid practical joke, and that was all.

Alderman Law said the prisoner would be remanded until Saturday for the attendance of the chemist from Eccleshill.

Mr. Berry: Will you take bail?

Alderman Law: No, certainly not.

Mr. Berry said perhaps they would hear his grounds for asking the question. The prisoner was a respectable man—

Alderman Law: We shall not take bail.

The prisoner was remanded until Saturday, and Mr. Rimmington was requested to analyse the contents of the two glasses.

On Saturday the prisoner was brought up on remand, when James Scott said the portion of powder put by the prisoner into the two glasses of ale was about as much as would cover a shilling.

Dr. Rabagliati deposed that two grains of emetic tartar had been known to prove fatal, although there had been recoveries from much larger amounts, probably half an ounce. A drachm would be considered a very dangerous dose indeed, and in medicine, in order to produce emetic action, they gave one grain. There was, in his opinion, about six grains in the paper produced. In answer to Mr. Mossman, Dr. Rabagliati said that if seven-tenths of a grain were divided into two parts and put into a glass, he should expect emetic action from any person drinking the beer; but should not apprehend dangerous consequences from such a dose.

Mr. Rimmington, analytical chemist, said he had examined the contents of the two glasses produced, and found that one of them contained tartar emetic; but he was of opinion that there was not a quarter of a grain in it. Supposing that three or four grains had been sold, there was still two grains and two-tenths left in the paper.

Mr. Edmund Taylor, chemist, Eccleshill, said on the 28th of December the prisoner called at his shop and asked to be supplied with six grains of tartar emetic for a vomit. Witness said he should not like to sell six grains, and that from one to two grains was considered an ordinary dose. In some cases the doses taken were as much as four grains. Ultimately he agreed to sell the prisoner three grains, and told him that the Act of Parliament required that he should sign for it. He got the prisoner's signature.

Alderman Law: We are very glad that you complied with the Act of Parliament. In addressing the prisoner, Alderman Law said he would be discharged, but the Bench never recollected such a shameful case coming before them in all their experience. He (the prisoner) ought to feel ashamed of himself, and he could not tell how he could manage to face anybody after doing such a dastardly act. The prisoner knew and intended that the emetic should make the girl painfully and distressingly ill. He had never known her before, and had had no provocation whatever. The prisoner ought to be heartily ashamed of himself, and he hoped that would be a caution to him in the future.

Mr. Berry said that was the feeling of the prisoner's friends, who were exceedingly respectable people.

Mr. Gurney said the magistrates thought that they would not have done their duty unless they had thoroughly investigated the whole of the case, and he thought that any one who read the evidence would agree with them. Although it might seem a long time for the prisoner to have been remanded, still under all circumstances it was necessary. If the emetic had been dangerous to life, it would have been the duty of the magistrates to commit the prisoner for trial, but as it was they discharged him, believing that he had committed only an idle disgusting freak.—*The Bradford Observer.*

Death while under the Influence of Nitrous Oxide.

An inquiry has been held at Exeter touching the death of Miss Ida Windham. It appeared from the evidence that the deceased lady had attended at the residence of Mr. Mason, dentist, for the purpose of having a tooth extracted. At her own request nitrous oxide was administered. The medical man who was present noticed the lowering of the pulse before the deceased was completely under the influence of the gas, and an unsuccessful attempt was made to extract the tooth. More gas was administered and the operation completed, when the patient's face suddenly grew livid, respiration ceased, and she shortly afterwards expired.

The jury, after a brief consultation, returned a verdict of "Homicide by misadventure," entirely exculpating the operators.

Obituary.

PROFESSOR SEDGWICK.

On Monday last, the University of Cambridge lost its senior Fellow and oldest Professor. On that day the Rev. Adam Sedgwick, LL.D., F.R.S., F.G.S., Professor of Geology in the university since the year 1818, died at his rooms in Trinity College. For some weeks previously the Professor had been in a very precarious state, and from his advanced age little hope was entertained of his recovery. Born at Dent, in Yorkshire, in 1794, he took his Bachelor's degree at Cambridge in 1808, being fifth Wrangler of that year. In 1810 he obtained a Fellowship; eight years afterwards he succeeded Professor Hailstone in the chair of geology, and continued to lecture for more than fifty years, Professor John Morris being appointed to act as his deputy in 1871. He was elected F.R.S. in 1818, and was President of the Geological Society in the years 1869–71. He was also one of the earliest Presidents of the British Association, he having been elected to the post forty years since, upon the occasion of the meeting of the Association at Cambridge in 1833. He has also filled the office of Vice-President and President of the Geological section on several other occasions.

Professor Sedgwick's studies were chiefly confined to geology, but in that field he was an acknowledged chief. He held a canonry of Norwich Cathedral, and also for many years acted as Secretary to the Prince Consort in his capacity as Chancellor of the University of Cambridge.

Notice has been received of the death of the following:—

On the 11th January, 1873, Mr. William Reynolds, Chemist and Druggist, of Hyson Green, Notts, aged 49.

Review.

Aide-Mémoire de Pharmacie: Vade-mecum du Pharmacien à l'Officine et au Laboratoire. Par Eusèbe Ferrand, Pharmacien, à Paris, etc. Paris: J. B. Baillière et fils. 1873. 8vo, pp. 587.

The object of the author in compiling this work has been to unite in a single compact volume the largest possible amount of information relating to Materia Medica, using the term in the widest sense. Each article furnishes the origin, composition, physiological action, and therapeutic applications of the substance to which it refers. With regard to the introduction of so much matter relating to the medicinal action of drugs, we quote the explanation given by the author himself in the preface:—

"L'action des médicaments sur l'économie devait tout particulièrement fixer notre attention, et dans notre opinion exigeait quelques développements; c'est un des côtés les plus importants de leur histoire. Si nous nous étions renfermés dans le cadre restreint de nos études légales, nous aurions pu limiter davantage cette partie de l'ouvrage; mais la pratique, qui est un guide sûr quand on veut écrire un livre pratique, nous poussait en sens contraire. . . . . .

"Nous sommes responsables, sinon d'après le texte de la loi, au moins d'après les traditions de la jurisprudence, de toutes les préparations que nous livrons au public. Le médecin lui-même, s'il vient à formuler une prescription dangereuse, peut abriter sa responsabilité derrière l'ignorance coupable du pharmacien qui n'a pas su reconnaître les lapsus d'une plume distraite."

The chemical portion of each article is treated from a practical point of view, the object being to furnish directions for establishing the identity of the substance and its freedom from impurity or sophistication.

Space is devoted to the analysis of many of the ordinary articles of commerce, with regard to which information is often required of the practical chemist. Antidotes to poisons and "incompatibles" are also noticed in their proper places, and appended to each article are the formulæ for most of the pharmaceutical preparations in use in French pharmacy, as well as, in a few cases, recipes from the British and other European pharmacopœias.

The chemical notation employed is exclusively that which is founded on the binary theory of the constitution of salts, and which we, in England, are in the habit of calling the "old notation," though it has been by no means completely abandoned by French chemists. Synonyms are supplied pretty freely, and a style of Latin nomenclature introduced which, if we mistake not, has already been suggested and discussed in connection with the nomenclature of our own Pharmacopœia. It results from an attempt to render into Latin the names which are in common use among chemists for distinguishing from such other salts corresponding to lower and higher degrees of oxidation. Thus we find carbonas ferrosus; chloruretum ferricum; chloruretum hydrargyrosum: chloruretum hydrargyricum. As will be seen, these are, in some cases, a little cumbersome, and there seems to be no well-founded reason for preferring them to the older names, with which, moreover, we are already familiar.

The whole is arranged in the form of a dictionary, the articles following one another in alphabetical order: and, in addition, there is a copious index. The book is not well printed, and is, of course, clothed in the usual paper cover, but the price is only six francs, and the addition of a strong binding would not very seriously increase the cost.

We have carefully examined the work, and can conscientiously recommend it to our readers as not only remarkably free from all but trifling inaccuracies, and as containing in a cheap and portable form much that will be useful both to pharmacists and students.

Notes and Queries.

[327.]—PILULÆ ILIACÆ RHASIS.—

℞ Colocynthidis
Sagapeni aa . . . . ℥vj.
Diagrydii . . . . . ℥ij.
Cum succo porri fiat massa.

Schroder *Pharmacopœia Medico-Chymica*, Ed. 4., 1656. —D.H.

POMADE FOR FRECKLES.—The following formula is from the *New York Druggists' Circular*:—Take of

Citrine Ointment and Oil of Almonds, each	1 drachm.
Spermaceti Ointment	6 „
Oil of Roses	3 drops.

Mix well in a wedgwood mortar, using a wooden or bone knife.

PREPARATIONS OF EUCALYPTUS.—The following formulæ for preparations of *Eucalyptus globulus* are given by M. Dorvault in *L'Union Pharmaceutique*, vol. xiii. p. 259:—

Syrup of Eucalyptus.

Distilled Eucalyptus Water	500 parts.
White Sugar	950 „

Dissolve without heat and filter through paper.

Tincture of Eucalyptus.

Eucalyptus Leaves (dry and cut)	1 part.
Rectified Spirit	5 „

Macerate ten days and filter.

Wine of Eucalyptus.

Eucalyptus Leaves (dry and cut)	30 parts.
Proof Spirit	60 „
White Wine	1000 „

Macerate with the alcohol during twenty-four hours; then add the wine and leave together for ten days, and afterwards filter.

Extract of Eucalyptus.

Eucalyptus Leaves (dry and cut)	1000 parts.
Water	3000 „

Distil to obtain the essence. Make an aqueous extract with the residue in the apparatus and to this add—

Proof Spirit	1000 parts.

Filter; concentrate this alcoholic solution to the consistence of an extract, and when cool add the volatile oil, mixing thoroughly.

Correspondence.

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

"MAJOR ASSOCIATES."

Sir,—Circulars are being sent by the Registrar of the Pharmaceutical Society to those Major Associates who are not in business on their own account, informing them that, "in accordance with the bye-law," they have been removed from the Register of Associates, and must either take up their membership—forms of application for which are enclosed—or cease to be connected with the Society.

As one of those to whom the alternative is presented, I would ask, which bye-law is referred to? The only one bearing on the point which I can find is clause 4 in Section XI., bearing date 1852. But this has been in abeyance twenty years, and no notice has been given of any intention to revive it. Naturally, therefore, considerable surprise and indignation are felt by those who are thus cavalierly told to increase their subscription or leave the Society. The salaries of chemists' assistants are not generally so large that half a guinea more or less is of no consequence to them; and on the other hand, an associate who has been connected with the Society for some years is unwilling to leave it.

What is the Society's motive in thus swooping down on us? In the Calendar for 1872, I see mentioned 149 Major associates who are not in business. Supposing that all these take up their membership, the Society will be an annual gainer of about £80. But is this likely? Is it not probable that the larger number of them will leave the Society? In that case we shall have the paradox that, while the Society laments that so few candidates present themselves for the "Major," it actually turns out a number who possess that qualification. And all for the sake of a potential eighty pounds!

Again, the bye-law directs that, on an Associate passing the Major examination, he shall be removed from the ranks of the Associates to those of the members. But in my own case I have been allowed to continue an associate for more than five years, and am now suddenly called upon to pay double subscription, or go. I cannot think this course a dignified one for the Society to pursue. Had they given us fair warning, there might have been dissatisfaction, but there would not have been the feeling of being "done," which now exists.

A MAJOR BEFORE THE PASSING OF THE PHARMACY ACT.

Sir,—Imagine my surprise when, on presenting the half-guinea subscription for the current year at the "Square," I was informed that it had just been discovered that a bye-law existed proving that there was no such grade as Major Associate, but that in future all Pharmaceutical chemists connected with the Society, whether in business or not, must pay the full subscription of one guinea.

Now, in the name of common sense, I ask, Where has this bye-law been all this time that it is only just discovered? and if brought into force, what will be its immediate effect? The secession of the greater number of those to whom the Society in the future must most look for support, and who have hitherto been known as "Major Associates."

Even as it is, I hardly know of one single immediate advantage to an assistant from holding the Major qualification. Painful experience shows that employers do not recognize it, for if the aspirant to the diploma dreams that he will get one penny more salary for his pains, he will, most probably, find himself painfully disappointed; and now if it is to mean an extra half-guinea yearly, I may safely predict that fewer will go to the expense and pains of qualifying, and fewer still will continue their connection afterwards.

If this hitherto dormant bye-law does exist, it should certainly be either amended at once, or allowed to die a natural death; to bring it into force would be ruinous policy to the Society, and a great injustice to those who have already qualified. I, for one, protest against it, and, in opposition, beg strongly to commend to the consideration of the Council a proposition of a late correspondent to the effect, "That Pharmaceutical Chemists not in business be admitted to membership on payment of the Major Associate subscription of half a guinea."

H. B. H.

P.S.—Provisionally that this bye-law does come into operation I have sent in my resignation, and I do not doubt that the example will be followed by many others.

Lancet Amenities.

Sir,—That the writer in the *Globe* should, through ignorance of the questions he was attempting to solve, have fallen into grievous error and committed himself to absurd "*non sequiturs*" is not surprising. Still less need one be astonished that the body of pharmaceutists having been attacked, the *Lancet* should have joined in the fray, and with its usual disregard of fairness and gentlemanly feeling done its little utmost to aggravate and exasperate the misunderstanding.

But the fact of the *Medical Times and Gazette* having also entered the lists, and, wonderful to observe, shown no greater degree of fairness or of good will than its contemporary, seems to point to a state of feeling in the medical mind that pharmaceutists are bound to take cognizance of. Do doctors, as a rule, regard the educated pharmacist as differing from an ordinary retailer only by his greater unscrupulousness and rapacity? Is that the sole result of the sustained efforts for thirty years of a host of men whom the public have regarded as at least respectable? What are we to think of the position we hold in the *public* estimation when a leader of medical opinion ridicules "the great skill required to dispense drugs" and propounds the question, "surely there is not such extraordinary skill required in obeying definite directions put down on a piece of paper?"

It is difficult to suppose that the writer could really have any other motives in inditing such remarks than to prejudice the pharmacist in the eyes of the public and injure his pecuniary position. He must be indeed ignorant of the kind and degree of knowledge required for the intelligent exercise of pharmacy to suppose that it is all summed up in the ability to mix certain substances "according to definite directions put down upon a piece of paper."

The less said about the "definiteness" of the directions, and the manner of "putting them down on paper," the better, I should have thought. Nor does it seem wise to disparage those who, being fairly behind the scences, and specially qualified to "reckon up" the pretensions of medical men, could so readily return a Rowland for their Oliver. But it is not worth while "to render railing for railing," for after all there is some look of hopefulness about the matter. Does not the crusade spring from an impression on the part of certain envious and probably impecunious individuals, that the status of the pharmaceutist is improving, and that he actually dares to approach the sacred dignity of a profession? And why should he not? Where is the great difference in the *personnel* of the trade and profession? Excluding from comparison the few doctors who have passed through a University course, the difference is very slight. Of course one ignores quacks on one side, and hucksters on the other. Yet, however true this may be, the public will not acknowledge it until the chemist makes up his mind to assert his position, and decline to be otherwise regarded than as equal to his medical brother. The relative position of the militia officer to the linesman is, I believe, defined as "with but after," and that, in his intercourse with the medical profession, every *pharmacist* should insist on. It is perfectly absurd to suppose that when a father having two sons, makes one a doctor and the other a pharmacist—the one should be treated as a gentleman, the other regarded as a social pariah. Such a state of things has existed and does exist. It depends on the rising generation of pharmacists to say how long it shall continue.

Rusty Cuss.

Sir,—The *Lancet* seems to be down on the trade and wishes to put the quietus on the seal-skin jackets of the chemists' better halves in this town. I do not know any chemist's wife who is the happy possessor of one, but I do know several wives of medical men who rejoice in them. If the editor of the *Lancet* will look down the list of businesses for disposal, returns in many cases from £250 to £400 a year, I think he will not be jealous of seal-skin jackets proceeding from the profits of such trading. The unlucky proprietors do not require putting down—down they are with their nose to the grindstone; and if they escape the list of bankrupts, eke out their wretched living either with Gilbey's wines, bottled ale, petroleum oil, mineral naphtha, Thorley's food, or a little bit of quacking. Therefore I hope more leniency will be shown to the poor chemist, who in small manufacturing and agricultural districts manages to keep the wolf from the door by little extras which may be *infra dig.*, but which very seldom produce that *rara avis*, a rich chemist and druggist.

Warrington, Jan. 27th, 1873. Pil Garlic.

Vermin Killers.

Sir,—I have read with a considerable amount of interest, and have derived a large amount of information from, the very able and comprehensive letter of Mr. Longley, of Leeds, on the subject of the Sale of Vermin Killers. I venture to assert that the majority of the trade (I ask the pardon of those members who take their stand on the lofty pinnacle and fondly imagine it ought to be designated a profession) have interpreted the meaning of the Act as he did, viz., that vermin killers were included in the second part of the Sale of Poisons Act. On reference to a card or paper issued to chemists and druggists by the local pharmaceutical secretaries, I find, in part two, the last article named is "Vermin Killers: every compound containing a poison and sold for the destruction of vermin." Now as far as my memory serves me, I think that paper was distributed since December, 1869; in that I may be right or wrong; but be that as it may, I think the Society, having the interest of the trade confided to their care, might have sent some time at all events during this last three years, a notification that vermin killers were classed in the first part of the list. Might I suggest to the proprietors of Battle's Vermin Killer—I merely take that preparation as I think it is the one most generally sold, and the one that after what it has done may with certainty be recommended as poison warranted to kill—that they should when sending it out mark the quantity of the potent poison on the wrapper, or say with each dozen, then the chemist may enter the quantity in his book, before serving his customer. Again, the question may be asked, Have these persons who put up the vermin killers any right to send it out without its being labelled with the name of the poison, the word poison, and their name and address? I fancy legally they have no right. I find it is the custom of the wholesale people to label all their poison with name and address—how then is vermin killer passed over? If chemists would agree to sell nothing less than say sixpenny packets, the profit on which would repay them for the time and trouble of registering the sale, I think it would be well. A beneficent legislature cries aloud, "Salus populi suprema est lex," but all the care of our paternal Government will not stop poisoning; but for the life of me I cannot see why the would-be-suicide should take so affectionately to vermin killers—how much pleasanter of the two would it not be to glide imperceptibly from the world under the influence of opium! the obtaining of which presents no difficulty, no signing in a book, no introduction required; sixpence and the excuse that the person suffer from neuralgic pains, or has been ordered to put laudanum in a poultice, is sufficient in pretty nearly every case.

Warrington, Jan. 27th, 1873. Pil Garlic.

Sir,—I must confess that I think the Council have arrived at a wise decision in adding "Vermin Killers" to Part 1 of the List of Poisons when they contain any such ingredients as strychnia or arsenic, and a chemist who sells them cannot plead ignorance as his reason for not entering the sale. There is no parallel case, as some have attempted to argue, between patent medicines that contain prussic acid, morphia, or tartar emetic, and the "Vermin Killers." The former are medicines prepared from private formulæ, and sent forth as remedies for certain complaints and diseases to which "mortal flesh is heir to," with full directions as to the dose, and generally accompanied with a promise to cure, but the latter are put forth as "Killers," not "Curers," and not to be taken at any time by our mutual friends the public. While on this subject I am obliged to acknowledge that entering poisons in a book is nothing like so troublesome a job as I expected it would be. Of course, on supplying a customer the first time there is rather more trouble than occurs afterwards, but any purchaser, having once been initiated into the course required, signs his name while I am getting his parcel ready, and very little time is wasted. On looking over about 200 entries during the three last months of 1872, I find not more than twelve are made for sales to fresh customers, so that more than ninety per cent. can be entered as "Known;" this, of course, very much diminishes both trouble and risk. It is quite evident that coroners are very desirous of keeping us up to the mark in observance of the necessary regulations of the Poisons Act, and in some instances have attempted to go beyond what the law allows; the public also back them up in censuring any laxity on the part of a privileged part of the community like ourselves, consequently it behoves us to show by our careful manner of dealing with poisons that it is a gain to the community to have an educated, well-regulated body of chemists to store and distribute such articles when required.

James Slipper.

London, January 28th, 1873.

Sir,—I am sure many will agree with your correspondent, Mr. J. W. Longley, in the Journal of January 25th, respecting the registering of the sale of vermin killers in the poison book. I for one do, being quite ignorant of the obligation so to do, until reading the correspondence in the last issue of the Journal and your editorial note in that of the 18th ultimo. In the latter you say, the Council of the Pharmaceutical Society resolved that a copy of the revised regulations should be issued to every registered chemist and druggist, but the copies have not reached this neighbourhood yet, and any detective might have pounced down upon us innocent, loyal creatures, by sending his son into the shop to purchase vermin poison, and while I was ignorant of the new interpretations of the law, might have brought me under the censure and reprimand of the coroner, though undeservedly. The plea of ignorance in this respect would surely have met with justice at the hands of the magistrates, but as to any intelligent member of the trade supposing that Battle's or other "killers" do not contain strychnine, or some poison, to me seems incredible.

Wm. T. Martin.

Lewes, January 28th, 1873.

Total Abolition of the Medicine Licence to Druggists.

Sir,—I read with much interest your minute and able *résumé* of the last page and year of our pharmaceutical history; it necessarily took notice of many points of a debatable character, which, though not yet settled, have given rise to discussions well calculated to ventilate matters of the first importance as regards our future welfare and progress as a body. At present I have no intention to take note of many subjects of major importance, which I doubt not will again be taken up by the stimulus which your own article has given to them. In the meantime, just allow me to refer to a comparatively small matter, but which, small as it is, I humbly think has not yet received that amount of consideration from you or from your correspondents which it properly deserves. I refer to the proposed change in the charge for licence duty for the retailing of patent medicines. On that point I cannot agree with you, that "the balance of opinion is inclined to a uniform rate of £2." In the metropolis and in large provincial towns such an alteration might be of advantage to the properly qualified chemist, but in country towns, properly so-called, and in villages which can boast of a professional pharmacist, the case would be quite different, as in such places the sale of "patents" is not at all confined to *our* fraternity, but is largely shared in by grocers and ironmongers, and booksellers and the like, who, indulging in the maxim of "small profits and quick returns," do not hesitate to act upon it, by selling "quack medicines" of all sorts and conditions—poisonous or non-poisonous—at a reduction of three-halfpence upon every shilling, that is, selling Cockle's Pills, etc., at 1*s*. instead of 1*s*. 1½*d*. Now, I believe, as a rule, that the increase in the price of licence duty might put a stop to this "cutting" business, but I verily believe that it would never tend to the aggrandisement of the druggist, as if the advanced licence duty would pay the one, I see no reason why it should not pay the other, to continue the competition.

But putting aside altogether the competitive part of the question, which alone has received consideration by your correspondents, I would just ask, firstly, why any but properly qualified chemists are allowed to vend the various, and in some cases the dangerous and poisonous, "nostrums of the day?" and, secondly, why *one* should be called upon to *pay any licence at all?* We have spent no end of time and money in receiving an extra liberal education; we have attended and paid for classes at the University or at Bloomsbury Square; we have passed the Preliminary, the Minor, and the Major examinations of the Society at great expense, and we annually put a guinea into the pharmaceutical coffers,—and for what, I would like to know, have we done all this? We have done it, I fear, just to be on an *equal footing* with our drug-selling neighbours, the grocers, who might and do sell nearly all the most profitable articles in the pharmacopœia, to say nothing of the "nostrums" referred to, or vermin killers, or "sheep-dipping compositions," whether poisonous or not. In fact, in such matters, more especially in the country, the Pharmacy Act, or Sale of Poisons Bill, is to all intents and purposes a dead letter.

But, referring again to the "patent medicine" duty, do you, Mr. Editor, not consider that we have already, by our education, and our examinations, and our fellowship with the Pharmaceutical Society, paid sufficient, and qualified ourselves sufficiently for the sale of Holloway's Pills and Ointment, without paying any more in the shape of a licence? I hold that the diploma of the Pharmaceutical Society of *itself* and *in perpetuity*, ought to be a sufficient warrant without a compulsory payment of two pounds, or even twopence per annum. On the other hand, as we have been promised so much increase of *status* (and *status* I consider of precious little value commercially, unless backed up by something more substantial), I venture to suggest that the privilege of selling drugs should no longer continue to be a marketable commodity, purchasable by grocers, booksellers, or anybody that can afford to pay the money, but should be the *exclusive right* of druggists and *druggists only;* or if this sweeping measure might be found to endanger our national resources in the matter of revenue, then let there be a licence of five guineas, to be paid by the cheesemonger aspirants to the drug business; thus would we gain at least one of the advantages so liberally promised to us; and so, the public, for the first time, would be made to see and to learn and to acknowledge, that our education gave us a privileged right and qualification above our worthy neighbours in the cheese and bookselling line of business.

January 8th, 1873. Scrutator, M. P. S.

J. Morris.—(1) We have seen it stated that an extract made from the watery matter which oozes from the livers, has sometimes been used in the preparation of pills. It has also been proposed to use a cod-liver oil and lime soap for the purpose (Vol. II. p. 830). See a report of an action for the price of a box of "Sir James Murray's Concentrated Cod Liver Oil Pills," printed in the first series of the Pharm. Journ., vol. XI. p. 478. (2) A formula for Tincture of Eucalyptus is given at p. 618.

K. T. F.—See Ure's 'Dictionary of the Arts,' *s. v.* "Bread," vol. i. p. 405.

W. H. W.—You will find an article on the subject in Ure's 'Dictionary of the Arts,' vol. i. p. 573.

"*Labiatæ*."—(1) You are recommended to forward the certificate to the Secretary in order that he may lay it before the Board. (2) No.

C. E. D.—The passages for the next examination may be selected from any part of the *De Bello Gallico* of Cæsar. In succeeding examinations they will be taken from either of the first three books of the Æneid.

G. J. C.—The only enclosure in your letter was the newspaper cutting.

C. Fryer.—We regret that we are unable to comply with your request.

J. Hamp.—Your letter has been handed to the Secretary who will forward you the information asked for.

A. Stathers.—According to the interpretation of the Regulations adopted by the Council in regard to "Vermin Killers," it is necessary to register the sale of "Battle's Vermin Killer," and otherwise to comply with the regulations relating to poisons comprised in the first part of Schedule A, as specified in Schedule F, the details of which are to be found in the Register or the Calendar of the Society. As to the quantity to be registered we are unable to give any information.

The report of the Leeds Chemists' Association reached the office after the Journal was made up.

We have to thank correspondents for supplying copies of the Brighton Examiner, Sussex Daily News, Melbourne Daily Telegraph, Northern Whig, Bradford Observer, Queen, Echo

Communications, Letters, etc., have been received from Messrs. J. H. H. Howard, F. H. Ellwood, Johnson, Barrett Whitwell, W. V. Churchill J. Young, Heaton M. M. B. "Tolu."

NOTES ON SOME DRUGS COLLECTED IN MOROCCO.*

BY ARTHUR LEARED, M.D., F.R.C.P., M.R.I.A.,

Senior Physician to the Great Northern Hospital.

In the latter part of the past year while travelling in the empire of Morocco, I had a good opportunity of making myself acquainted with the products of that extensive and little-explored country. My attention turned to the drugs and remedies employed by the people, and I set myself the task of collecting specimens and procuring as much information about them as possible. But the difficulties which at every step beset the inquirer in Morocco, from ignorance and fanaticism, almost exceed belief. That strange mediæval jumble of astrology and pharmacy may be daily witnessed in the Moorish towns. The turbaned and cross-legged medicine-man, before he prescribes, displays mysterious diagrams and consults your stars. Such information as a man of this kind possesses he will not impart. He would, if possible and convenient, destroy instead of benefiting the infidel. And although the Arab race is numerous in Morocco—the race which produced an Avicenna and a Rhazes—the state of barbarism into which this fine country has fallen is such that it possesses no native physician or pharmaceutist worthy of the name.

A few preliminary remarks on the climate, soil, and general productions of the country will not be out of place.

The vegetable productions of Morocco are those of a sub-tropical country, in which there is great variety as regards the nature of the soil, elevation above the sea-level, and irrigation. My own travels extended from about 36° to 31½° of north latitude. In the neighbourhood of Tangier in the north, the country consists, to a great extent, of a succession of low hills closely succeeding each other. They are in general sandy, and the succulent plants which belong to this kind of soil thrive luxuriantly. The aloe, and the prickly-pear (which is said to have been introduced from the Canary Islands) both attain large dimensions. Thousands of acres in the open country are clothed with the palmetto, which forms one of its main features. Junipers and various prickly shrubs cling to the stony hillsides, and, in some places, constitute extensive thickets, which afford shelter to boars and other wild animals. But anything worthy of the name of a tree is seldom seen. As one proceeds south, fine level plains having a deep loamy soil are met, and in the rainy season they are covered with rich herbage, dotted with a variety of bulbous-rooted flowers.

In a journey of about 130 miles, from Mogador to the city of Morocco, and from thence to the coast again to the town of Saffi, I had a good opportunity of judging of the interior of the country. From Mogador to the city the route is almost due east, and the elevation of the ground, I found by an aneroid barometer, at about 50 miles from the sea, to be 1250 feet. At this point the plain of Morocco begins, and the elevation in the next 80 miles is only 250 feet more, attaining its highest point at the city itself. A day's journey further east takes one to the foot of the great Atlas range, which, by forming a barrier towards the east, protects Western Morocco in a great measure against the scorching desert winds which are so hurtful in many countries.

But the point which at present deserves attention, as bearing on the productions of the country, is the great diversity of climate and soil experienced within short limits. When leaving Mogador on September 29th, the weather was, as usual, pleasantly warm; when inland, four days afterwards, the thermometer stood at 94° F. in the shade. Rain, which is usual between September and March, had not yet commenced to fall. The country, except where a rare irrigation afforded the grateful sight of patches of green maize, was, in general, parched and arid.

In this journey one thing arising out of the circumstances mentioned struck me forcibly, namely, the peculiar distribution of the vegetable products. It almost seemed as if the trees and plants of the soil, like the people who inhabit it, are possessed with those exclusive tendencies which prevent one race or one sect from mixing with another. Thus, on leaving Mogador the path lies through miles of deep sand, covered with nothing but the waving branches of the "artim" or white broom; then a tract is entered where the "argan"-tree prevails, at times to the degree which constitutes a forest. Gradually this tree drops out of the landscape. A zone of palmettoes is now passed through. Then broom reappears, and next on the plain of Morocco the whole country is covered with a thorny ill-conditioned shrub of moderate size, the name of which I am not acquainted with. After this, at Seshowia, about 80 miles from Mogador, where there is a river, the "sidra"-tree commences, and prevails to Monzoudia, a distance of about 17 miles. This is now replaced by a shrub about 3 feet high, called "shey," which gives the road a monotonous and dreary aspect. Finally, this is succeeded by the date-palm plantations, which, for many miles, surround the city of Morocco. As nothing of the kind is to be seen in the previous journey, and their limits are sharply defined, these trees present a magnificent appearance to the eye, and their pleasant shade is hailed with delight. The city of Morocco is well supplied with water, and the numerous gardens in and about it are stocked with fine fruit- and shade-trees, amongst which the orange, the olive, and the banana are conspicuous.

I have been somewhat minute in describing the vegetation of a portion of the country traversed, on account of its bearing on the diversity of the drugs to be described. Thus caraway seed, which is the product of a cold climate, is an article of export; and while many of the articles are produced in our own country, others belong exclusively to hot climates, and some, as argan nuts, ammoniacum and euphorbium gums, are peculiar to Morocco. In a few cases, the drugs are not products of Morocco, but have been added to the list to show the medicines in common use amongst the Moors.

Almost all the information about drugs which I possess, has been obtained from the Jews of Morocco. These people, degraded, oppressed, and consequently ignorant and superstitious, are observant and communicative. But there are some exceptions of educated and enlightened gentlemen amongst them. To one of these, Signor Yusef de Elmaleh, High Priest at Mogador, I am much indebted for many additions to my collection, and for information that may be relied upon. This collection, made at most of the coast towns from Tangier to Mogador, but principally at the latter place, and also

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, February 5, 1873.

in the city of Morocco, although somewhat extensive, cannot be said to have yielded rich results. As might be expected, many of the herbs proved to be old friends with new names. At the same time, a certain interest attaches to the identification of our own remedies amongst the Moors; and I am yet in hopes, that some additions to our remedies may result from the present inquiry. On the whole, it seemed to me that the matter possessed enough of interest to bring it under the notice of the Pharmaceutical Society. It will be easily understood that the difficulty of identifying roots and some other parts of plants has been very great, and that many specimens have consequently been as yet undetermined. In this place it is proper to add, that I have derived much assistance from Mr. Collins, who compared the specimens with those in recognized collections. I have taken much pains to render the vernacular names as closely as possible in English. These names appear to be, in almost every instance, peculiar to Morocco. Very few of them bear any resemblance to the Arabic names for the same drugs given in books.

Leaves, Flowers, and Plants.

Labiatæ.

Zater.—*Thymus species?*—Flowers. The infusion is used to promote digestion. It was formerly exported to Holland in large quantities.* It is also much used by the Moors for flavouring tea.

Aflau.—*Thymus species?*—Flowers, etc. They have a peppermint-like odour. The infusion is used for flatulence and colicky pains.

Taserkina.—*Thymus species?*—The infusion is used in diarrhœa.

Elhalhal.—*Micromeria species?*—Tops, etc. Stomachic, etc.

Azeer.—*Lavandula stœchas*, L.—Leaves. Used for fumigation in small-pox, gonorrhœa, etc.

S'dia.—*Lavandula stœchas.*—Tops. Used in colic, etc. The two last appear to be different names for different parts of the same plant.

M'roy.—*Marrubium undulatum*, Benth.—Tops. Used in stomach affections.

Timza.—*Mentha sylvestris*, L.?—Tops. Used in diarrhœa.

Maroui or Marout.—*Ballota lanata*, L. Used for removing the scabs of small-pox, and as an application to hæmorrhoids, etc.

Rutaceæ.

Ruta.—*Ruta angustifolia*, Pers.—Rue. Carried about the person as a safeguard against infection, etc. Given for "nervousness," etc.

Compositæ.

Sech.—*Artemisia Aragonensis*, Lam.?—Tops. Barbary worm-seed. Used in infusions for colds and also in fumigation for small-pox, etc. It is exported to Holland to make "bitters." Barbary worm-seed was considered by Guibourt to be the produce of *Artemisia glomerata*, Sieber.†

Shiba (trans. Old man's beard).—*Artemisia absinthium*, L.—Wormwood. Used in dyspepsia and also for giving flavour to green tea.

* 'Account of the Empire of Morocco,' by James G. Jackson. London: 1814. p. 243.

† Pereira's Mat. Med., art. Artemisia.

Babinouse.—*Matricaria chamomilla*, L. Used as stomachic.

Sadear —? Leafy tops. Used as a stomachic.

Leguminosæ.

Senaherram.—*Cassia elongata*, Lémaire Lisancourt.—Senna. Stated to be brought to Morocco by the pilgrims returning from Mecca. This is confirmed by the fact that the specimen is identical with Mecca senna imported *viâ* India into this country. Used as a purgative.

Artim.—*Spartium junceum.*—Spanish broom. This shrub forms a feature of the landscape. In many places it covers thousands of acres of sandy soil, to the exclusion of almost every other plant. Its white flowers in spring diffuse a strong and agreeable odour. It appears to be used by women as a remedy for barrenness, and although one would hardly regard it as poisonous, an instance was related to me in which death was caused by an overdose.

Myrtaceæ.

Rahan.—*Myrtus communis*, L.—Myrtle leaves. The infusion is used for diarrhœa. The leaves are also employed by the Jews in their ceremonies.

Oleaceæ.

Agzas.—*Phillyrea angustifolia*, L.—The infusion is thought to make the hair grow.

Paronychiaceæ.

Haydorley. — *Paronychia argentea.* — Flowers. Used as a diaphoretic, and also for colicky pains.

Dioscoreaceæ.

Eriffi.—*Tamus communis*, L.—Black bryony. Leaves. This plant, which is common to most parts of Europe, is employed, when pounded, by the Moors as a topical application to wounds and bruises as the root of white bryony, commonly known as mandrake-root, occasionally is in this country. The tincture of *Tamus communis* forms one of the so-called homœopathic remedies.

Gentianaceæ.

Castelheyea, or Noar Muley Ali (trans. Muli Ali's flower).—*Erythræa ramosissima*, Pers.—Closely allied to gentian. Used in dyspepsia.

Cannabinaceæ.

Kief.— *Cannabis sativa*, W. — Hemp. Whole plant. It is grown largely in the provinces of Haha and Shedma. The right of dealing in it and in tobacco is monopolized by the Emperor. These monopolies are farmed to Jews, who buy at a price fixed by law, and sell at an enormously advanced price. The plants are pulled up when the seed is ripe or nearly so; and the leaves, when dried and coarsely powdered, constitute kief. This is smoked in very small pipes. As may be supposed, a few inhalations exhaust the contents of the bowl. The smoke is taken into the lungs, and produces a powerfully narcotizing effect. But, unlike the preparations of the plant, which are swallowed, the effect soon passes away. Some smokers indulge their propensity frequently during the day; yet I have been assured by them that, after twenty or thirty years, they have not suffered from the practice.

Hashish, the preparation which is eaten, is too well known, from recent descriptions, to require much to be said about it. It is made by mixing the powdered leaves with butter, and also as a conserve with honey, to which opium is added.

?

MAROUT ZARBE.—Used as an application to wounds.

FRUITS AND SEEDS.

Umbelliferæ.

CARWIA.—*Carum Carui*, L.—Caraway seed. It is grown largely in the neighbourhood of Larache, and is shipped at Tangier in sugar casks and serons, but chiefly in bags, to England and America, It is also produced round Morocco city. At Mogador, where it is rarely shipped, it is called Fez caraway seed. One cannot help being surprised at finding this cold climate plant a product of Morocco,

CUMIN.—*Cuminum cyminum*, L.—Cumin seed. This is produced in quantity in the interior provinces of Hamer and Rahamna. The Jews mix it in their bread. It is exported to America, and also to the Canary Islands, where it is used in preserving tunny fish.

NAFFA.—*Fœniculum dulce*, C. Bauh, jun.—Fennel seed. This is used as a substitute for aniseed for flavouring mahaya, a spirit extensively used, which is made chiefly from the water in which the combs are boiled in preparing beeswax. This water being impregnated with honey is allowed to ferment, and is then distilled.

Euphorbiaceæ.

ELGASTO (trans. Castor oil).—*Ricinus communis*, L.—Castor oil seeds. Castor oil is not made in Morocco, although the soil and climate seem well suited to the plant. About Saffi, I saw it of the dimensions of a small tree, and abundant. It was introduced there only some years ago.

HABTMILK.—*Croton tiglium*, W.—Croton oil seeds. The Moors use the seeds as a strong purgative, and I found that they are well known in the interior of the country. But I was not able to satisfy myself that *Croton tiglium* grows in Morocco. The seeds were stated by the Moor who gave them to me to be *Romi*, *i.e.*, European.

Sapotaceæ.

ARGAN.—*Argania Sideroxylon*, Rœm. et. Sch.—Seeds. The oil expressed from the nuts is in general use for cooking. Fowls and other articles of diet are served up soaked in this oil, which is preferred by some Europeans to olive oil. But such greasy food is very distasteful to most stomachs. It is customary to allow it to simmer over a fire with a piece of bread in it to remove its pungent taste, and this process is also believed to obviate a supposed tendency to cause leprosy.

Goats, sheep and cows eat the fleshy part of the argan fruit freely, and the nuts are then laboriously broken with stones in order to extract the kernels. These are first partially roasted and then ground in a handmill. The oil is extracted from the meal by working it with the hands, and water is added to the mass as seems necessary. The argan, like many other trees in Morocco, has a local distribution. It is only found to the south of the River Tensift, and at no very great distance farther south again disappears. In the Province of Haha there are large forests of it, and a tree exists a few miles south of Mogador, which is the largest known. It is of great age and has a circumference of 72 yards. The trunk, which is very rugged and unequal, measures 26 feet close to the ground, and soon branches out. The branches extend more or less horizontally, and then droop so as to rest on the ground, while at the same time other branches are sent upwards. This gives the appearance of several trees in a group (as seen in the photograph I took) instead of being merely branches. The highest part of this venerable tree does not exceed twenty feet.*

Rhamnaceæ.

NABU.—*Zizyphus orthocanthus*, DC.—Jujube berries. The fruit of the sidra-tree. This tree varies in size from that of a small tree to a small shrub, depending upon the soil in which it is found. It is widely diffused. The berries are eaten and are commonly sold in the markets of Morocco. The oil of the kernel is used as a perfume.

Cucurbitaceæ.

ELHEDJA.—*Cucumis Colocynthis*, L.—Fruit. I obtained this pepo the size of a large orange in the city of Morocco. It differs from the ordinary Mogador kind in being, instead of a yellow colour, of a bright green with numerous yellow streaks, made up of more or less broken and irregular patches, which mark it into segments. It is probably only a variety. The Moors introduce colocynth pulp into the rectum as a purgative.

Zingiberaceæ.

GOOZA SEHRAWEEA.—*Amomum Melagueta*, Roscoe.—Grains of Paradise. This drug appears to be an importation from Europe. It is mixed in bread and is used as a sexual stimulant.

Rutaceæ.

HARMEL.—*Peganum Harmala*, L.—Seed. Used in fumigation as a disinfectant, and also against the effects of the "evil eye."

?

SANOUS.—?—Seed. Used as a diaphoretic. This seed resembles the preceding (harmel) in size and appearance, except in colour, which is perfectly black, whereas harmel is brown.

Plantaginaceæ.

ZERKTOUNA.—*Plantago Psyllium*, L.—Seeds. Used as a demulcent in fevers and in colds.

Ranunculaceæ.

HABRAS.—*Delphinium Staphisagria*, L.—Seeds. Used to destroy vermin.

Leguminosæ.

ELHELBA.—*Trigonella Fœnum-Græcum*, L.—Fenugreek. Employed by women to induce fatness, and it is also given with barley to horses. When first taken it purges.

BARKS.

Juglandaceæ.

SUMAC (trans. a stain).—*Juglans regia*, L.—Used by the Moorish women for staining the lips black.

?

EDRO.—Bark used in fumigation and also for tanning.

ROOTS.

Leguminosæ.

ARKSUS.—*Glycyrrhiza glabra*, L.?—Licorice. Given for coughs and chest affections. Produced in the southern province of Suse.

* The best account of the argan tree is contained in Hooker's 'Journal of Botany,' vol. 6, p. 97.

Thymelaceæ.

ADAD.—*Daphne Mezereum*, W.—Purgative; and used for fumigation in dropsy.

Zingiberaceæ.

KEDILSHAM.—*Alpinia galanga*, Swartz.—Infusion of root used in gonorrhœa and urethral discharges.

Asclepiadaceæ or Apocynæ?

WASKIZA.—Used as an emetic for children combined with *Taserkina.*

Cruciferæ.

L'FUELY.—*Raphanus sativus*, L.—Radish. The root, when pounded, is applied to wounds. I saw radishes in Morocco city of enormous size, quite as large as ordinary mangold wurzel roots.

Liliaceæ.

B'SELT DIB (trans. Jackal's onion).—*Scilla maritima*, L., or more probably *S. indica.*—This, when boiled in oil, is highly esteemed as a sexual stimuant.

Iridaceæ.

HAMBER ELHOR.—*Iris Germanica*, L.—Orris root. —It comes in large quantities from the city of Morocco to Mogador, from whence it is shipped to England and France. It is not yet two years since this trade sprang up, and at the present time many tons of the root are exported monthly.

ELFOA, Madder.—Long thin, almost tasteless root. Infusion used for diarrhœa, also as an application to sore eyes; taken by women as an emmenagogue, and to improve the complexion.

?

ODEN ELHALOF (trans. Boar's ears.) — Taken by women in decoction to induce fatness.

?

TOWSERGENT.—The grated root is mixed in bread to induce fatness.

?

TASERKA.—This root is emetic.

?

BERESIMIS. — Infused in water when given in fever, with the view of preventing the water from being injurious.

Araceæ.

IRENE.—*Arum Arisarum?*—The interest which belongs to this plant lies in the circumstance that it yields a useful starch. In times of famine, which occasionally happen from drought or from a visitation of locusts, the tubers are dug up, washed, dried in the sun, and ground between hand-millstones. Without further preparation the meal is then cooked by steam, like kuskusso, the national dish, made of granulated wheaten flour. As happens in the case of the allied plant, *Arum maculatum*, which yields Portland arrowroot, Irene tubers contain an acrid poisonous principle which should be removed by repeated washings. As this is neglected by the Moors, it is not surprising that people who live entirely upon this food suffer severely from abdominal pain, and that many of them die. When travelling between Saffi and Mazagan in the early part of November, the ground was in many places studded all over with the single leaf of this plant, which had then just appeared above ground. I may add that I succeeded in bringing home some growing plants, which are now flourishing in Kew Gardens.

EXUDATIONS.

Euphorbiaceæ.

PHORBIUM. — *Euphorbium resinifera*, Berg.—Euphorbium gum. I have little to add about this substance to what is already known. It is produced in the inland provinces of Deminet and Antife, but the plant is found in other places. A plant which grows freely in the neighbourhood of Mogador was pointed out to me as that yielding the gum, but it proved to be *Kleinia pteroneura.* A kind of honey from the province of Haha is sold in the Mogador market. This when eaten causes a burning sensation in the mouth and throat. It is on this account regarded as of a heating nature, and like the squill is valued as an aphrodisiac. I was assured that these properties are due to the euphorbium flowers, from whence bees obtain the honey. It calls to mind the intoxicating effects of honey, as experienced by some of the ten thousand Greeks in their retreat under Xenophon, effects attributed to the *Azalea Pontica.* But poisonous honey is found in various countries, and the poison seems due to many different plants. The people who pack euphorbium at Mogador wear veils to protect themselves from the dust which is so irritating to the eyes and nostrils. Pliny tell us (b. xxv. c. 28) that persons engaged in collecting the juice of the euphorbium plant were on account of its acrid nature obliged to stand at a distance and pierce it with a pole shod with iron, and that the juice flowed into kid-leather receivers placed beneath. Serapion makes the same statement, except that the stomachs of animals were employed as receivers.* Avicenna says that Euphorbium loses its virtues after three or four years. But he adds, some think these may be restored by placing the gum for some time in a vessel containing decorticated beans.†

Umbelliferæ.

FESHOOK.—*Ferula species?*—Gum ammoniac. It is called fasoy by the Barbary merchants. The plant is called kelth, and is abundant in Woled Busebbah, two days' journey from Mogador on the road to the city of Morocco. It grows very quickly after the first autumnal rain. The stalk exhibited is one inch and a quarter in diameter, and was obtained at Mogador. Before parting with it the Moor broke off a portion, intending it, as he said, to fumigate his sore eyes. By virtue of its adhesiveness, the gum is also used by the Moors as a depilatory. Very little ammoniacum is sent to Europe. But a great deal is carried by pilgrims to Egypt and Arabia, where it is used for incense. It is chiefly shipped from Mazagan to Gibraltar for reshipment to Alexandria; a little is sent from Mogador, and none from the other ports. Pereira was of opinion that the Greeks and Romans were unacquainted with Persian ammoniacum (the produce of *Dorema ammoniacum*, Don.). The name ammoniacum is stated by Pliny (b. xii. Chap. 49) to be derived, like that of the oracle of Jupiter Ammon, near which the gum was produced, from ἄμμος (sand), in reference to the surrounding sandy country. This would indicate that it was brought from Lybia, the modern Tripoli. The Arabian physician, Serapion, writing at the com-

* "Serapionis, Medici Arabis celeberrimi Practica" Venetiis, apud juntas 1500, p. 179.

† Avicenna, Venetiis, apud juntas, 1595, B. 2, p. 313.

mencement of the ninth century, mentions two kinds of ammoniacum, the best sort of which was produced from the root of a plant found in Crete; and an inferior kind of which he says, " Sed illud quod continet terram et lapides, nominat chironia et defertur a terrâ quæ dicitur Monacon et est succus plantæ, similis plantæ galbani in similitudine suâ et nascit ibi." This description agrees with the present Morocco product, and Monacon may be an early name for that country. It is observable that Serapion calls ammoniacum, 'raxach'; and that 'assach,' 'ushak,' and 'oshac' are severally employed by Arabian and Persian writers to designate the gum. These approach 'fasogh' and 'feshook,' the modern Moorish names.

?

Alkeptum.—This terebinthinate gum-resin I have failed to identity, nor do I know the uses to which it is put. It is probably the product of *Pistacia atlantica*.

Miscellanea.

Papaveraceæ.

Benaman.—*Papaver dubium*, L.—Capsules, etc. Used as a diaphoretic.

Tamaricaceæ.

Tacout. — *Tamarix articulata*, Vahl. — Galls. Used for tanning, and shipped for this purpose to Algiers.

Terebinthaceæ.

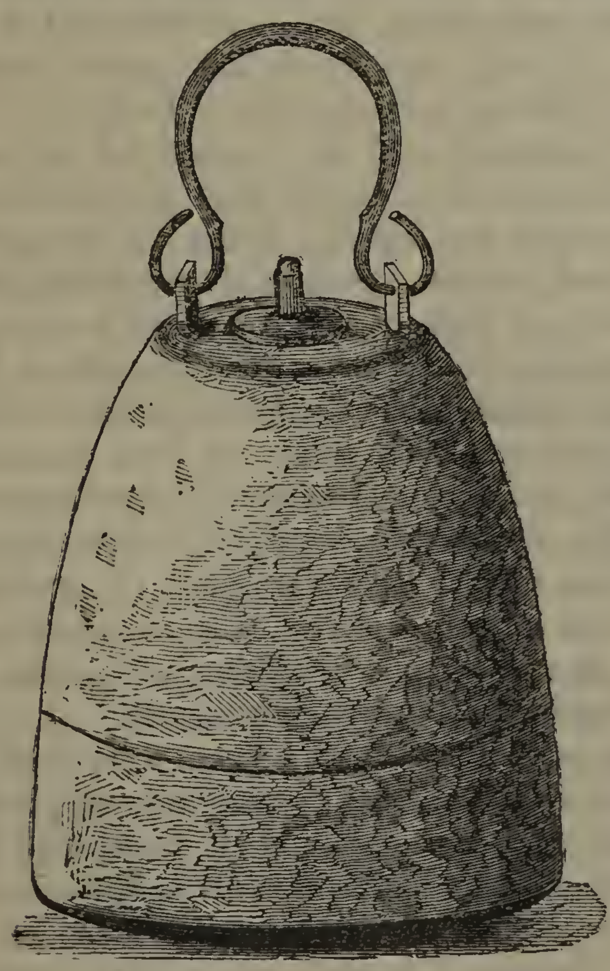
Elleg.—*Pistachia atlantica*, L.?—Pistachia galls. Produced in Showia. Used for diarrhœa, and also as a cosmetic.

?

Rassoul.—Is a mixture of stalks, buds, etc. Used for cleaning woollen clothes. I obtained it in the city of Morocco.

Aurantiaceæ.

Elma delichien.—*Citrus Species*|?—Orange-flower water. This, the quality of which is good, was



brought from Terodant, a town three days journey south of Mogador, which is unvisited by Europeans on account of the fanatic nature of its inhabitants. Rosewater is brought from the same place, and both articles are largely used by the Moorish ladies. Vessels like that represented in the engraving are used to contain these waters. They are made of hammered copper tinned over, and are of the shape of half an egg, having the top part depressed, to which part a handle is attached. These vessels are $8\frac{1}{2}$ inches in height by $7\frac{1}{2}$ inches diameter at the base, and contain about a gallon. It is curious to find such peculiarly shaped and well-made vessels, probably formed of native copper, employed in this way in this rude country.

Animal Substance.

Hamber.—*Amberbris.* — Strangely enough, this substance is brought to Mogador in considerable quantities by the Timbuctoo caravans from the interior of Africa. It probably finds its way there from the west coast. It is also obtained from sperm whales, which drift in dead on the Morocco coast. One of these whales has been thus procured at Casa Blanca in each of the three years just past. All contained ambergris, and the last an unusually large quantity. It was purchased by a Jew, who, it is said, sold it for £3000. Much of it was exported to London. At Mogador it sells for about £20 per pound. Most of the well-off Moors have ambergris in their houses. They use it in green tea as a flavour, and one of the greatest compliments paid to a guest is to present him with a cup of this curious mixture.

This somewhat extensive list does not pretend to be exhaustive, and yet it certainly contains a large proportion of the drugs commonly employed by the Moors. It will be observed that while a great many natural orders of plants are represented, there is a great preponderance of the Labiate order. I remember when travelling in Asia Minor, in a somewhat similar climate and country to Morocco, having been frequently struck with the number and diversity of this group, by whose fragrance the air was charged with odours.

Out of the foregoing list consisting of sixty-one articles, each having a distinctive Moorish name, more than half are well known and commonly used substances amongst ourselves, or else are obviously derived from plants so closely allied to those in common use as to be practically the same. About a fourth are on the same principle from plants known to us, but not in common use, and about the remaining fourth are derived from plants either not at all in use, or else as yet unidentified. The practical results are not at present important, but the members of a society engaged in such patient investigations as the Pharmaceutical Society will admit that knowledge is in itself important. To place the alleged virtues of a new drug on a secure basis, is a work of time and labour. It is not improbable that Morocco may contribute out of its undeveloped resources some agents of great value to our more enlightened materia medica. It is my intention to continue these investigations by trials of the drugs at present in my possession, and also by obtaining new ones, on a second visit to the country or through my correspondents in Morocco. On a future occasion I may again ask the privilege of laying the results before this Society.

[*The discussion upon this paper is printed at p.* 638.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 8, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

COUNTER PRESCRIBING.

THE following advertisement bears upon a question which occasionally threatens misunderstanding between the medical profession and ourselves :—

"WANTED.—Immediately, a young man, as dispenser to a surgeon with retail, capable of prescribing in simple cases, and able to extract teeth. Time for study allowed. Apply, by letter, stating salary, etc., or personally, before eleven or after six p.m., to Dr. Hutton, 240, City Road, or 87, Lever Street."

Being inserted in the PHARMACEUTICAL JOURNAL, it must be taken to be addressed to pharmaceutists. Nor is it a chance evidence of an unusual state of things, for we all know that it is not uncommon for dispensing surgeons in London and elsewhere to devolve a portion of their medical practice upon their non-qualified dispensers. The custom is no doubt convenient, and, if it is not abused, advantageous to the master and to the patients. But it follows that the same experience in the pharmaceutist's possession must be available to be exercised in his own shop for the public accommodation, as well as to be hired out to the use of the surgeon. In both cases the same conditions must be observed, viz., that the "prescribing" should not exceed proper limits or go beyond "simple cases."

If within such limits the practice is reprehensible, consistency demands that the profession should put a stop to it at home before they denounce it abroad. They altogether lose sight of the practicable when they call upon chemists to confine themselves *rigidly* to "the work of preparing drugs prescribed by others," and prohibit the public from taking any medicines except under medical prescription.*

We may here note for the information of our readers that another medical journal, the *Doctor*, has followed the *British Medical Journal* in denouncing as unjust the *Globe's* "rather silly assertion about the extortionate charges of druggists," expressing surprise that it should have been adopted by the *Medical Times* apparently under a misunderstanding of the question, and without giving pharmacists, as a body, credit for the advances they have made. The *Doctor* points out that, although the public is accustomed to amuse itself with good-natured smiles about the profits on medicines, it is generally known that the returns of chemists are so small that it would be impossible to exist on the profits that would be, in other trades, handsome.

* *Vide Lancet*, Oct. 22nd, 1870.

COMMENTARY ON THE PHARMACOPŒIA GERMANICA.

WE have just received the first number of a new work by an author whose name is well known to pharmacists in this country as an eminent pharmaceutical writer and commentator. A commentary on the German Pharmacopœia by one so well qualified for the task as Dr. MOHR is known to be cannot fail to prove a valuable addition to pharmaceutical literature, which many of our readers will appreciate. The part of the work before us, consisting of 96 pages, treats of the vinegars, acids, and other articles up to "*æther*," taken in the alphabetical order in which they are described in the German Pharmacopœia. The commentaries appended to each of the pharmacopœia processes and descriptions resemble, in their general scope, those given by the late Mr. RICHARD PHILLIPS in his 'Translation of the London Pharmacopœia.' They contain the critical remarks and observations resulting from long practical experience of one of the most accomplished of modern pharmacists. The work is remarkably well printed and illustrated with numerous excellent wood-cuts.

THE RISE AND FALL OF PHARMACEUTICAL PRODUCTS.

THE development and extended usefulness of some pharmaceutical products and the failure and loss of others are matters of interest for various reasons, especially as showing the real value for man's benefit of the earth's products, the more perfect test of their usefulness in the progress of science, and also sometimes of their failure through want of proper supplies consequent on the extinction of the plant in the country from which the sources have been drawn or from the fluctuations of trade.

No better notion of the rise and fall of medicinal products can be obtained than by reference to the old Herbals and similar works on the subject of drugs, and by comparison of them with the pharmacopœias and Materia Medicas which have connected those times with our own. The Herbals of PARKINSON and GERARD, the 'Compleat History of Druggs' by POMET and other works of that character, are valuable as showing the state of knowledge in those days, but, on the other hand, we fear that when these books have fallen into the hands of unscrupulous traders on human credulity, they have been a ready means of supplying a vocabulary of quaint phraseology used to puff up quack nostrums.

This subject has been indirectly touched upon in a recent article in a daily contemporary, wherein the value of modern science and its union with the progress of the noble profession of medicine in our own times is compared with medical science in the old days. Certain it is that many more nasty drugs were used in those days than at the present time, and we are not one whit the worse off for their loss, but then the fault usually lay with the patients themselves, for we are reminded that "nasty draughts" were preferred by the sufferers before "such mild and dulcet applications as the refinement of modern science has introduced."

As in other branches of science so in pharmacy, everything now works as by steam power compared with preceding generations. It does not now, as a rule, take us years to discover the true value of a new remedy; witness the rapid fall of cundurango, the efficacy of which from the very outset was doubted; *Eucalyptus*, again, seems to be now upon its trial, and by the end of the present year the verdict will in all probability be pronounced.

Setting aside the consideration of articles which, one hundred or two hundred years ago, were of medicinal value, but which are now obsolete, it is interesting to note the growth and development from those times of some pharmaceutical products which are now of known value; or again the accuracy with which many of them were often described, and to the knowledge of which we in modern days have been able to add little or nothing. These thoughts have been brought out after looking through an unpretending little book, published in London in 1690, entitled 'The Treasury of Drugs Unlock'd.' It was published at one shilling, and as the title-page tells us, it treats of "all sorts of drugs, and chymical preparations sold by drugists." Cowitch we find described as the "down of a large cod, like a pease-cod, of a brown colour, like dark cinnamon, the said cowitch being nothing else but a down covering the said cods, called cowitch, because of its provoking itching and scratching, is of no other use but to play tricks and waggery with; it cometh from Jamaica." Here then is a brief, popular and tolerably accurate description of the pods of *Mucuna pruriens* which could readily be "understanded of the people." The cuticle itself which, as every one knows, is composed of the short stinging hairs from the outside of the pods, and which is well known as a vermifuge, though not official, seem to have been of no medicinal value in those days. Perhaps before another two hundred years have passed the *Mucuna* will be entirely forgotten in the praise bestowed upon another remedy; who knows but that the short rigid hairs from the involucres of *Corylus rostrata*, Ait., which have been used as a substitute for *Mucuna* in North America, may not be sent over to us as an article of trade?

As an example of accuracy, we will quote a paragraph referring to white pepper, which we are correctly told "is made from the largest black pepper, by art, being very full, round, large and white;" we also learn that "some has been made here in England, but not so good." This knowledge contrasts favourably with that possessed by the directors of a Bencoolen pepper plantation, who, on account of the higher price of white pepper, gave orders to the superintendent of their plantation to cultivate the white pepper plants in preference to the black. With regard to the adulteration of drugs and other articles of trade, perhaps there is some consolation to be derived from the fact that our forefathers practised a system of cheating certainly equal to any system practised now, for we are told that musk is frequently adulterated, and are consequently warned that "those musk cods which have been opened and sowed again, are very suspicious of adulteration; for there is often found lead, stones, leather, etc., stuffed in the cods amongst the musk. and that so cunningly, that it can hardly be perceived." We hope now that we hear so much of public analysts, the dawn of a better time has arrived, a time when we shall get pure food and pure medicine, articles of approved value and acknowledged purity.

AMERICAN NOTES.

In New York a new monthly publication, to be called *The Druggist*, is announced, the earlier numbers of which are to be illustrated by coloured plates of poisonous plants.

It is satisfactory to find that the colleges of pharmacy in the United States are reported to have larger classes during the present session than ever before; that Philadelphia has within the last seven years doubled the number of its students, and has just issued a catalogue of the class for the fifty-first session (1872-73) numbering 293 names. At Cincinati the class numbers 50 students; at Louisville, in its second session, the class numbers 15, and an effort is being made to endow the college. At Chicago the college has 75 students, and the gift of books, etc., from English pharmacists is at last safely housed and being utilized. We regret, however, to hear that Professor Ebert has been seriously ill since the beginning of October. In explanation of the above figures, it may be mentioned that in some of the States the certificate of a legal incorporated college of pharmacy is allowed in lieu of an examination. In New York there appear to be several persons who have failed to comply with the new law regulating pharmacy in that city, against whom proceedings are to be at once commenced.

We learn from a letter placed at our disposal by Professor Attfield that one of the buildings which escaped destruction in the recent great conflagration at Boston was the College of Pharmacy. Among those destroyed was the office of the 'Boston Journal of Chemistry,' together with a drug warehouse, and two laboratories, which were in connection.

We are sorry to learn that, owing to the death of a relative, Mr. Daniel Frazer was prevented from attending the meeting of the Council on Wednesday last.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

February 5th, 1873.

MR. A. F. HASELDEN, F.L.S., PRESIDENT, IN THE CHAIR.

Present—Messrs. Atherton, Baynes, Betty, Bottle, Greenish, Hampson, Hills, Mackay, Owen, Radley, Sandford, Savage, Schacht, Shaw, Stoddart, Sutton, Urwick, and Williams.

The minutes of the meeting on January 1st and of the adjourned meeting on January 8th were read and confirmed.

BALLOT FOR RETIRING MEMBERS OF COUNCIL.

The lot for the next Council having been taken in the usual manner, the following were declared to go out of office, but are eligible for re-election:—

BAYNES, JAMES, 24, Waterworks Street, Hull.
BETTY, SAMUEL CHAPMAN, 6, Park Street, Camden Town, London, N.W.
BOTTLE, ALEXANDER, 37, Townwall Street, Dover.
HAMPSON, ROBERT, 205, St. John Street Road, London, E.C.
HILLS, THOMAS HYDE, 338, Oxford Street, London, W.
RADLEY, WILLIAM VALENTINE, 74, Market Place, Sheffield.
SAVAGE, WILLIAM DAWSON, 30, Upper Bedford Street, Brighton.

The following seven go out by rotation, but are eligible for re-election:—

ATHERTON, JOHN HENRY, Long Row, Nottingham.
BROWN, WILLIAM SCOTT, 113, Market Street, Manchester.
GREENISH, THOMAS, 20, New Street, Dorset Square, London, N.W.
HASELDEN, ADOLPHUS FREDERICK, 18, Conduit Street, London, W.
MACKAY, JOHN, 119, George Street, Edinburgh.
SANDFORD, GEORGE WEBB, 47, Piccadilly, London, W.
WILLIAMS, JOHN, 16, Cross Street, Hatton Garden, London, E.C.

The following gentlemen remain as members of the Council for the ensuing year:—

FRAZER, DANIEL, 113, Buchanan Street, Glasgow.
OWEN, JOHN, 51, Holloway Road, London, N.
SCHACHT, GEORGE FREDERICK, 7, Regent's Place, Clifton.
SHAW, JOHN, 24, Great George Place, Liverpool.
STODDART, WILLIAM WALTER, 9, North Street, Bristol.
SUTTON, FRANCIS, Bank Plain, Norwich.
URWICK, WILLIAM WALKER, 60, St. George's Road, London, S.W.

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

Elliman, Samuel Francis...... Slough.
Heppell, James.............. Durham.

Several persons having paid arrears of subscriptions, together with the subscription for the current year, were restored to their original status in the Society.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following Pharmaceutical Chemists were elected Members:—

Adams, Frank .... Stoke-on-Trent.
Ashworth, Amos .... Liverpool.
Badcock, Daniel .... Barnard Castle.
Borchert, Heinrich Theodor Gustav.. Netley.
Bridges, Charles William .... London.
Brown, Frederic Peter........ Bath.
Brown, James .... Rugby.
Butterworth, John .... Walworth.
Chater, Edward Mitchell .... Watford.
Clarke, George Ernest........ Lydney.
Collishaw, John .... Hickling Wharf.
Cope, John Ambrose .... Derby.
Davies, Peter Hughes, jun..... March.
Edwards, John Jones .... Douglas.
Elliman, Samuel Francis .... Slough.
Forster, Henry.............. Durham.
Griffiths, Waldron .... London.
Hackett, John Henry .... Pickering.
Hanbury, Frederick Janson .. London.
Henry, James Hay .... Macduff, N. B.
Heppell, James.............. Willington.
Hibbert, Walter Griffiths .... Neath.
Hick, George .... Bradford.
Holmes, Nathaniel Wheatcroft. Manchester.
Hooper, Frank.............. London.
Houghton, Robert William .. Bermuda.
Howie, William Lamond...... Edinburgh.
Iliffe, George .... Nuneaton.
Iliffe, Thomas Perkins ...... Nuneaton.
Jameson, William Edward.... London.
Johnson, Edward Eli .... Manchester.
Kitchin, William Henry...... Whitehaven.
Maitland, John Edward ...... London.
Mills, Robert................ Northampton.
Monkhouse, Joshua .... Liverpool.
Morgan, William............ London.
Moss, Albert .... Ilkeston.
Mumford, Alfred .... Southampton.
Palmer, Alfred Neobard ...... Bury St. Edmund's.
Parson, Henry James .... Hull.
Pasmore, Frederic Rich. ...... London.
Peel, James .... London.
Peters, David .... London.
Powell, Thomas Henry ...... Benson.
Preston, Joseph Classon ...... London.
Richardson, Robert .... Cheadle Hulme.
Shenstone, William Ashwell .. Colchester.
Sidley, Thomas Insall........ Lichfield.
Smith, John Francis .... Scarborough.
Stoakes, Benjamin Maidens.... Burgh-le-Marsh.
Swire, Jabez .... Halifax.
Thomas, John Darby Dermott Bristol.
Thompson, Henry .... London.
Thompson, William Milner .. York.
Thurston, Frederick .... Long Melford.
Townley, Thomas William.... Keswick.
Trist, Richard .... London.
Videon, Charles .... Paris.
Wallis, John Thomas Ward .. London.
Wilford, Josiah.............. Newport Pagnell.
Williams, James .... Dorking.
Wing, Lewis................ Yeovil.
Yates, Robert .... Southwark.

Chemists and Druggists.

Abbey, Joseph .... Nottingham.
Duncan, Alexander .... Bournemouth.
Jenkinson, John Henry Dixon. Sheffield.
Lemmon, George Francis .... King's Lynn.
Lewinton, Alexander Bellamy. London.

ASSOCIATES.

The following, having passed their respective examinations and being in business, were elected "Associates in Business of the Society":—

Minor.

Beard, James Collins .... Ealing.
Bowker, William .... Bolton.
Colley, John .... Ripon.
Cooling, William John ...... Newark-on-Trent.
Marshall, Alfred .... Upper Holloway.

Rieveley, Charles .... Birkenhead.
Smith, Arthur Harry .... Hanley.
Wenham, George Daniel...... Stamford.

Modified.

Arkle, William .... Lancaster.
Ault, Reuben................ Chesterfield.
Black, James................ Leslie, N.B.
Cock, John.................. Penzance.
Dobinson, Thomas .... Bishop Auckland.
Downing, James Henry ...... Southwell.
Houseman, Alfred Hodgson.... Southborough.
Kitchen, George Seaton ...... Nottingham.
Leithead, John Henry........ Chester.
Lugar, Henry .... Notting Hill.
Perkins, John Jaquest........ Denny, N. B.
Robinson, Jonathan Scott .... St. Leonards-on-Sea.
Robinson, John Threlkeld .... Compstall.
Scholefield, Herbert.......... Ravensthorpe.
Stewart, James .... Portishead.

The following, having passed their respective examinations, were elected "Associates":—

Minor.

Bascombe, Frederick .... Weymouth.
Beaton, William .... Fraserburgh.
Hearne, John .... Liverpool.
Jones, James Parry.......... Newcastle.
Lansdale, John Anstey ...... High Wycombe.
Marson, William .... Stafford.
Mumby, Charles John Everitt Bury St. Edmund's.
Pidd, Arthur Joseph .... Hulme.
Robinson, Richard Atkinson .. London.
Sargent, John Charles........ Leamington.
Scoley, Thomas Edward ...... Boston.
Smith, John Jacob .... Yeovil.
Williams, David Henry ...... Aberaman.
Worthington, William ...... Preston.

Modified.

Brooks, Owen .... Wellington.
Cavell, John .... Long Sutton.
Coates, Joseph .... Newcastle.
Johnson, Edward .... Southport.
Jones, Enoch Henry.... ..... Bristol.
Kay, John .... Crewe.
Lambert, George Pitt .... Brompton Road.
Pettinger, Elmer .... London.
Sharpley, Samuel Latham .... Sheffield.
Smith, James Malcolm ...... Doncaster.

APPRENTICES OR STUDENTS.

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

Ashley, Henry .... Gravesend.
Bailey, John Harvey .... Winchester.
Baker, Thomas.............. Ryde.
Barker, Charles Dexter ...... Birmingham.
Barlow, Frederick .... Birmingham.
Barnes, Nathaniel Morris .... Bolton.
Barton, Thomas James ...... Coventry.
Bray, Ernest Edward .... London.
Bray, William John .... Saffron Walden.
Brearey, Arthur William .... Douglas.
Brown, Alfred Duncombe .... Halstead.
Brumwell, Herbert .... Fleetwood.
Brunt, Edwin .... Great Grimsby.
Campbell, Henry .... Hammersmith.
Case, William .... Norwich.
Challinor, Cedric .... Bolton.
Clare, Thomas .... Cheltenham.
Davenport, Charles Aldersey.. Chapel Ash.
Davies, William .... Llandilo.
Donaldson, James .... Edinburgh.
Edwards, Frank Dunn ...... Usk.
Ellis, Henry .... Rochdale.
Evans, Evan Thomas .... Carmarthen.
Evans, Thomas.............. Cwmbach.
Fowler, George William .. Hackford next Reepham.
Garth, John .... Preston.
Geldart, William .... Seacombe.
Gibson, Frederick .... Blackpool.
Glasbrooke, Thomas Guttery.. Kidderminster.
Hammond, Henry .... Bradford.
Hanson, George Huskinson .. Boston.
Harriman, Edwin............ Liverpool.
Heywood, John Henry ...... Lincoln.
Higgs, Alfred Henry .... Bristol.
Hodgkinson, Peter James .... Congleton.
Hoyles, George.............. Lincoln.
Illingworth, William Henry .. Halifax.
Irving, Peter................ Dumfries.
Jacob, Henry Garrard........ Portsmouth.
Johnson, Edward .... Stockport.
Jones, Samuel .... Flint.
Jones, Thomas .... Rhuddlan.
Kemp, Harry .... Salford.
Kidd, William Champley .... Malton.
Laing, Joseph Lythall Leigh.. Ipswich.
Lawton, John Dyson .... Louth.
Legat, William Henry ...... York.
Leslie, George .... York.
Lewis, Edward Prosser ...... Tenby.
Littlewood, John Oscroft .... Sutton-in-Ashfield.
Lucas, Joseph Michael Mark .. Gravesend.
McCallum, Hugh............ Berwick.
Matthews, Thomas Averill.... Worcester.
Mill, George .... Edinburgh.
Millhouse, Harry How ...... Sleaford.
Mills, William Hamer ...... Heywood.
Moore, Henry .... Brighton.
Murdoch, John McGill ...... Glasgow.
Osborne, George Cooch ...... Northampton.
Oxley, Frederic Augustus .... Epsom.
Park, Charles James .... Devonport.
Parker, William Marris ...... Walcot.
Parminter, Urban .... Exeter.
Peché, John .... Chertsey.
Plumbe, Charles Marshall .... Mansfield.
Ponçon, Alfred Augustus .... Wallington.
Porter, Thomas .... Fleetwood.
Powell, Cuthbert .... Bristol.
Princep, Philip.............. Uppingham.
Richards, William .... Nottingham.
Roberts, William............ London.
Roberts, David Prosser ...... Hereford.
Robertson, Andrew .... Markinch.
Robinson, Edward .... Birmingham.
Royse, John Frederick ...... Stockport.
Servant, James.............. Thorne.
Shemmonds, Adrian .... Uttoxeter.
Slinger, Robert Thomas ...... Manchester.
Starling, William Egerton.... Tunbridge Wells.
Steele, Samuel .... Plymouth.
Stephenson, Robert .... Bradford.
Strickland, Augustus James .. London.
Sutton, William .... Chatteris.
Symons, William Henry .... Barnstaple.
Thomas, Frank.............. Boston.
Thompson, Lawrence Joseph.. Thirsk.
Topliss, Walter George ...... Wainfleet.
Trible, Edward.............. Launceston.
Ward, Matthew .... Leeds.
Wardley, Frederick Samuel .. Lowestoft.
Watt, George Adam.......... Hartlepool.
Webb, Robert William ...... Clifton.
Weston, Matthew Frank .... Bury.
Wing, William.............. Sheffield.
Wood, Henry .... Bury.
Wylde, James .... Reading.

The above list originally contained the names of three females, but on the fact being mentioned, it was decided that they should be put separately, in order that the question of admitting females to connection with the Society might be voted upon separately.

Mr. Schacht inquired if any ladies had ever been admitted to the Society heretofore.

The Secretary replied in the negative.

Mr. Hampson moved and Mr. Mackay seconded the election of the following as apprentices or students of the Society:—

Hart, Alice Marion .... London.
Minshull, Rose Coombes...... London.
Stammwitz, Louisa .... Wandsworth.

Mr. Sandford moved the following amendment:—

"That Alice Marion Hart, Louisa Stammwitz, and Rose Coombes Minshull be not elected apprentices or students of the Society."

He said the step now proposed was a very important one, and in refusing the privilege, the Council would not be in any way shutting ladies out from the business of a chemist and druggist. He should be sorry to prevent any lady devoting herself to any trade or calling which she desired to follow, but the Society was founded by men and for men, and this was altogether an innovation. There had always been an objection to receiving ladies as members, but if they were once admitted as apprentices, they would naturally go on to full membership. He had as much respect for the ladies as any one, and should not have voted with the majority had he been present at the last Council, when it was decided not to allow them to compete for the Sessional prizes. Having admitted them to the lectures, he thought they should be allowed to compete for any prizes which were offered to the students of the class, though not those offered to associates.

Mr. Betty seconded the amendment. He would not detain the Council by repeating the arguments he had formerly used, though he thought they all applied with redoubled force on the present occasion. The question was whether they should continue to be a society of men, or whether the female element should be introduced. It would not be competent to them to pass this amendment if it went in any way contrary to the intention of the Act of Parliament, but he did not believe this was the case. The 16th clause of the Act, which provided for executors carrying on the business of a deceased chemist and druggist for the benefit of his widow, to his mind showed clearly that Parliament never contemplated the case of such a business being carried on for the benefit of a widower, on the demise of a female pharmacist. There were many little matters which he need not advert to more particularly, which seemed to render it undesirable that ladies should be encouraged to enter the business, and as the admission of ladies as apprentices would lead to their attending the evening meetings, and ultimately perhaps to their appearance at the Council-table, he thought it best to interpose and check at the very outset what he considered a move in the wrong direction.

Mr. Savage could not conceive the object of the opposition to the admission of the ladies who now applied for election. It was quite a mistake to suppose that they would be inundated with ladies; the few who would come amongst them were exceptional, and might well receive exceptional privileges. The clause in the Act which Mr. Betty had referred to would justify him in supporting the admission of ladies, because it was one of the most anomalous clauses in the statute; and it was evidently a great mistake, as it was there enacted that ladies should be precluded from carrying on the business, if they were capable of doing so, after the death of their husbands. If ladies had the moral courage to undergo an examination and to obtain the qualification which was granted, irrespective of sex, they ought to be allowed to go through the whole curriculum, and be encouraged in so doing.

Mr. Williams said Mr. Betty's argument, founded on the Act of Parliament, had really nothing to do with the question. It was not whether these ladies would become pharmaceutical chemists, which they might do already, but whether they should become connected with the Society. There was no doubt this was the first step to admitting ladies to membership, because they would naturally proceed from studentship to associateship, and then to full membership. The question was so serious and important that he should like it deferred for further consideration.

Mr Urwick thought the matter had better be settled at once. If it really were the will of the majority of the Society that ladies should be members of the Council, he should be quite willing to see them elected. But it should also be remembered that it would appear by the Report of the last Preliminary examination that, in refusing to elect these ladies, they would be rejecting the very flower of the intellect which attended, for it appeared that one of these ladies was at the top of the list.

Mr. Betty explained that he quoted the 16th clause of the Act of 1868 simply to show that in not admitting ladies the Council would be in accord with the intention of the Legislature at the passing of the Act, as there was no provision made for them in it.

Mr. Hampson said when this subject was brought forward at the last Council, he was told that these ladies were in a measure out of order in applying to compete for the prizes, because they had not passed the examination which would make them eligible. Now he was told that that was of no effect at all. He did not see the necessity for considering the matter any further; he simply wanted the matter treated from a common-sense point of view. The Act permitted ladies to become pharmaceutical chemists, and therefore Mr. Betty's argument on that head, as far as he could see, came to nothing. If they were permitted to become chemists and druggists, surely they should be encouraged to become students in every sense of the word.

Mr. Sutton said when this question first came up, he was rather opposed to the admission of ladies in any way to the business, but his views had undergone a change, and he thought it really was a question for serious consideration whether the occupation of dispensing was not one which they ought to be encouraged to follow. For his own part, he believed that many young men were not nearly so careful, cleanly, and methodical in their habits as properly trained young women; and for his own part, he should feel no objection on principle to the introduction of them into the trade. It was admitted they might attend the lectures, and having done that, he thought this further step should not be denied to them.

Mr. Schacht remarked that a distinction had been drawn by Mr. Sandford between excluding ladies from the legal qualification to earn their livelihood as chemists and any claim they might have to become members of the Society, thereby contending that the Society was of a private nature, and had a perfect right to regulate its own affairs according to the wishes or even whims of its members. He could hardly take that view of the case at present, for they were not now simply a private society; since the passing of the last Act they were a society which had imperial powers, and if it were of advantage, as it was generally considered, to any member of the trade to become a member of the Society, it was certainly putting such persons under a disability if they were refused the privilege. The Council, in his view, had a certain trust imposed upon them which they had no right to exercise selfishly, but were bound to do so with the largest liberality possible. Anything which excluded a lady from the same advantages which the Society offered to men was a disability placed upon them on account of a natural accident which might as well be applied to men having hair of a particular colour. No one had shown that the occupation of pharmacy was unsuited for ladies, and that being taken for granted, it seemed to him an act of tyranny to exclude any one from the advantage of that Society. He therefore hoped the resolution would be carried by a large majority.

Mr. Bottle asked under what section of the bye-laws it was proposed to admit the ladies. He did not think section 10 met the case, because that applied to persons who were assistants or apprentices, which he did not understand these ladies to be. He suggested a compromise, that the ladies should be made honorary associates, and ventured to hope that the matter might stand over for another month, in order that this idea might be considered.

Mr. Betty also advocated an adjournment of the question.

Mr. Urwick said the ladies did not wish to be admitted on any but equal terms with the opposite sex.

The President said he did not see why ladies should be admitted to the Society simply because they had passed the Preliminary examination; many gentlemen passed that examination who never went any further. He should vote for the amendment.

The amendment was then put with the following result:—

For—Messrs. Atherton, Betty, Bottle, Greenish, Haselden, Radley, Sandford, Stoddart and Williams.

Against—Messrs. Baynes, Hampson, Hills, Mackay, Owen, Savage, Schacht, Shaw, Sutton and Urwick.

The amendment was therefore lost.

The original motion having again been put,—

Mr. Williams moved the following amendment, which was seconded by Mr. Greenish:—

"That the question of the election of Alice Marion Hart, Louisa Stammwitz, and Rose Coombes Minshull, be deferred until the meeting of Council in June next."

Mr. Baynes said he did not see the use of deferring a decision unless it stood over to a new Council.

Mr. Bottle suggested that it should stand over till the meeting of the Council in June; seeing that it was an extremely important subject, and as they were approaching the eve of a general election, the question would then go to the country and members would be returned to the Council after having expressed their opinions upon it. He therefore suggested that Mr. Williams should alter his amendment to that effect.

Mr. Shaw said the election of members of Council was not to hinge on that single question.

Mr. Williams said the course now proposed would give an opportunity for discussing it at the general meeting.

Mr. Owen said if it were deferred at all, it should be deferred to a new Council.

Mr. Urwick thought it a great mistake to defer a matter of this sort which might very well be dealt with at the present time.

Mr. Betty supported the adjournment of the question.

Mr. Hills said although he had voted against Mr. Sandford's amendment, he thought it might be better to delay a final settlement until after the annual meeting.

Mr. Mackay said that what had been said did not alter his opinion one iota that the Society would be stultifying itself to a certain extent if it refused admission to these ladies. Under the Act of 1868 no one denied that ladies were to be admitted to the Modified examination, or that several ladies came up for that examination, passed it, and were at this moment on the Register as chemists and druggists. And so far as he knew no one was able to show that they were not in all respects as fully qualified to conduct the business as any one else. He could not follow the argument advanced as to the propriety of deferring this question until the annual meeting; for he thought if they were not competent to settle such a simple question, they were not worthy of their position as councillors of the Society. He was not beset by the terrible fear which some seemed to feel, that if ladies were admitted to the educational department of the Society, and to the position of apprentices, associates, and members, they would come forward in such numbers as to swamp the male element. But even if a dozen, 100 or 500 ladies entered the Society, it did not follow that they would be elected on the Council. They could not be so elected unless it were the general wish of the whole body, and if it should happen that that was the case, he should certainly have no objection to seeing ladies sitting there. Still he looked upon that as not at all probable, though barely possible. He thought deferring this question for four months was quite unnecessary.

The amendment being put, the following gentlemen voted:—

For—Messrs. Atherton, Betty, Bottle, Greenish, Haselden, Radley, Sandford, Stoddart and Williams.

Against—Messrs. Baynes, Hampson, Mackay, Owen, Savage, Schacht, Shaw, Sutton and Urwick.

Mr. Hills did not vote on this division, consequently the numbers were equal, whereupon the Chairman gave his casting vote in favour of the amendment.

Finance.

The report of the Finance Committee was received and adopted, and sundry payments ordered to be made.

North British Branch.

Mr. Mackay presented the account of the North British Branch, audited by three gentlemen whom he named; and he stated he should be happy to give any further particulars which might be required. There was a balance of £67. 19*s.* 5*d.* in favour of the Society, which would go to carry on the current expenses of the present year. With regard to the payments in connection with furnishing the new rooms, it would be in the recollection of the members that £100 had been voted for that purpose, and the committee in Edinburgh had gone to work as economically as possible, still they had spent that amount and £32. 9*s.* 4*d.* in excess; but he believed very full value was obtained for the money, as might be seen by looking at the particulars. He also stated they were much in want of a set of specimens for the purpose of the Examiners. The reading-room and library, and especially the museum, were being taken advantage of by young men to a very gratifying extent; several students coming up, spending a fortnight or three weeks in close reading, etc., and examination of the specimens in the museum. They still looked forward to the President, or a deputation from the Council, coming down and seeing what was being done, and what their requirements still were. The President was *ex officio* a member of the Examining Board, and two former Presidents had done them the honour of visiting them; namely, Mr. Jacob Bell and Mr. Evans. He hoped, therefore, that at the approaching examination in April, the President, perhaps accompanied by some other members of the Council, would come down and see what they were doing.

Mr. Shaw said he had looked over the particulars and thought the money had been expended very economically. He had no doubt that when it was known to wholesale druggists and others throughout the country that specimens were required, they would be very soon forthcoming.

Mr. Schacht remarked that he hoped the Council would at once order the supply of everything which was necessary for the proper conducting of the examinations in Edinburgh; and if that was the proper time, he should be happy to move a resolution to that effect.

Mr. Hampson suggested that the North British Branch should prepare a statement of what they required, when he had no doubt the Council would supply it.

Mr. Williams was surprised to hear that the specimens were not in good order, because two years ago following the visit of Mr. Deane to Edinburgh, the Council authorized the expenditure of a sum of money for the purpose of making good these defects. He was rather astonished now to find it had not been done; it was certainly very false economy not to provide for the proper conduct of the examinations.

Mr. Mackay said the matter had been standing over in consequence of the getting into the new premises. In fact, even the old specimens had had to be stored until the new rooms were ready, and they had been rather hoping that the President would come down and see them, when it might be decided what additions and improvements should be made.

The President said it would be much more satisfactory to him if the necessary articles were provided first under the direction of the Edinburgh Board, so that when he visited them, as he hoped to do in April, he should see them in thorough working order.

Benevolent Fund.

The Report of this Committee was read, giving the particulars of an application for assistance by Elizabeth Parker, widow of Mr. James Davies Parker, upwards of twenty years confidential clerk to Messrs. Herrings, who died suddenly a short time since.

The Secretary said he was sorry to find, notwithstanding the distressing circumstances and deserving character of the applicant, that, though her late husband had made the necessary application and was eligible for the Modified examination, he had not presented himself for examination, and, therefore, was not registered as a chemist and druggist. As the Benevolent Fund was only applicable to registered persons, the Council were unable to make a grant to Mrs. Parker.

The report was received and adopted.

Library, Museum, and Laboratory.

The Report of this Committee was read. It recommended the purchase of a new edition of Beasley's 'Druggists' Receipt Book' for the library.

The report was received and adopted.

Provincial Education.

The Report of this Committee, recommending a grant of £10 to the Leicester Chemists' Association for the purchase of glass cases for the museum, was received and adopted.

Parliamentary.

The Report of this Committee was read, giving particulars of two cases in which proceedings had been taken against offenders under the Pharmacy Act.

The report was received.

One of these cases, that against William L. Wilson, of 142, Garscube Road, Glasgow, was fully reported in the Society's Journal, of January 25th. In the other case, against James Mathieson, of 109, South Portland Street, Glasgow, the defendant pleaded "guilty," and the penalty of £5 and costs had been recovered.

Proposed Alterations in the Bye-laws.

Several alterations in the bye-laws were proposed for the consideration of the Council. They were read by the President and discussed *seriatim*.

Present.	Proposed.
Section 1, *clause* 10.	*Section* 1, *clause* 10.
It shall be competent to the Council to restore any defaulter to his former status in the Society on payment of his arrears and any fine which it may be thought fit by the Council to impose, not exceeding half-a-guinea.	It shall be competent to the Council to restore any defaulter to his former status in the Society on payment of a fine, not exceeding five guineas.

This was agreed to without discussion.

Present.	Proposed.
Section 1, *clause* 12.	*Section* 1, *clause* 12.
All persons becoming Members of the Society, in exercise of the privileges conferred and defined by Sections 18 and 19 of the Act, 1868, shall on election pay an entrance-fee or sum of two guineas, exclusive of an annual subscription.	All persons becoming Members of the Society, in exercise of the privileges conferred and defined by Sections 18 and 19 of the Act, 1868, shall on election pay an entrance-fee or sum of one guinea, exclusive of an annual subscription.

The only alteration in this, as will be seen, was the substitution of one guinea entrance fee instead of two guineas.

Mr. Mackay thought this was a great mistake, and if a vote were taken upon it, it would be settled without further question.

Mr. Owen believed, on the contrary, that a vast number were kept away from the Society owing to the payment of an entrance fee of two guineas.

Mr. Urwick said he had given notice of a resolution to admit all chemists without an entrance fee, and therefore, of course, he should support the alteration. He did not know whether they would have many more or less, but he thought they should be liberal and ready to admit into the Society everybody, provided their character and position were respectable. It should not be a question of money whether a man should join the Society or not. For his own part he should like to see the entrance fee abolished altogether.

Mr. Atherton said there had been no general demand made for such an alteration, and he saw no necessity for it. It would be doing injustice to those who had paid the higher entrance fee.

Mr. Shaw thought the Council were unanimous on a former occasion, and declined to make any alteration such as was now proposed. He should object most strenuously to the proposed innovation. If a member discontinued his subscription and fell into arrear, by the section they had just adopted, they reserved to themselves the right to make him pay five guineas before re-admitting him, and what justice was there in admitting another man who had never paid anything towards the fund of the Society, on payment of one guinea only?

Mr. Stoddart said he should oppose the alteration.

Mr. Schacht said it was absurd to reduce the entrance fee in the first instance, and at the same time to charge an old member five guineas for restoration.

Mr. Betty said the entrance fee of two guineas was imposed in 1868 on all gentlemen who wished to enjoy the benefits of the Society in order to defray the great expense occasioned by the passing of the Pharmacy Act and by other matters connected with the conduct of the Society. They then undertook to register, free of cost, all those who chose to apply, and that was done at a very considerable expense, and he doubted whether the entrance fee of two guineas already received had recouped the Society the outlay then incurred. He saw no reason now to reduce that fee to one guinea. If the argument was, that more would be induced to join, he did not think that was worth consideration. Prior to the passing of the Act careful estimates were made as to the number of "outsiders," as they were then called, who might be expected to come in, and he believed that estimate had been pretty nearly justified. He did not think that the reduction of the entrance fee would cause any appreciable increase.

Mr. Savage mentioned a case which had recently come under his own notice in which a gentleman told him that he should have joined the Society a year ago if it had not been for the two guineas entrance fee, which he strenuously objected to.

Mr. Greenish believed that the reduction in the entrance fee would be the means of bringing in many new members, and the loss from this source would be very trifling; but he did not look at it altogether from a pecuniary point of view. He considered that if the alteration were adopted, it would be an additional element of strength in the Society.

Mr. Baynes said he should support the one guinea entrance fee, because he did not think the little difference to the Society was worth mentioning. He thought they were now making a fresh start, and should induce every one they possibly could to join.

Mr. Bottle opposed any alteration, saying the bye-laws were carefully settled after the passing of the recent Act, all these matters being taken into consideration; and the same individuals composed the class affected by this bye-law at that time as now. He did not think it was consistent with their own dignity that they should vary the fees in this way, and, like a Dutch auction, getting as many as they could at two guineas, then reduce it to one guinea; get as many as they could at that price, then, afterwards, reduce it to half-a-guinea, and then, finally, to five shillings. He did not believe that any great number would be attracted by the lowering of the fees, because any cautious man would say to himself that as the fees were being lowered, he would wait until they reached the minimum.

The President did not think it would be just to those who had paid two guineas to reduce the entrance fee to new-comers, nor did he think any large additional number would be induced to enter. The guinea subscriptions barely paid the expenses of membership.

On being put to the vote the proposed alteration was lost.

Present.	Proposed.
Section 3, *clause* 3. The Common Seal shall not be set or affixed to any deed, instrument, or writing whatsoever, unless in the presence of the Council of the Society, and in pursuance of an order or minute entered in their books.	*Section* 3, *clause* 3. The Common Seal shall not be set or affixed to any deed, instrument, or writing whatsoever, except by order of the Council of the Society, and in pursuance of an order or minute entered in their books, and in the presence of the President, or Vice-President, and two Members of the Council.

This alteration was agreed to without discussion.

Section 9, *clause* 1. This Committee shall consist of not less than four Members, two of whom shall constitute a quorum. The Committee shall meet once in every month, and report from time to time to the Council.	*Section* 9, *clause* 1. This Committee shall consist of not less than five Members, three of whom shall constitute a quorum. The Committee shall meet once, or oftener, in every month, and report from time to time to the Council.

This also was agreed to.

Section 10, *clause* 1. The Board of Examiners heretofore appointed shall continue in office until the first monthly meeting of the Council after the general meeting in the year 1869.	*Section* 10, *clause* 1. The Board of Examiners heretofore appointed shall continue in office until the end of the month of December, 1873.

The President said the object of this amendment was that the new Council should not have to appoint a Board of Examiners of whom they knew hardly anything. Being appointed in December, all the members of the Board would be known to the Council before they would be re-elected.

This was immediately agreed to, as also were the five following:—

Present.	Proposed.
Section 10, *clause* 2. The Council shall, at the first monthly meeting of the Council after the general meeting in 1869, and in every subsequent year, appoint such competent persons as they shall think fit, to be examiners to conduct all such examinations as are provided for or contemplated by the Charter or by the Statute, 1852, and the persons so appointed shall constitute and be called the Board of Examiners for England and Wales.	*Section* 10, *clause* 2. The Council shall, at their monthly meeting in December, 1873, and in every subsequent year appoint such competent persons as they shall think fit, to be examiners to conduct all such examinations as are provided for or contemplated by the Charter or by the Statute, 1852, and the persons so appointed shall constitute and be called the Board of Examiners for England and Wales.
Section 10, *clause* 3. The Council shall, at the first monthly meeting of the Council after the general meeting in 1869, and in every subsequent year, appoint fit and proper persons in Scotland to be examiners, and to meet in Edinburgh or Glasgow, or such other place or places as the Council may think desirable, and to conduct there all such examinations as are provided for or contemplated by the Statute, 1852, and the persons so appointed shall constitute and be called the Board of Examiners for Scotland.	*Section* 10, *clause* 3. The Council shall, at their monthly meeting in December, 1873, and in every subsequent year, appoint fit and proper persons in Scotland to be examiners, and to meet in Edinburgh or Glasgow, or such other place or places as the Council may think desirable, and to conduct there all such examinations as are provided for or contemplated by the Statute, 1852, and the persons so appointed shall constitute and be called the Board of Examiners for Scotland.
Section 10, *clause* 4. The President and Vice-President of the Society shall, *ex officio*, be members of the Boards of Examiners, and shall preside at all meetings of such Boards at which they shall be present.	*Section* 10, *clause* 4. The President and Vice-President of the Society shall, *ex officio*, be members of the Boards of Examiners, and one or other of them shall preside at all meetings of such Boards at which they shall be present.
Section 10, *clause* 5. After the first day of January, 1871, the Council shall not appoint any person who has attained the age of sixty-five years at the time of the appointment to be an examiner, unless such person shall be the President or Vice-President of the Society.	*Section* 10, *clause* 5. The Council shall not appoint any person who has attained the age of sixty-five years at the time of the appointment to be an examiner, unless such person shall be the President or Vice-President of the Society.
Section 10, *clause* 6. After the first day of January, 1871, no person shall be appointed an examiner who at the time of appointment is, or who during one year prior to the time of appointment has been, a Member of the Council, other than the President or Vice-President; and the election of any examiner to be a Member of the Council shall vacate his appointment as an examiner.	*Section* 10, *clause* 6. No person shall be appointed an examiner who at the time of appointment is, or who during one year prior to the time of appointment has been, a Member of the Council, other than the President or Vice-President; and the election of any examiner to be a Member of the Council shall vacate his appointment as an examiner.

The following proposed alteration was then read:—

PRESENT.	PROPOSED.
Section 10, *clause* 12.	*Section* 10, *clause* 12.
Such of the said persons as shall desire Certificates of competent skill and qualification to be engaged or employed as Assistants shall be examined in the First Examination, and also in the translation and dispensing of Prescriptions, in Botany, in Materia Medica, in Pharmaceutical and General Chemistry, the Chemistry of Poisons and Posology, which examination shall be called the Minor Examination; and such of the said persons as shall desire certificates of competent skill and qualification to exercise the business or calling of Pharmaceutical Chemists shall be examined in the Minor Examination, and in more extended knowledge of Botany, Materia Medica, the translation and dispensing of Prescriptions, Pharmacy, General Chemistry, the Chemistry of Poisons and Posology, which examination shall be called the Major Examination.	Such of the said persons as shall desire Certificates of competent knowledge and qualification to be registered as apprentices or students shall be examined or shall have been examined in Latin, English Grammar and Arithmetic. This shall be called the First or Preliminary Examination. Such persons as shall desire to obtain the Certificate of qualification of Chemist and Druggist under the Pharmacy Act, 1868 shall be examined in the translation and dispensing of Prescriptions, in Botany, in Materia Medica, in Pharmaceutical and General Chemistry, the Chemistry of Poisons, and Posology, which examination shall be called the Minor Examination. Such of the said persons as shall desire Certificates of competent skill and qualification to exercise the business or calling of Pharmaceutical Chemists shall be examined or shall have been examined in the Preliminary and Minor Examinations and in a more extended, and scientific knowledge of Botany, Materia Medica, Pharmacy, General Chemistry, the Chemistry of Poisons, and Posology, which examination shall be called the Major Examination.

Mr. HAMPSON thought there could be no objection to this, as it rendered the bye-law more clear and definite, and was in strict accordance with the Act of Parliament.

Mr. SANDFORD objected to the removal of the word "assistants," as the Act of 1852 contemplated the existence of such a class.

Mr. WILLIAMS said the Council might agree to the principle of the alteration, leaving any verbal alterations to the Parliamentary Committee, with the assistance of the Solicitor.

Mr. SANDFORD said he could not agree to the principle of omitting the word "assistant."

Mr. WILLIAMS said he did not think that was at all a point of contention.

The clause was thereupon agreed to, subject to the retention of the word "assistant."

PRESENT.	PROPOSED.
Section 10, *clause* 16.	*Section* 10, *clause* 16.
All persons before registration as Apprentices or Students shall pass the First examination, and shall pay a fee of Two Guineas, whereupon they shall be registered as Apprentices or Students.	All persons before registration as Apprentices or Students shall pass the First or Preliminary examination, and shall pay a fee of Two Guineas, whereupon they shall be registered as Apprentices or Students.
	After the 31st day of December, 1874, no person shall be admitted to the Minor Examination who shall not have attained the full age of twenty-one years. After the 31st day of December, 1876, no person shall be admitted to the Minor examination who has not been engaged or employed as an Assistant, Apprentice or Student at least three years previously.
	After the 31st day of December, 1876, the Board of Examiners shall cease to hold the First or Preliminary examinations, except in London and Edinburgh, and persons desiring to be registered as Apprentices or Students shall pass the Society's examinations in London or Edinburgh, or produce certificates of having passed either the Oxford or Cambridge local examinations, the examinations of the College of Preceptors, or of some other examining body, previously approved by the Council of the Pharmaceutical Society, provided such examination includes the Latin language and arithmetic.

Mr. WILLIAMS said he thought it would be convenient to omit the consideration of the first paragraph of the amended clause, because the whole question of fees could be considered afterwards.

Mr. HAMPSON said he was sorry to say he did not agree with the majority of the Parliamentary Committee in recommending this amended bye-law, because he thought it was introducing a great change, and one contrary to the spirit of the Act. The charter of 1843 gave power to the Society to examine candidates in such manner as the Council thought proper. The Act of 1852, which gave them further powers for the safety of the public, authorized the registration of such as passed the examination. Authority was also given by this Act to frame bye-laws proper and necessary for the purpose contemplated by the charter and the Act, and a detailed definition was given as to the nature of the examination intended, but there was no mention or allusion to any condition with which the candidates were to comply, other than the ability to comply with the tests imposed by the examiners, and thus showing that they possessed a competent and practical knowledge. The Act was framed with a view to the safety of the public, and not from any exaggerated notions of pharmaceutical attainment. In the preamble to the Act of 1868, the same plea on behalf of the public was set forth, and by this Act the Society was entrusted with large powers, including the power of compulsory examination of all persons intending to follow the business of chemist and druggist. But that Act gave no power to prescribe either the age at which the examination should take place or that any time of service should be previously passed. Now the proposed new bye-laws and regulations agreed neither with the letter nor spirit of the charter or Acts of Parliament in this respect, but constituted an unwarrantable innovation, and as the Council no longer represented a small voluntary association, he would urge upon them not to be too hasty in making new regulations which had not been proved to be either necessary or expedient. He was well aware that the Board of Examiners had recommended these changes, and that those recommendations were adopted, but he contended that they were not properly discussed, but were passed with unusual precipitation. Therefore he considered he was quite justified in discussing the matter on this occasion. He had more faith in the examiners than they had in themselves, and thought they were fully competent to test the qualifications of the candidate without arbitrarily fixing the age and intervals between the examinations, or prescribing that he should have passed any specified time in the business. He had not a word to say against the propriety and usefulness of the ordinary mode of entering the business, if it were done voluntarily, but he had the strongest possible objection to tying down the hands of the candidates in this way, and was sure that no good results would accrue from this source. He might be excused for remarking that if these regulations had been in existence some years ago, he should not have been a member of the Council or in the trade at all. He felt positive that this was a retrogressive step, and as other bodies, such as the Apothecaries' Company, no longer required a term of apprenticeship, he thought it was a great pity to introduce these limitations. He moved an amendment that the second paragraph be rejected.

Mr. Savage seconded the amendment.

Mr. Bottle submitted that the proposed alteration was strictly in accordance with the terms of the Act of 1868, referring especially to clause 4. If the Legislature contemplated that a man, in order to pass the Modified examination, should have been three years in business, it could not be inconsistent to ask that a young man who came forward subsequently should serve three years before passing the Minor examination. There were other clauses giving the Council power to make such bye-laws as they thought fit, and therefore he contended it was fully within their power to make the proposed alteration.

Mr. Mackay, on the whole, agreed with the proposed amendment, though he should have preferred the age being fixed at twenty instead of twenty-one. At the same time he would not take a vote upon that subject, especially as it would not come into operation until after 1874. His own idea, however, would be to make twenty the age for the Minor, and twenty-one for the Major. With regard to the objection to the term of apprenticeship, he thought that matter would right itself before the new bye-law came into operation, because there was a great feeling in Scotland, and he believed it would be so in England, that no apprentices should be taken who had not passed the Preliminary examination. Now, after he had passed that examination, it was quite right he should spend three years in practical acquaintance with the business before passing the Minor. In some branches of the legal profession it mattered not what was the age of the person applying, whether it was twenty, thirty, forty, or even sixty, he must serve a certain number of years and give evidence of having been so engaged before he could obtain the qualification he desired.

Mr. Shaw said this matter was fully discussed three months ago, and he did not think it ought to be reopened. He believed the proposed alteration was in strict accordance with the spirit of the Act, and it was impossible that a person could have a practical knowledge of the business without serving three years in it. With regard to the age, that had been fully discussed, and it had been almost unanimously decided that twenty-one should be the limit. He must say, however, he took exception to the last paragraph.

Mr. Urwick said it was true this matter had been previously discussed at the Council when he was in a minority, and he supposed he should be so still, for he had a strong objection to seeing industry and intellect weighted. By this clause they put a weight on young men who were persevering and intelligent, confining them to three years' experience and the age of twenty-one, when they might be fully qualified at an earlier period. He did not think in all cases three years were necessary to learn the business. It depended somewhat on the age at which a young man entered, and also on the education the lad received beforehand. It was very different now when youths were educated up to the age of sixteen or seventeen to what it was years ago, when boys were apprenticed at thirteen or fourteen. If a young man were apprenticed at sixteen or seventeen, and applied himself diligently to his business, so that he could pass the Minor at nineteen or twenty, he was worth to himself at least £10 a year more, and it was not fair to prevent him getting that. He thought the examiners themselves ought to be able to test the competency of a young man without reference to his age.

Mr. Williams was astonished at the discussion on this clause, since it was simply for the purpose of giving legal force to the regulations adopted by the Board of Examiners which the Council had already adopted.

Mr. Sandford said he thought the matter had been already settled. As to the age of twenty-one years, he might say that at the time the Act of Parliament of 1868 was under consideration the Government were very anxious, in the interest of the public safety, to introduce that requirement for passing the examination, but it was then waived in obedience to the wishes of the Council. However, he believed the Corncil were now pretty well convinced that the introduction of such a limit would be beneficial. The great point was to ensure the proper education of youths coming into the business, and therefore it was proposed to require an interval of three years between passing the Preliminary and the Minor, which would ensure not only sufficient education to begin with, but in effect a certain amount of practice in the business. It had been proposed to substitute the words "engaged and employed" for the word "registered," but he thought registered was the proper word, as a man would not register himself as an apprentice unless he intended to follow up the business. Registration was the legal thing, and he should prefer that word being retained. They did not require apprenticeship to any particular men, they only insisted that the candidates should have been occupied a certain time in the business. He had no doubt about their power to make the bye-law.

Mr. Greenish would have preferred fixing the limit of age at twenty.

Mr. Shaw said it was stated that it was illegal to admit persons under age to the qualification of chemists and druggists.

Mr. Baynes said the great point was that directly a man had passed the Minor examination he could immediately commence business, and he thought twenty-one was quite soon enough.

Mr. Hampson having briefly replied,

The President then proposed to put the amendment, but

Mr. Savage stated that he had only seconded it because he objected to the age of twenty-one years as the limit, and not with the intention of defeating it altogether.

The amendment, therefore, fell to the ground, and the paragraph was adopted.

With regard to the third paragraph, the President said he should recommend the rejection of it altogether. He thought that if youths were either obliged to pass the Oxford or Cambridge examinations, or to go to Edinburgh or London to be examined, it would put them to a great deal of inconvenience.

Mr. Greenish said there was a general impression that these examinations in the country were not satisfactory, and the desire was to abolish them altogether.

The President said they were as well superintended in the country as they were in London. He thought all the dissatisfaction arose in consequence of an unfortunate circumstance which took place on one occasion, but which could not take place again.

Mr. Betty said the Committee recommended this change, he believed, not as a matter of efficiency or otherwise in the Preliminary examination, but in order to separate the technical examination of the business which strictly belonged to the Society, from a matter which was already recognized as being one which could be equally well discharged by other bodies whose certificates were even now received. A change was proposed for the purpose of convenience and carrying on the Society's business, and with a view to draw a broad line between examining a man's knowledge of his business and that preliminary knowledge which would enable him to learn it. It had been originally proposed to abolish the Preliminary examination altogether in connection with the Society, but a compromise had afterwards been arrived at by which it was proposed to retain these examinations in London and in Edinburgh, and he thought that would meet all the difficulties of the case.

Mr. Savage expressed himself in favour of retaining the Preliminary examinations as at present, on the ground that their abolition would greatly inconvenience students.

Mr. Urwick was of the same opinion.

Mr. Sandford hoped the paragraph as amended would be passed, or else that the Council would go back to the old system under which the students either had to come to London to pass the examination or produce certificates from some competent authority. He thought these examinations in the country were often most unsatisfactory, and hoped they would not be continued.

Mr. Mackay did not think the present system was unsatisfactory, and saw no reason to effect a change. He had had from 24 to 30 students under examination at Edinburgh, and never discovered the slightest irregularity.

Mr. Betty hardly thought Edinburgh was a fair criterion.

On being put to the vote the paragraph was rejected by a considerable majority.

The following new clause, to follow number 19, section 10, was agreed to:—

To follow clause 19, *section* 10.

No person shall be admitted to the Major examination who has not passed the Minor examination at least three months previously, except in special cases, approved and allowed by the President of the Council for the time being.

The new bye-law of which notice was given last month was then considered. It runs as follows:—

Section 20, *clause* 4.

No resolution of the Society, by which the legal position of the members of the Society, or the legal position of chemists and druggists (whether members of the Society or not), may be altered, shall be passed at any meeting unless fourteen days' previous notice of the intention to introduce such resolution has been given, and ten days' notice thereof given to each person entitled to vote at such meeting.

The President read a letter from Mr. Vizer on the subject commenting on the above, which had already appeared, and suggesting as an improvement the following form:—

"That no resolution of the Society, by which the legal position of the members of the Society, or the legal position of chemists and druggists (whether members of the Society or not), may be altered, shall be received or adopted at any meeting of the Society unless 14 days' previous notice of the intention to introduce such resolution has been given by the secretary to the members."

Mr. Sandford remarked that the Parliamentary Committee had agreed to the addition of the words, "and ten days' notice being given to each person entitled to vote at such meeting." He did not like the phrase, "legal position," which was very vague. There was scarcely a resolution passed at an annual meeting which did not alter their legal position in some way. He therefore suggested the following:—

"That no resolution of the Society which would impose on Pharmaceutical Chemists and Chemists and Druggists any legal penalties or obligations shall be passed at any general meeting, unless fourteen days' previous notice of the intention to introduce such resolution has been given to the President of the Pharmaceutical Society, and notice thereof has also been given in the Pharmaceutical Journal by the Secretary, together with the notice convening the general meeting at which it is to be proposed."

Mr. Williams thought the Secretary was the person to whom the notice should be given.

Mr. Urwick thought the words "legal position" were better than those suggested by Mr. Sandford, especially as they had been settled by the Solicitor.

After some further discussion the clause was agreed to as first read, with the omission of the words "of the Society" in the first line, and the addition of the following words:—

"And notice thereof has also been given in the Pharmaceutical Journal by the Secretary, together with the notice convening the general meeting at which it is to be proposed."

Examination Fees.

Mr. Williams then moved,

"That the fee for registration upon passing the Preliminary examination be £2 2*s.*; for registration as a Chemist and Druggist upon passing the Minor examination, £5 5*s.*; and for registration as a Pharmaceutical Chemist upon passing the Major examination, £3 3*s.*"

Although several members of Council had left, he hoped this would be assented to on the understanding that it might be reconsidered at the next Council meeting.

Mr. Savage seconded the motion.

Mr. Betty thought they could not do it in that formal way.

The President thought it was a mistake to make a man pay two guineas more before he took up the status of Chemist and Druggist, and let off the man who passed as a Pharmaceutical Chemist to the same extent.

Mr. Williams said the man who passed the Minor examination got the full benefit of the Act of Parliament. It gave him power to keep open shop, and he held that was the one which he ought to pay the heaviest fee for. At the present time he stepped in for three guineas, and he believed this stood in the way of many coming forward to pass the Major examination. There was a great outcry made as to there being so few pharmaceutical chemists coming forward, and it was said there might be a difficulty hereafter in recruiting their members. It was with a view to remedy this that the change was proposed. The Minor examination was previously intended for assistants; and as it now gave a man a full qualification to enter a business, it was only fair the fee should be raised.

Mr. Mackay differed altogether from Mr. Williams on this point, seeing that this examination was now compulsory by Act of Parliament, and that the man who passed it must have already paid a two-guinea fee for the Preliminary. He considered three guineas quite enough, especially as compared with the fees paid in other higher professions. In Edinburgh a man could pass the examination of the College of Surgeons for a fee of ten guineas, and get a diploma, and even if he became a physician he had only five guineas more to pay. If he went on to the further degree of Master in Surgery, there was only a further five-guinea fee. In Glasgow the diploma of the Faculty of Physicians and Surgeons might be obtained for a ten-guinea fee; and if Chemists and Druggists were going to be weighted in this way with additional fees, it would simply have the effect of driving many men to scrape together a few guineas more to qualify themselves for the higher examination of the College of Surgeons, and pay the ten guineas, when they would open shop and do as they pleased. It must not be forgotten either that there were many young men to whom an extra two guineas at the expiration of their apprenticeship appeared a very large sum of money.

Mr. Betty said the fees payable in London on taking up a medical degree were much higher than in Scotland, amounting to about thirty guineas on the average.

Mr. Urwick was in favour of the proposed alteration, and did not think it would tell so much against the Society as some thought. He believed that the number of Pharmaceutical Chemists would continue to fall off, and that the expenses must be paid by those passing the Minor. The whole course of instruction was kept up for their benefit, and in the course of time they must expect that the Examiners' fees and other expenses would increase, and therefore he saw nothing unfair in increasing the examination fee.

Mr. Greenish deprecated any alteration. He considered it would be specially hard on those who passed the Minor and still continued assistants. It must not be taken for granted that every one who passed immediately went into business on his own account. Nor would lowering the fee for the Major induce men to present themselves for that examination. No doubt if the payment of the fee was a qualification for the ordeal, there would soon be a large addition to the number; but it was the examination, not the fee, which was the obstacle.

Mr. Hampson said, looking at the matter broadly, if three guineas paid the expenses, seeing that the examination was compulsory, he thought they ought to be satisfied.

Mr. Betty said he doubted whether the annual meeting would sanction a bye-law raising the examination fee, unless a clear necessity for it could be shown, which was not the case.

On the question being put, the proposed alteration was lost by a large majority.

It was then arranged that the alterations in the Bye-laws, as now agreed upon, be submitted to the Society's solicitor to be put into legal form.

The Report of the Board of Examiners was received and adopted.

Report of Examinations.

January, 1873.

ENGLAND AND WALES.

Examinations.	Candidates. Examined.	Passed.	Failed.
Major	3	1	2
Minor	42	17	25
Preliminary	312	166	146
	357	184	173

Certificates received in lieu of Preliminary examination:—

University of Cambridge 2

SCOTLAND.

Examinations.	Candidates. Examined.	Passed.	Failed.
Major	2	1	1
Minor	5	2	3
Modified	3	0	3
Preliminary	42	24	18
	52	27	25

Certificates received in lieu of Preliminary examination:—

University of Edinburgh 1

REGISTRAR'S REPORT AS TO MEMBERS, ASSOCIATES, AND APPRENTICES OR STUDENTS OF THE SOCIETY FOR THE YEAR 1872.

Members—Pharmaceutical Chemists.

Number of Subscribing Members, 1871	1797
,, ,, ,, restored, 1872	9
,, ,, ,, elected, 1872	34
	1840
Deaths, Secessions, etc.	74
Total number of Subscribing P. C. Members, 1872	1766

Summary—1871 . . . 1797
1872 . . . 1766

Decrease . . . 31

Members—Chemists and Druggists.

Number of Subscribing Members, 1871	669
,, ,, ,, restored, 1872	2
,, ,, ,, elected, 1872	97
	768
Deaths, Secessions, etc.	19
Total number of subscribing C. and D. Members, 1872	749

Summary—1871 . . . 669
1872 . . . 749

Increase . . . 80

Associates in Business.

Number of Subscribers, 1871	160
,, ,, restored, 1872	1
,, ,, elected, 1872	105
	266
Deaths, Secessions, etc.	19
Total number of Subscribers, 1872	247

Summary—1871 . . . 160
1872 . . . 247

Increase . . . 87

	1871.	1872.	Increase.
Associates not in business	566	630	64
Apprentices or Students	613	644	31

PHARMACEUTICAL MEETING.

Wednesday, February 5th, 1873.

MR. A. F. HASELDEN, F.L.S., PRESIDENT, IN THE CHAIR.

The following donations to the Library and Museum were announced, and the thanks of the Society were voted to the donors:—

'Calendar of the Royal College of Surgeons of England, 1872,' from the College; 'Catalogue of Scientific Papers (1800–1863), Vol. vi.,' from the Royal Society of London; Signal Service Weather Maps and Meteorological Records of November 22nd, 1872, three issues, from the U.S. War Department; 'De la Rage en Algérie,' par Dr. C. Roucher, 'Essai sur un Arbre du genre Pinus,' par P. Dive, and 'Les Champignons de la Charente-Inférieure,' par J. Mousnier, from Dr. Soubeiran; 'Year-Book of Pharmacy and Transactions of the British Pharmaceutical Conference, 1872,' from Mr. R. Bremridge; 'Sur la situation actuelle du Bureau des Longitudes,' par M. Faye; A report of Microscopical and Physiological Researches into the nature of the agent or agents producing Cholera,' by T. R. Lewis, M.B., and D. D. Cunningham, M.B.; 'On a Hæmatozoon inhabiting Human Blood: its relation to Chyluria and other Diseases,' by T. R. Lewis, M.B.; 'The Telegraphic Journal for November, No. i.;' 'Sessional Proceedings of the National Association for the Promotion of Social Science,' Vol. vi., Nos. 1–2; 'The Ancient Physician's Legacy to his Country,' by Thomas Dover, M.B., second edition, 1732, from Mr. Daniel Hanbury; 'Specimens of Egyptian Tamarinds, of the rind of the Bergamot Fruit, and of the roots of the Jalap Plant, showing the formation of the tubercules,' from Mr. Daniel Hanbury; specimen of 'Guaiacol, and specimen of Theine obtained from Guarana,' from Messrs. Hopkins and Williams; 'Sulphocarbolate of Calcium, in very perfect Crystals,' from Mr. De Witte; 'Arsenious Acid with Crystals formed upon its Surface,' from Bissoc Arsenic Works, Cornwall, from Mr. R. H. Martin; 'Eucalyptus Oil,' from Messrs. Felton, Grimwade and Co.; 'Native Borate of Lime from Singapore,' from Mr. J. Collins.

The PRESIDENT, in announcing the contributions to the Library, called attention to a very old book which had been presented by Mr. Hanbury, and which was by Thomas Dover, the originator of "Dover's Powder." The book contained a curious recipe for the preparation of that powder.

Professor ATTFIELD exhibited some syrup of iodide of iron containing iodide of lead. The specimen had been sent by Mr. Rimington, of Bradford, who believed it to be quite unique. Specimens of syrup of iodide of iron had, probably, been brought before the Society as often as any preparation, but they had never had one like that then shown, which was truly a "golden syrup," full of spangles of golden lustre. These spangles were iodide of lead. Mr. Rimington stated in a letter that the iodine he had been supplied with contained lead, the iodine probably having been sublimed on to a leaden surface. Professor Attfield had sometimes found lead mechanically mixed with iron filings. If Mr. Rimington had made his syrup from iron filings, that fact might account for the presence of lead; being made from iron wire, however, the lead was clearly traceable to the iodine, added to which, Mr. Rimmington had detected lead in the iodine.

Mr. WILLIAMS said that on more than one occasion he had found his syrup contaminated with iodide of lead, and he once had more than 150 pounds weight thus spoiled. He separated it by sulphuretted hydrogen after dilution. In each of the cases he had met with, the lead was entirely derived from the iron filings, and not from the iodine. He had used portions of the same iodine with pure filings, and found his syrup free from lead.

Mr. UMNEY said that he had seen the same impurity in syrup of iodide of iron, but it occurred only when the syrup was prepared from rough iodine. He had checked this observation by the use of different qualities of iron, and had found the lead in the syrup even when iron wire had been used. When resublimed iodine was used, iodide of lead did not occur.

MOROCCO DRUGS.

A paper on "Some Drugs collected in Morocco" which is printed at p. 621, was read by Dr. Arthur Leared, and gave rise to the following discussion:—

The PRESIDENT, after expressing the thanks of the Society to the author for his interesting, instructive, and, he might say, amusing paper, remarked that orange-flower water was generally imported in copper vessels containing nine or ten gallons each, but not made in the costly style of the vessel which Dr. Leared had just exhibited.

Mr. HANBURY said that Dr. Leared had referred to a seed extremely like that of *Peganum Harmala*, but black instead of brown. *Peganum Harmala* was a plant well known in the East, and its seeds possessed a remarkable property of affording, when digested in spirit, a green fluorescent solution. With regard to orris root, which, they were told, had lately come into the market from Morocco, he had the other day observed the curious fact that at the beginning of the present century price currents always used to contain both Florentine orris root and Barbary orris root. The Barbary orris root was entirely derived from *Iris germanica*, the common blue flag of our gardens. With regard to cumin we were told that it was used by the Jews in their bread, and also for flavouring pickled tunny fish. In the middle ages it was much used in Europe as a spice and a condiment. Dr. Leared had drawn attention to the remarkable fact of caraways being brought from Morocco. He (Mr. Hanbury) confessed that when he was shown Morocco caraway seeds in London some time ago, he hardly knew how to believe his eyes, for the caraway was essentially a northern plant, dwelling in Scandinavia and the colder parts of Europe. On looking, however, at Jackson's 'Morocco,' a work published at the beginning of the present century, he found that the author distinctly mentioned caraway seeds as an export of Morocco, and upon his (Mr. Hanbury's) sowing some of the Morocco caraway seeds last spring, he obtained a plant exceedingly like that of Europe. As to grains of paradise, it might be true, as stated by the people of Morocco, that their drug came from Europe, but it was a very curious fact that at Tripoli and the towns on the northern coast of Africa grains of paradise were still brought by caravans coming from Soudan and Timbuctoo, and from the tropical parts of Africa east of Sierra Leone. They were so brought in the middle ages, and shipped to the ports of Italy; and as they came from an unknown and remote region, and were much esteemed, they acquired their present name, the people supposing that no place but Paradise could produce anything so delightful. In subsequent times, when there was direct trade between Western Africa and Europe, grains of paradise were an article of very large import, being brought direct even to England and France. They were once in common use as a condiment for human food.

Professor BENTLEY said that Mr. Hanbury had anticipated some of the remarks he had intended to make. He must say that, although he had come to the meeting fearing that the paper, being technical, would be uninteresting, he had found it quite the contrary, and had listened to it with great gain. Researches such as those of Dr. Leared were the only means by which they could get any historical knowledge of old remedies, or form an acquaintance with new ones. As to orris root, it was very interesting to find that it came in such large quantities from Mogador, in Morocco. Dr. Leared had referred to only one species of *zizyphus* though there were several species known by the common name of jujube;

but as to the so-called jujubes manufactured in London, it was quite understood that the juice or the fruit of the jujube plant did not enter into their composition. He was very sorry that the great fascination of partridge shooting had prevented Dr. Leared from seeing the ammoniacum plant, as he should have liked to be informed of the mode in which it was obtained. Perhaps Dr. Leared might have heard from the natives whether the drug ammoniacum was obtained from the root, from the stem, or from both. In the museum there was a very interesting specimen of the stem of the Persian ammoniacum plant, with the ammoniacum *in situ*. That result had been produced, not by incisions, but by the attacks of beetles or some creatures of the kind, in consequence of which the gum had exuded and covered the stem. The poisonous nature of *Spartium junceum* had been referred to in the paper. The Spanish broom had been examined by Dr. Stenhouse, who had found a new principle in it, and therefore, anything in connection with that subject was of interest. Of course, the drug was a strong diuretic. With regard to starch, no doubt it was present in plants allied to the arum, and could probably be obtained in large quantities from the large corms and underground stems without much difficulty. He apprehended that the poisonous quality was got rid of not so much by washing as by a certain amount of temperature that was employed in the preparation of the substance.

Mr. COLLINS said that there seemed to be two kinds of 'harmala' seed, and both seemed to have had that name at first. Those of *Peganum harmala* he had compared with a herbarium specimen. The other was certainly those of a rutaceous plant, but whether it was a variety of *Peganum harmala*, he (Mr. Collins) could not say. He did not see in the Herbarium of the British Museum any specimen which showed a variation in the seed between those two. With regard to argan, he could not help wondering why the oil had not been introduced into this country. Sir William Hooker, in the 'Journal of Botany,' gave a very good account of it, and it had been very highly spoken of. As to Tacout galls, they were very small, and they did not seem to be equal to the Morea galls. The latter were introduced to commerce some time ago, but from inquiry which he had made, he found that they were not considered good enough to be sent. The dealers said that when the galls were very small they did not like them, because they were very often mixed with foreign substances. With regard to *euphorbium*, it would have been very interesting if the plant from Kew had been sent to the meeting, because it had now, through the researches of Dr. Cosson,* some historical interest. It would be remembered that Dr. Berg sometime ago made an examination of certain parts of the stems found in the specimens, and he gave it the name of *Euphorbium resinifera*. Dr. Cosson having examined specimens which he received from Mr. Hanbury and others, said that he believed that Dr. Berg was correct. Dr. Hooker in the meantime had obtained a plant from Mr. Cartensen, and this was now growing. The only matter to be cleared, and to make one sure that it was this species which yielded the gum euphorbium, was the flowering of the specimen. That event would prove whether Dr. Berg and Dr. Cosson were correct. As to the wormwood, if he remembered rightly, Mr. Wilkomm and Dr. Berg gave it the new specific name of *Cina*. There was an article in the Journal on the subject.† Mr. Wilkomm had proved what Dr. Berg had said to be correct. They had given that new specific name to the Barbary worm seed.

At the request of the PRESIDENT, Dr. Leared consented to leave his specimens on the premises of the Society for two or three days, that other members might have an opportunity of examining them.

* Pharm. Journ. [3] vol. ii. p. 1049.
† Pharm. Journ. [3] vol ii. p. 762.

PROPOSED ADDITIONS TO THE BRITISH PHARMACOPŒIA.

The PRESIDENT informed the meeting that Professor Redwood was anxious to make an important statement with regard to the Pharmacopœia.

Professor REDWOOD said he should occupy but a very few minutes, as the usual time for adjournment was already passed. He might resume the subject at another meeting, probably; but there was an object in its being brought before the members of the Society before the next meeting was held. He referred to proposed alterations and additions to be made in the British Pharmacopœia. The work had now been published about six years, and it had, during that time, been reprinted, and would require to be reprinted again very shortly. In introducing a reprint of it on the next occasion, it was proposed to add to it a supplement or appendix which should contain certain new remedies which had been established in medical practice since the work was published. The question arose as to whether, on this occasion, a new edition should be brought out, or an alteration or addition made simply in the existing one. It had been considered that there were very serious difficulties and objections that would attach to issuing a new edition at the present time. The difficulty of inducing the medical profession generally to take up a new pharmacopœia was very great, and there were many other difficulties that would stand in the way. It was generally considered and recognized that ten years was about the time that a pharmacopœia should be allowed to remain in circulation before it was materially and generally altered; and therefore it was proposed merely to issue now a supplement or appendix with the reprint. This would be attached to the end of the reprint, and would be issued separately besides; so that those who had the work already could possess themselves of it in addition to the original work. The next question was, as to what this appendix should contain. There were several medicines and preparations that he had himself suggested, and other persons (members of the Pharmacopœia Committee of the Medical Council) had suggested others. It was desirable to induce pharmacists and others in this country, and in Scotland and Ireland, to make suggestions of what they thought should be introduced into the appendix of the Pharmacopœia at the present time. Now there were certain things that were quite obvious, as, for instance, hydrate of chloral and nitrate of amyl. Acetic æther he proposed more especially with a view to its use subsequently, when the Pharmacopœia was more generally altered. Then there were chloroform water (aqua chloroformi) and mustard paper (charta sinapis). There was a preparation of elaterium, which it was suggested to introduce in the form of a diluted powder (pulvis elaterii compositus), which would consist of elaterium with nine times or seven times (he should say nine times) its weight of sugar of milk. In that diluted form its administration would be facilitated and rendered more safe. Tincture of orange peel was a question which had been before them, and it was suggested that, leaving the present tincture in the Pharmacopœia, they, nevertheless, might add a tincture of the fresh peel; but that, however, was a question to be considered, and in reference to which they were anxious to receive the opinions of practical pharmacists. Then it was proposed to introduce a syrup of liquorice (syrupus glycyrrhizæ). Some of the medical members of the Committee had suggested that that would be a convenient preparation to order frequently in prescriptions. Then they had such things as the hypophosphites, hypophosphite of lime and hypophosphite of soda, and the sulphites, as, for instance, sulphite of soda, although he should himself consider that the hyposulphite, which was now in the Pharmacopœia among the tests, would answer every purpose, and be quite as effective as the sulphite. Then there was oxide of bismuth, and there were two preparations which were suggested and brought under the notice of the Society some time ago, by Dr.

Dyce Duckworth, assisted by Mr. Carteighe, namely the acetum and the oxymel ipecacuanbœ. And then it had been suggested that it would be very desirable to have a pill mass in the Pharmacopœia of a purgative nature, and not containing aloes. There was none such at present, and therefore they had proposed pilula jalapæ composita, which should be free from aloes, and should owe its purgative quality to some other ingredient. Then there was nitrate of ammonia, which they thought of introducing because it was now used in the preparation of nitrous oxide. Next there was precipitated oxide of mercury, which, for certain purposes, was found to be more active and efficacious than the red precipitate obtained by the application of heat. Then there was pepsine, some form of which it would be proposed to introduce into the supplement. It had been suggested, moreover, that they might probably introduce a new form of suppositories. Some medical men took exception to the present suppositories on account of their greasy basis, and it had been proposed that either gelatine, softened with glycerine, or starch and glycerine, might be used in certain cases as a more suitable because a more cleanly basis. The greasiness occasioned by the use of the present suppositories was a source of discomfort and annoyance. These were some of the propositions which had hitherto been made, and the Pharmacopœia Committee were anxious to obtain as extensively as possible the opinions of pharmacists with reference to these and other additions which it might be thought desirable to make to the Pharmacopœia.

The President said that this communication was a very important one, and he hoped that the members would work at the subject, and state the result at some future meeting.

Professor Bentley asked whether Dr. Redwood proposed to bring the subject forward again.

Dr. Redwood said that perhaps he should have explained that his reason for bringing the subject forward provisionally that evening was that the Medical Council expected to meet in the early part of April, and the Pharmacopœia Committee proposed to have the draft of an appendix prepared and submitted to the Council next month. He should have to draw up that appendix and submit it to the Committee by the 1st of March, so that it might be circulated before the Council itself met. Of course, it would be quite open to make any further alterations afterwards, but, in some form or other, the appendix would have to be before the members of the Medical Council soon after the first of next month. That would happen before the next meeting, but, probably, throughout the whole of this year the subject could be discussed, for he was not quite clear that the reprint would take place until the commencement of next year.

The President announced that the next meeting would be held on the 5th of March.

Provincial Transactions.

CARLISLE CHEMISTS' ASSOCIATION.

The usual monthly meeting of this association was held in the class-room on Thursday evening, the 23rd January. There was but a moderate attendance of members, but a tolerably good muster of associates.

Upon the table was displayed a collection of specimens of materia medica, comprising about forty articles, the gift of Messrs. Clarke, Bleasdale, Bell and Tollinton, of York; also a copy of Pereira's 'Materia Medica,' presented by W. Martindale, Esq., of London.

Votes of thanks were unanimously passed to the donors, after which, Mr. J. Robson proceeded to read a paper upon "Glycerine as a Means of Preserving Infusions," etc., which was very well received, and gave occasion for an animated discussion, diverging into the question of the propriety or otherwise of using concentrated infusions generally.

A cordial vote of thanks was given to Mr. Robson, and a similar vote to the president closed the proceedings.

Correspondence.

Milk Testing.

Sir,—Before closing your pages to the discussion on milk adulteration, I desire to express my dissent from the conclusion of Mr. Ekin, "that water is really the only adulterant ever met with in milk." That it is more extensively and frequently used than any other I freely admit; but when purveyors of milk become purchasers of lactometers, and milk, as an article of commerce, manufactured to a standard within the range, something more than aqueous attenuation must be sought for, and is, by diligent research, too frequently discovered.

I have found commixture with eggs adopted to conceal other adulteration of both milk and cream. Very recently a sample of the latter which had undergone spontaneous coagulation was sent to me for examination, and I believe that yolk of egg is the golden accompaniment which more frequently than any other colouring matter assists in passing off attenuated sky-blue as new milk. The suggested method of a correspondent for determining the amount of milk-sugar in whey by cupric reduction possesses no novelty. It is familiar as Barreswil's process. Many of your older readers will doubtless remember to have seen it as a portion of a very good article by M. Poggiale "On the Estimation of Sugar of Milk, and the Determination of the Richness of Milk," which was copied from the 'Journal de Pharmacie' into Vol. IX. of your Journal, 1849–50. This article also appears, with additions, in the 'Chemist,' vol. iv. N. S., 1857.

I remember to have read years ago of the discovery in Paris of the use of dextrine as a milk adulterant to some considerable extent, and then drew the inference that the comparatively easy transformation of this substance into glucose would materially detract from the value of Barreswil's process as a facile mode of approximately determining the amount of water adulteration in milk. To my mind it is open to question whether a useful cupric solution can be made, as stated by your correspondent, so that 100 grains should correspond to 5 whole grains of lactose, and I have still graver doubts as to whether the use of such a concentrated solution affords the best or even a reliable method of estimating lactose in whey. It is certain that lactose cannot in its reducing effect on cupric salt be considered equivalent to glucose, although the somewhat vague quotation from a correspondent's letter (page 482) would seem to imply that Dr. Attfield, in this respect, so treated them. I have read the several editions of Attfield's 'Chemistry' with both pleasure and profit, and venture to affirm that in all of them our worthy Professor has been too careful to commit himself to such a blunder, or even suggest the application of any such cupric solution as a mode of determining lactose. The divergent results of the observations of Messrs. Ekin and Southwell as to the acid or alkaline reaction of new cows' milk may be easily reconciled, and possibly were contingent upon the state of health and condition of the animals yielding it, but are far more likely to be dietary results arising from and attributable to variation in the mode of feeding. It will be found, as a rule, subject to some exception, that the recent milk of pastured cows indicates alkaline, whilst that of stall-fed cows gives acid reaction.

I need scarcely add that in other respects the quality of the milk yielded depends very much upon the quality and kind of food given. The observations and experiments of Mr. Thos. Garside, printed in your last number, commend themselves to the careful consideration and remembrance of all those who are engaged in milk investigation, or are ever required to offer opinion upon the dietetic value of milk of commerce.

Alexr. Bottle.

Joseph Young (Leicester).—Spirit of ·888 sp. gr. = 63 per cent. alcohol, is 24·3 o. p. Spirit of ·830 contains 87 per cent. of absolute alcohol by weight. The other equivalents you quote are correct.

☞ In consequence of the length to which the report of the Society's proceedings has extended, we are compelled to defer the publication of several communications and answers to correspondents.

Communications, Letters, etc., have been received from Messrs. C. Patrouillard (Gisors), J. Leay, Crew, McKnight, Bennett, White, Masson (Paris), J. Cyriax, Schweitzer, Haffenden, Pitman, A. H. Mason, R. E. Charles, Dawes, Widdowson, Yewdall, Biss. Kay Bros., Dr. Kidd, Cecil, Major Associate, Pix Liquida.

ARSENICAL WALL PAINTS.

BY FREDERICK JOHN BARRETT, F.C.S.,

Pharmaceutist to the Wolverhampton and South Staffordshire General Hospital.

A short time ago I was requested to make a qualitative analysis of three samples of a suspiciously brilliant green paint, which had been used for colouring the children's ward of a large provincial hospital. A preliminary examination gave abundant proofs of arsenic in all three of the samples, and the colours upon the walls were immediately ordered to be removed. In a subsequent quantitative analysis I discovered that all contained Scheele's green (arsenite of copper) in considerable proportions. The following are the results of my examination:—

Sample No. 1.—A light green powder, containing about 90 per cent. of pure arsenite of copper, $CuHAsO_3$ (corresponding to 47·52 per cent. of arsenious acid), with a small quantity of carbonate of lime as an admixture.

Sample No. 2.—A soft watery green paint, containing 9·73 per cent. of $CuHAsO_3$ (corresponding to 4·44 per cent. of As_2O_3).

Sample No. 3.—A darker green powder, supposed to be a mixture of Scheele's green with a non-arsenical green. This contained 36·5 per cent. of $CuHAsO_3$ (corresponding to 19·27 per cent. of As_2O_3).

I found on inquiry that the powder green, No. 1, had been converted into the paint No. 2 by the admixture of whitening, size, and water, and that the darker green had been used for painting the borders of the wall. About seven pounds of No. 1 powder (containing arsenicum equivalent to 53·224 ounces of arsenious acid) had been used for painting a ward the walls of which measured 910 square feet, so that upon each square foot there was Scheele's green equivalent to about 26 grains of arsenious acid. The paint, moreover, was readily removed by rubbing and by moisture.

Since making the above examinations I have been induced to extend my inquiries to various paints, wall-papers, and painted articles which, from their brilliant verdancy, attracted my attention, and which were readily obtained from the artists' colourmen and others. With very few exceptions, the more attractive green papers were laden with arsenical pigments, and only those colours which were dark and heavy looking were free from that poison. Scheele's green, emerald green, Brunswick green, Schweinfürth green, and mineral green are all arsenical compounds, and are extensively used in painting theatres, ball-rooms, and other public places. Large quantities of arsenical papers are exported to India and the Colonies. And it has been asserted by a correspondent of the *British Medical Journal* that severe attacks of throat disease, closely resembling diphtheria, at Melbourne, Victoria, and elsewhere have been caused by their use. He also states that "arsenic is largely used in oil paints, which are, consequently, exceedingly dangerous, owing to the escape of the poison in a gaseous form, a fact apparently unrecognized by the chemists and physicians of Great Britain and Ireland, though well known to their brethren in Germany." The greatest ignorance of the poisonous character of these paints appears to prevail amongst the vendors of them. Although they are preparations of arsenic, no questions are asked of the buyers, no poison label is used, no entry is made in the poison-book, and the sellers are not registered under the Pharmacy Act. In Germany the sale and use of arsenical pigments are prohibited by law, except under special circumstances.

In addition to the above uses arsenical pigments are also employed to paint children's toys, artificial flowers, confectionery, fancy boxes, wafers, etc., and (it has been stated) for painting the shelves upon which articles for domestic consumption are stored in the shops of bakers, greengrocers, and others.

I examined a quantity of children's toys and some confectionery, and was pleased to find they were not coloured with these paints. The box, however, which held the sweetmeats was ornamented with gaily coloured flowers, containing a large quantity of arsenic. A lady kindly furnished me with some artificial flowers from her head-dress, which, when tested, were found to contain a portion of this pigment. One berry alone containing equivalent to nearly one-sixth of a grain of arsenic. The lady, not being a qualified pharmaceutist, expressed much astonishment at the result.

I quote from Watts's 'Dictionary of Chemistry' the following remarks in reference to arsenical colours:—"A great deal of needless alarm has lately been excited about the supposed deleterious effects of this pigment. It is extensively employed in staining wall-papers, and persons inhabiting rooms thus papered are said to have had their health seriously injured by the arsenical fumes evolved from it. Now it is utterly impossible that arsenic should volatilize from such a compound at ordinary temperatures. It does not decompose at any temperature below redness. The only way in which danger could arise from the use of paper stained with an arsenical colour is that particles of the compound might be brushed off in dusting the paper, and thus become mixed with the air of the apartment; but it is not in this way the supposed accidents are said to have occurred; the panic has arisen from a mistaken notion as to the volatility of the arsenic. That the use of this pigment is not really dangerous may be safely inferred from the fact that no bad effects are experienced by the workmen engaged in its manufacture."

There can be little doubt that great danger does arise, not so much from the volatility of the arsenicum, or the decomposition of the arsenites, as from the fact that the colour is so easily removable from the walls. Danger there certainly is; and it is to be regretted that this is very insufficiently pointed out by the above remarks, for it is certain that many cases of poisoning, much injury to health, and even death have been clearly traced to the use of arsenical colours. In 'Taylor on Poisons,' cases are given in which the dust which had gathered upon the furniture in rooms painted with Scheele's green was carefully analysed, and arsenic found to be present in very considerable quantity. He says, "It is therefore obvious that the atmosphere of rooms papered with arsenical paper hangings must be more or less contaminated with the fine particles of the green pigments removed from the walls by mechanical causes. Changes of a hygrometric and thermometric nature may affect this porous pigment, and render it more easily detached by currents of air, vibration, etc.; the poisonous particles may thus be received into the lungs; and although the quantity breathed at any one time may be small, it is certainly not advisable that merely for the sake of a green colour, persons should be exposed to breathe, day by day, arsenic in any proportion." I must apologise for the want of originality in this communication, but as it is a subject of some importance I have been induced to forward it for publication.

STRIATED IPECACUANHAS.*

BY M. PLANCHON.

(*Concluded from page* 523.)

The synonymy of the two kinds of striated ipecacuanha described in the former part of this paper is difficult to clear up, in consequence of the manner in which authors have confused the two species. But a consideration of the characters previously indicated has enabled me to do so pretty clearly.

The first author whom I have found clearly referring to a striated ipecacuanha is Lemery, who describes the third of his four species of ipecacuanha as "espèce grise cendrée glycyrrhizée."† Now this sort, according to the characters attributed to it (larger dimensions than those of the official species, and a sweetish taste recalling that of liquorice) can only answer to my "major" striated ipecacuanha. It is the same sort as Mutis had sent to Europe as identical with "Brazilian" ipecacuanha, and of which he had sent the mother plant to Linnæus. At the end of the eighteenth century and the beginning of the nineteenth this sort was to be met with rather frequently in collections of drugs if not in pharmacies. It is clearly the root of the *Psychotria emetica* which Richard describes in his inaugural thesis‡ under the name of striated ipecacuanha; whilst Mérat and De Lens,§ and more lately Guibourt,|| confound it under the same name with the minor striated ipecacuanha.

This kind has occurred in commerce from time to time, but in the present day it has little chance of entering a pharmacy. Mr. Hanbury has sent me a specimen that was offered to the Pharmacie Centrale in Paris in 1858 under the name of Ipecacuanha of St. Martha. M. Vogl has described it in a memoir under the name of *Ipecacuanha glycyphlœa*,** and states that it was sent into the market of Bremen as Carthagena Ipecacuanha. Some fragments, which I owe to the kindness of Mr. Hanbury, came from some packages sent from Bogota in 1870 and offered in the London market. It was from these packages the specimens were taken that were analysed by Professor Attfield,* and which he called "elastic striated ipecacuanha." Lastly it was a short time previously that M. Dorvault received at the Pharmacie Centrale the "violet" ipecacuanha which attracted my attention and which agrees as nearly as possible with the roots of *Psychotria emetica*.

It appears difficult to say when the "minor" striated ipecacuanha first appeared in commerce. But it is clear that this was the kind analysed by Pelletier in 1820,† since that chemist noticed 79 per cent. of woody fibre, gum and starch, and we know that only the "minor" contains starch. Now this species existed in the drug cabinet of the father of Pelletier under the name of "Ipecacuanha des Côtes d'Or (Minas de Oro)," and Pelletier adds that he also recognized it in a mercantile house which had received it from Peru, *viâ* Cadiz. Moreover, it must have been present at that time in most collections. It was this sort that M. Guibourt used principally for illustration at the School of Pharmacy, and it is the only sort which I have found named as striated ipecacuanha at the Pharmacie Centrale des Hôpitaux. M. Vogl‡ saw it in the collection at Vienna described as *Ipecacuanha striata seu nigra*. Professor Attfield found it in the Museum of the Pharmaceutical Society of Great Britain, and analysed it under the name of "brittle striated ipecacuanha."§ Finally, it has recently been described in detail by Mr. Pocklington in a paper on the use of the microscope in pharmacy.||

It is remarkable that this latter sort has hitherto been considered by most authors to be the produce of the *Psychotria emetica*, to the exclusion of the former. Pelletier first, then successively Vogl, Thénot, C. Ménier and Pocklington have referred it to that origin. Professor Balfour,** also, after describing the *Psychotria emetica*, attributed to the root of that species the chemical composition given by Pelletier, which we have seen could only have agreed with that of the "minor" striated ipecacuanha. The more active properties of the "minor" sort, its greater richness in emetine, and also the fact of its having been analysed by Pelletier, have brought it into greater prominence and caused it to be looked upon as the true type of striated ipecacuanha, and consequently the botanical origin generally attributed to striated ipecacuanha has been specially applied to it. In no other way can the general error into which authors have hitherto fallen be explained.

To sum up, there exist two sorts of striated ipecacuanha, of which the following appears to be the synonymy:—

1. "Major" Striated Ipecacuanha. — Roots of *Psychotria emetica*, L.—*Ipécacuanha gris cendré glycyrrhizé*, Lemery (Dict. Drog. Simp. p. 459). *Ipécacuanha strié*, Richard (Thèse Inaug.). *Ipécacuanha strié* (*partim*), Mérat and De Lens (Dict. Mat. Méd. vol. iii. p. 643); Guibourt (Drog. Simp. 6th edit. vol. iii. p. 94). *Ipecacuanha glycyphlœa*, Vogl (Zeits. d. Œstr. Apot.). *Ipécacuanha strié*, G. Durand (Thèse, 19). *Elastic Striated Ipecacuanha*, Attfield (Pharm. Journ. [2] vol. XI. p. 141).

* 'Journal de Pharmacie et de Chimie,' vol. xvii. p. 19.

† 'Dictionnaire des Drogues Simples' (1759), p. 459.

‡ 'Histoire Naturelle des Diverses Espèces d'Ipécacuanha du Commerce' (Thèses de la Faculté de Médecine de Paris, 1820).

§ Dict. de Matière Médicale (1831), vol. iii. p. 643.

|| Guibourt's figures (Hist. Nat. des Drogues Simples, 6th edit. vol. iii. p. 94) agree in part (the two larger specimens) with the "major" striated ipecacuanha, and in part (the specimen placed between the other two) with the "minor."

** Vogl, *loc. cit.* The authors of the 'Jahresbericht der Pharmacognosie,' etc., are wrong in referring this *Ipecacuanha glycyphlœa* to *Cephaelis*. All its characters, exterior and anatomical, agree with those of my "major" striated ipecacuanha.

* Pharm. Journ. [2] vol. XI. p. 141.

† Journ. Pharm. et de Chim. vol. vi. p. 261.

‡ 'Jahresberichte d. Pharmacognosie,' 1867, p. 64.

§ Pharm. Journ. [2] vol. XI. p. 141.

|| "The Microscope in Pharmacy" (Pharm. Journ. [3] vol. II. p. 921).

** "Remarks on Plants furnishing Varieties of Ipecacuanha" (Pharm. Journ. [3] vol. II. p. 970).

Ipécacuanha strié de la Nouvelle-Grenade, C. Ménier, (Thèse Inaug. p. 15). *Ipécacuanha violet* of commerce, Thénot (Thèse, p. 122); C. Ménier (Thèse, p. 15). *Ipecacuanha of St. Martha* and *Carthagena Ipecacuanha* of commerce.

2. "Minor" Striated Ipecacuanha.—*Ipécacuanha des Côtes d'Or* and *Ipécacuanha noir*, Pelletier (Journ. Pharm. vol. VI. p. 261). *Ipécacuanha strié* and *Ipécacuanha noir* (partim), Mérat and De Lens (Dict. Mat. Méd. vol. iii. p. 643); Guibourt (Drog. Simp. 6th edit. vol. iii. p. 94). *Ipécacuanha strié*, Thénot (Thèse, p. 120). *Ipécacuanha strié*, C. Ménier (Thèse, p. 13). *Ipécacuanha striata seu nigra*, Vogl. (Zeits. Œst. Apot.). *Brittle Striated Ipecacuanha*, Attfield (Pharm. Journ. [2] vol. XI. p. 141).

THE DISTRIBUTION OF ALKALOIDS IN CINCHONA BARKS.*

BY P. CARLES.

The anatomical structure of cinchona barks is one of the points which have most recently attracted the attention of quinologists, who have sought in the aspect of their fracture for an indication of their richness in alkaloids. The characters presented by the various barks are so well established, and are reproduced so regularly, that M. Weddell has been able to attribute all the barks to three principal types.† These facts appear to be well established; but what is much less certain, according to M. Planchon,‡ is the seat of the alkaloids. Upon this point two opinions, diametrically opposed, have been put forth.

"There is," says M. Weddell,§ "one fact well-ascertained; it is that the *Cinchona Calisaya* is the bark richest in quinine, and experience teaches us that the barks which next to *Calisaya* contain most quinine, are precisely those of which the epidermis is removed from the liber by the successive exfoliations of the outer coats, or at least by their junction to the periderm. On the other hand, it is known that the grey cinchonas, which are principally the young barks of other species, contain a much larger proportion of cinchonine than of quinine; this occurs also in old barks that have retained the cellular envelope of their earlier age." The author, therefore, concluded that quinine had by preference its seat in the liber, or, to speak more correctly, in the cellular tissue interposed between the liber fibres. Karsten, in his memoir upon the officinal barks of New Granada, maintains the same opinion.

Wigand also concluded from his observations that the alkaloids of cinchona barks occur in the walls of the liber cells, because those organs have the property of fixing in a remarkable manner the colouring matter of a solution of cochineal. But Müller has pointed out|| that the walls of parenchymatous cells possess the same property in a high degree. Moreover, these walls are so thick that the cavity of the cells themselves is, according to Jussieu,* almost obliterated, and could not, therefore, contain alkaloids. Other circumstances appear to tell in favour of this view of the question. When both surfaces of strychnos bark are touched with nitric acid, it is in the internal or liber part that the acid shows the presence of the alkaloids.† The poisonous alkaloids, morphine, narcotine, strychnine, says Richard,‡ are the product of the cortical cells, being present in the liquid they contain. When young, these cells enclose nutritive juices; later, only air. If, therefore, the analogy were complete with the cinchona barks, the alkaloids would only be found in the younger, that is to say, the innermost fibres. But the foregoing assertions,—if not pure hypotheses,—have the disadvantage of not resting upon direct experiment. One of the first thus to investigate the subject was Mr. Howard,§ who made analyses of barks of *C. lancifolia* and *C. succirubra*, which had been divided into two portions: the one, exterior, consisting of the cellular layer and some cortical fibres; the other, interior, consisting only of the liber layers. From his experiments he arrived at the conclusion that the superficial layers were not only the seat of the quinine, but also contained the largest proportion of both alkaloids.

M. Carl Müller|| has also recorded some experiments upon *C. Calisaya* bark, the parenchyma of which he states contained 9·876 per cent. of quinine, and the liber only 2·462 per cent. The author, however, is inclined to think that M. Müller's mode of operating did not yield the alkaloids in a pure state.

M. Carles, the author of the present paper, in order, if not to decide the question, at least to rest his conclusions upon a wide basis, experimented upon barks of various species. The different layers were separated by means of a knife or a rasp, according to their texture and the thickness of the bark, and each layer was divided into two or three lots. The method adopted was one formerly described by the author.** The quinine was estimated as crystallized sulphate after heating to 100° C.; and the cinchonine and other alkaloids, precipitated from the mother-liquor by ammonia, were weighed after desiccation at the same temperature. In the following tables, showing the results, the designation of the layers is not absolutely anatomically correct, in consequence of the difficulty of separating them; but by cortical parenchyma is meant all the more external layers of the entire bark, and by liber the more internal.

C. Calisaya (fine bark). In 1000 Parts.

	Entire bark.	Cortical parenchyma.	Liber layers
Quinine	20·40	23·40	13·20
Cinchonine	6·40	5·20	4·80

C. Calisaya (thin barks). In 1000 Parts.

	Entire bark.	Cortical parenchyma.	Liber layers.
Quinine	17·70	20·70	14·40
Cinchonine	4·80	4·40	3·60

* Abstracted from 'Journal de Pharmacie et de Chimie' [4] vol. xvii. p. 22.
† 'Hist. Nat. des Quinquinas,' Paris, 1849.
‡ 'Mém. sur les Quinquinas,' Paris, 1864, and 'Drogues Simples,' edit. by Planchon.
§ *Loc. cit.* and 'Compt. Rendus,' vol. xxviii. p. 729: Report of M. Jussieu.
|| 'Revue Bibl. de la Soc. Bot de France,' vol. xiv. p. 27.

* Report (Comptes Rendus, vol. xxviii. p. 729).
† Guibourt, 'Drogues Simples,' vol. ii. p. 515.
‡ 'Eléments de Botanique,' 1864, p. 60.
§ 'Quinology of the East India Plantations.'
|| 'Revue Bibliographe de la Soc. Bot. de France,' vol. xiv. p. 27.
** 'Journal de Pharmacie et de Chimie,' 1870.

C. lancifolia (cortical parenchyma, thick and parenchymatous).

In 1000 Parts.

	Entire bark.	Cortical parenchyma.	Intermediate layers.	Liber layers.
Quinine	8·10	24·60	11·10	6.60
Cinchonine	3·60	5·50	4·80	3·20

New Granada Bark (very fibrous, liber abundant).

In 1000 Parts.

	Entire bark.	Cortical parenchyma.	Intermediate layers.	Liber layers.
Quinine	2·01	3·90	traces	none.
Cinchonine	11·20	7·60	8·40	8·00

Bright Red Bark.

In 1000 Parts.

	Entire bark.	Cortical parenchyma.	Intermediate layers.	Liber layers.
Quinine, Cinchonine, Quinidine	20·25	21·60	11·20.	14·80

C. succirubra. In 1000 Parts.

	Entire bark.	Cortical parenchyma	Intermediate layers.	Liber layers.
Total alkaloids	45·40	36·60	23·20	16·40
Quinine (imp.)*	10·60	19·60	12·00	6·40
Cinchonine	34·76	17·00	11·10	10·00

Huanuco Bark. In 1000 Parts.

	Entire bark.	Cortical parenchyma.	Liber layers.
Quinine	traces†	traces	none.
Cinchonine and Cinchonidine	51·40	47·00	45·7

Loxa Bark. In 1000 Parts.

	Entire bark.	Cortical parenchyma.	Liber layers.
Quinine	traces	traces	none.
Cinchonine	2·20	1·40	traces.

These results show that quinine exists in all parts of the bark, but in a much larger proportion in the external than in the liber layers; and analysis of the intermediate layers indicates that the proportion diminishes pretty regularly from the exterior to the interior. The seat of the cinchonine does not however appear to be so well established. If experiments 1, 2, 3, 6, 7, 8 appear to show that, like quinine, it accumulates in the external parts of the bark, experiments 4 and 5 show some indications in favour of the liber layers.

The whole of these results are perfectly in accord with the experiments of Mr. J. E. Howard.

* From the large proportion of cinchonine present in this bark it is very difficult to separate exactly the quinine in the state of sulphate; it being necessary to effect the separation previously by means of washed ether. Now this vehicle carries away together with all the quinine and a little cinchonine, a resinoid matter (quinoidine), which saturates the sulphuric acid, hinders the crystallization of the sulphate, and remains in the mother-liquor. It constitutes about one-third of the products soluble in ether; is precipitated freely by ferrocyanide of potassium, and is not coloured green by chlorine or ammonia. It occurs principally in the external layers.

† It appeared strange not to find quinine in this specimen of cinchona, since authors having spoken of it as containing 5 to 6 parts per 1000. Does the error arise in the separation of the two alkaloids by ether? In every case the cinchonine here noted was partly soluble in washed ether, and showed very feebly some reactions of quinine.

STARCH AND ALBUMEN.*

BY R. ROTHER.

The non-appearance of coagulated albumen, by boiling the percolate obtained in exhausting licorice root which had been previously moistened and heated with a portion of the menstruum, induced the writer to ascribe this effect to the solvent action of starch upon albumen, both of which bodies are normal constituents of the root. But, to obtain more direct and positive evidence, the exigencies of the case required that the pure isolated bodies should be brought in contact under those circumstances in the absence of other extraneous matters of the root that would naturally interfere with or entirely obscure the reaction, consequently the writer employed egg albumen and pure starch.

Pure starch (fifty grains) was mixed with water (one fluid ounce), and the albumen of one egg was diluted with water to three fluid ounces, and strained through muslin. Then after uniting the clear albumen solution with the starch, the mixture was subjected to prolonged boiling; no precipitation however occurred, the liquid having only the opalescent appearance of starch water. The solution filtered quite readily, yielding a clear and transparent filtrate. A drop of strong nitric acid added to this instantly produced a dense gelatinous white coagulum. The solution, when diluted and treated with nitric acid, immediately gave an abundant precipitate of white voluminous flakes, which rapidly deposited, leaving the supernatant liquid clear.

The writer considers that these positive reactions are indubitable evidence that in the presence of starch, albumen is held perfectly in aqueous solution at a boiling temperature, and that only a strong acid can then separate it from such a solution.

LEAD POISONING.†

BY BEVAN LEWIS, M.R.C.S., L.C.R.P.

The manufacture of metallic lead is a process attended by disastrous results to those workmen who neglect, during their employment, those precautions necessary for their safety. Undoubtedly the carbonate is by far the most poisonous salt of lead; yet the fumes which arise round the workmen at the lead works are also extremely deleterious. To illustrate how far these men are exposed to these poisonous influences I cannot do better than rapidly glance at the various processes which the metal undergoes from the condition of rough ore to that of pure lead.

The men more immediately concerned in working the metal belong to four classes—the calciner-men, furnace-men, potmen, and refinery-men. The first of these are occupied in passing the rough ore through its first stage of reduction towards metallic lead. The ore consists of the sulphuret of the metal—the "galena" of commerce, containing usually a large percentage of silver. By the heat of the calciners this argentiferous galena is brought into the condition of sulphate, free oxide of lead, and sulphuric acid; these oxidized products react on the remaining sulphide, producing metallic lead and sulphurous acid. The fumes of sulphurous acid are allowed free exit from the flues into huge culverts which run along the floor beneath the furnaces, branching out to receive the contents of other flues, eventually terminating in a condensing chamber near the stack. Now, it will be observed that during the roasting of the ore the men are perfectly shielded from its fumes, except at intervals of from fifteen to twenty minutes, when the doors are thrown back, and the contents of the furnace well stirred about. During this process of stirring, and still more so on "discharging" the contents of the furnace, huge volumes of the fumes issue from the

* From the 'Pharmacist.'

† From the 'Medical Times and Gazette.'

opening, enveloping all around in a stifling, unhealthy atmosphere, in which the furnace, or calciner-men, are actively employed. The necessity for the use of respirators is undoubted, yet the men wholly disregard this precaution. The rough metal so obtained is now submitted to the furnace, mixed with pieces of old iron, which assist greatly in its reduction from all further impurities; the latter floats in a molten state above the heavier mass of fluid lead, which is now run out into the pots. These pots are huge reservoirs arranged in a long row down the apartment, and in these the lead, by its crystallization, becomes separated from the silver. At this work the potmen are engaged: bathed in perspiration, parched with thirst from their arduous exertions and the heat around, they raise by means of great perforated ladles the crystalline masses of the metal, and, swinging up and down upon the longer arm of the ladle as a lever, effectually shake out all the lead and silver still remaining in a molten state. The crystalline mass is swung round into the pot next to the workman. The same process is repeated here, the lead again passed on to a reservoir still further off, until at the extreme end of the row we may find but half an ounce of silver in a ton of lead; whilst, on the other hand, each successive pot further on is of course poorer in lead, richer in silver, even to the extent of 200 ounces in the ton of lead.

Now as to the hygienic condition of the pot-men. The surface of this molten mass in each huge reservoir is constantly undergoing rapid oxidation. The fumes escaping into the atmosphere around consist almost entirely of oxide of lead. For eight hours a day successively the pot-men are exposed to these fumes—inhaling the poison at every breath, receiving it upon the surface of the skin when in a state particularly favourable to absorption, washing the deposit which must occur upon the lips and tongue into the stomach by the large amount of water which many take to allay their thirst. Such are the ordinary conditions of life to which the pot-men at these smelting works are exposed.

To follow the lead and silver in their further stages will take a brief sketch. The lead, which has been desilverized as above described, is now run into moulds stamped with the proprietor's name, and is ready for the market; whilst the contents of the reservoir so rich in silver are brought into the refinery. Here it is kept at a red heat, and a blast of steam constantly passing over its surface oxidizes the lead, which, being readily fusible, runs off as "litharge" through an aperture in the furnace. The appearance of the interior of this furnace and the formation of litharge must be seen in order that the beauty of the sight may be fully appreciated. The litharge is again reduced into the metallic state, whilst the silver not yet perfectly refined is kept in a molten state in a furnace driven to the intense heat of quite 1873° Fahr. until all impurities are removed, when it is allowed to cool in a mould of calcined bone-ash—the only material known which will answer the purpose, and resist the intense heat of the silver. The formation of this great silver plate at one of our large lead works is the "lion" of the building; and the sea of molten silver once seen is not easily forgotten.

At what expense to the health of the workmen is this interesting process purchased? The exposure to the fumes at the furnaces being only necessitated during the stirring and discharging of the load, the occupation is decidedly less noxious than that in which the pot-men are engaged. A knowledge of this fact evidently has much to do with the hours during which the men are employed; for, whilst the men at the furnaces are on duty for thirty-six hours at a time, the pot-men are divided into three "watches," each of which is occupied for eight hours at a time. The intermittent nature of the duties at the furnaces has the result of securing to the men a far greater immunity from the action of lead on the system than is the case with the pot-men, who, without exception, exhibit every appearance of failing health. They all have a sallow, haggard countenance; the breath is offensive; they complain of a sweet taste in the mouth; their teeth are usually carious in the extreme; often the "blue line" is very evident; their digestive powers are impared; the secretions generally are torpid. With such a state of things as the general rule of their lives—constantly adding day by day to the accumulation of the poison within their bodies,—it may well be supposed that their existence is none of the happiest; constantly handling the metal, inhaling it in a minute state of division into their lungs, swallowing it with every draught of water, bathed in an atmosphere teeming with the fumes of the furnaces and pots, it is indeed not surprising that, unless very strict precautions are taken, they are as likely to suffer from lead-poisoning as are their fellows at the whitelead establishments. The more serious effects of lead result from sheer carelessness on the part of the men; utter want of regard for their personal welfare is the mainspring of these evils; added to which, ignorance of the simplest hygienic principles and total disregard to ordinary cleanliness degrade their moral and physical endowments.

The managers use every expedient which has a protective tendency, and constantly give general directions to the men regarding sanitary measures, which the workmen as constantly neglect—in fact, they all seem to require a severe attack of colic to bring them to be anything like reasonable agents in the matter. The works to which I chiefly allude have an extremely healthy site, in view of the Worm's Head, with the dashing breakers on the Pembrey Sands ozonising the atmosphere; and in such a locality our numerous cases of lead colic would remind us of the lines in 'Lalla Rookh'—

"Full in the sight of Paradise,
Beholding heaven and feeling hell!"

The precautions which should be enforced in these establishments are twofold in nature, and refer to the buildings and the person of the workmen. The apartments should be lofty; perfect ventilation, with a full current of air through the buildings, is absolutely requisite. Each workman, by this means, would secure not only a large cubic volume of air, but the poisonous fumes would be more diluted and more freely conveyed out of the building. The floors should be swept daily, after having been previously damped so as to avoid all dust arising. The men should be directed to use their ladles carefully, so as to disturb the contents of the pots as little as possible. In regard to the person of the workmen more particularly, they should cover themselves with a garment to be used only when at work, and which should be shaken and laid aside as soon as they leave the buildings. Strict cleanliness should be observed in their person—their hands should be washed frequently, and more especially before meals, from the adhering metal. Respirators ought more generally to be worn throughout these establishments, and if they are neglected the mouth should be well rinsed out with water before swallowing their food, or, better still, a gargle of dilute acetic acid or table vinegar might be used with advantage. Even with these precautions the salivary secretion carries a certain amount of lead into the stomach, so it is decidedly advisable that an occasional purge of sulphate of magnesia be taken, as well as the sulphuric acid drink which is used at whitelead-works, and which should be taken two or three times a week. These simple rules, if strenuously adhered to, would render cases of colica pictonum at these works comparatively rare. The buildings here are lofty, allowing of a good current of air, the floors are regularly damped and swept; but, in spite of every persuasion on the part of the managers, the men assiduously neglect the other important items. They often take meals in the same clothing as they work in, frequently avoid washing their hands, and absolutely refuse to wear respirators. One man actually declared he had a great antipathy to these useful little articles, because he feared "the work would get too healthy, and the wages consequently lowered!" It is such ridiculous notions, or else obstinacy of will, which render these workmen blind to their own interests, nor can I see any means of reform amongst them, unles it be the compulsory enforcement of rules, which will eventually prove to them, by incontestable facts, the benefit which managers and workmen will enjoy from their observance.

THE FIFTEENTH REPORT OF THE COMMISSIONERS OF INLAND REVENUE.

This report which relates to the financial year, ending on the 31st March, 1872, contains some interesting and valuable information for those who take pleasure in the commercial progress of the country. It shows that although there was a repeal of assessed taxes, yet the net increase in the income from the Inland Revenue amounted in the year to upwards of four millions—the total sum received being £44,805,895. The Commissioners point out with pardonable pride that upwards of 25,000,000 gallons of spirits were charged with duty, and that the percentage of increase was, in England 8·58, in Scotland 4·89, and in Ireland 7·20. Of the quantities retained in the three countries for consumption, the percentages vary slightly from the above. Thus the increase in England is 6·91 per cent., in Scotland 4·40, and in Ireland 10·30—the total increase in the United Kingdom being 7·08 per cent. Taking the census of 1871 as the basis of the calculation, it is shown that the quantity of spirits actually drunk in the United Kingdom is sufficient for every man, woman, and child to have 0·574 gallon in England; 1·727 in Scotland; and 1·064 gallon in Ireland—the average being 0·781 gallon. The Commissioners direct attention to the fact that with respect to whisky, there has been a great change in public taste. Comparatively speaking, Irish whisky has not been, till recently, a popular beverage; but during the last two or three years it has risen in public estimation, and is now becoming a substitute both for Scotch whisky and brandy. However, as it takes a longer time to mature than Scotch whisky, the revenue authorities have been compelled to provide increased warehouse accommodation; the quantity of whisky in bonded warehouses, at the close of 1871, being over 19 million gallons, as against 11½ millions in 1867.

Before leaving the subject of the spirit duties, the Commissioners state that 1,086,671 gallons of spirits have been methylated—the increase on the year being 84,373 gallons. The increase is considered to be due to the general expansion of trade, and there is no official reason to believe that methylated spirit is used for any other than legitimate purposes. It would appear from the 1144 detections of illicit distillation made during the year, that the heavy duty on spirits of 10*s.* per proof gallon offers a strong inducement to persons to try to evade the duty. This number, however, though large, shows a falling off of over 700 cases; the inference drawn by the Commissioners being that there has been less illicit distillation than for the past twenty years.

Whilst the distillers have been driving such a thriving trade, the malsters have been somewhat less prosperous. In Scotland there was an increase in the quantity of malt made; but in England and Ireland there was such a falling off that the decrease in the year reached 868,382 bushels, or 1·64 per cent. The total quantity of malt charged with duty reached 52,061,010 bushels; and in addition there were 5,336,680 bushels made for distillation and exportation. Of these quantities, it is estimated that 1,740,115 bushels were either exported or used in brewing beer exported on drawback.

From duties the report passes on to licences, and under the head of Establishment Licences (*i.e.* on servants, carriages, horses and mules, horse dealers, armorial bearings, and dogs), it is stated that the amount of revenue collected is more than a million and a half. The licence duty on dogs, although it has been reduced from 12*s.* to 5*s.*, reached for the year 1872 £280,000, as against £231,000, when the licence was fixed at the higher rate.

It appears from the report that 12,854 medicine vendors took out licences, and that the sum paid for the same was £7139.

It may be noticed, in passing, that the amount of revenue yielded from stamps reached £9,739,548, and from taxes £11,680,283. Of this latter, the sum of £9,328,102 was derived from the income-tax.

In the appendix there is a short report from Mr. Phillips, the principal of the Inland Revenue Laboratory, of the work performed in his department during the year. Although the narrative is brief the amount of work performed is very large, the number of samples examined being 12,128; of this number, 2241 were received from the Customs, and 933 from the Board of Trade.

The samples of tobacco examined amounted to 404 in number, and of these 271 were adulterated, the adulterants being rice starch, liquorice, gum, logwood, caramel, sugar and salt of iron.

The amount of adulteration ranged to 4 per cent. rice starch, 44 per cent. liquorice, and 5 per cent. gum. The gum was discovered in tobacco obtained at two manufactories in the north of Ireland; and the novelty of this detection consisted in the fact that manufacturers being aware that tobacco contained gum, appeared to have thought that any kind of gum could be added to tobacco with impunity. Happily, chemistry proved to demonstration that there was a marked difference between the gum found in these two samples of tobacco and that naturally present in all tobacco, and the traders were accordingly fined for this novel evasion of the law.

It appears that during the year 42,656,658 pounds of tobacco were cleared for consumption, and this quantity represents 1 lb. 5½ oz. as being consumed by every man, woman, and child in the United Kingdom. The revenue derived from tobacco amounts to about seven million pounds sterling, and the quantity used is steadily on the increase.

Of 34 samples of snuff examined, 6 were adulterated with umber and lime. 1267 samples of tobacco and 433 samples of snuff were examined for estimation of duty on drawback; and of 15 samples of chicory and coffee examined, 5 were adulterated with roasted biscuit.

Out of 134 samples of beer and materials used in brewing beer, 25 were adulterated with one or other of the following ingredients:—liquorice, caramel, footsugar, grains of paradise, salt, and copperas.

Of 687 samples of malt examined, 89 contained an illegal quantity of ungerminated grain. 6546 samples of beer were tested to determine the original gravity for drawback, and 326 samples of naphtha were examined as to their being of the proper quality and strength for methylating purposes.

The lime and lemon-juice examined for the Board of Trade for the use of the mercantile marine amounted to 761 samples, representing 84,649 gallons; 126 samples, representing 14,208 gallons, were rejected, thus showing that about one-sixth of the juice presented for examination did not reach the fixed standard of strength and purity.

The 356 miscellaneous samples examined include perfumed spirit, methylated spirit, laudanum, and paregoric. It is thus evident that the authorities have a vigilant eye to the detection of the improper use of methylated spirit for medicines for internal use.

This interesting report closes with some observations on the work performed at the Government chemical stations situated at Bristol, Hull, Liverpool, Newhaven, Southampton, Glasgow, Leith, Belfast, Cork, and Dublin, and it appears that the samples examined at these places were about 4000 in number.

The appendix contains other papers of importance, but they are not of sufficient interest to the general public to refer to them in this paper.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 15, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE INLAND REVENUE RETURNS.

BESIDES the numerous matters to which reference is made in the abstract from the Fifteenth Report of the Commissioners of Her Majesty's Inland Revenue which appears on the opposite page, there are one or two other points that are worth noting before they partake of the fate which too often befalls valuable and interesting information contained in "blue books." And, first, we would observe that some of the details given must in one respect disabuse the minds of those who imagine beer is brewed only from malt and bittered with hops. As the law allows brewers to use any substitute for hops which is not a substitute for malt, and at the same time not injurious to health, the report passes over hops in silence. But it is recorded that in the year no less than 29,188,303 lb. of sugar were used by licensed brewers. The quantity is certainly very great; and as it is well known that large quantities of sugar are also used, which the Revenue authorities know nothing about, it must be apparent that the amount of sugar used in the brewing of beer is enormous. Nearly four million pounds of sugar were made in England and charged with duty during the year; however, the greater part of this was made from starch for brewers' use only.

There is a very interesting paper in the report on the mode of charging with duty beet-root sugar made in Belgium. Our readers are doubtless aware that in 1864 this country entered into a convention respecting the sugar duties with France, Belgium, and the Netherlands; and as beet sugar is now made on a considerable scale by Mr. DUNCAN, at Lavenham, in Suffolk, it is necessary that the mode of assessing the duty should be within the terms of the convention. In passing, we may note that whilst Great Britain has but one beet-sugar manufactory, Belgium has 131, France 458, and the Zollverein 284. Why they should flourish on the Continent and not in this country it is difficult to understand, as the climate is favourable to beet cultivation; but of this we may be sure, that if the Lavenham factory be a success, others will soon be started; and thus the agricultural interests of the country may at no distant day be benefited.

The before-named paper shows conclusively that the present method of charging duty on beet juice in Belgium is strongly in favour of the manufacturer, who is able to produce much more refined sugar than the juice is estimated to yield; and he is thus able to pocket the duty on the surplus quantity made, and which is in reality, though indirectly, a bounty from the Government.

This mode of charging duty on the estimated quantity produced, and not on the actual quantity, carries us back to the time when in this country the Government used not to charge a distiller with duty on the actual quantity of spirits produced, but he was simply called on to pay a licence duty according to the size of the still. Of course the distiller took care never to let his still be idle, and the consequence was that the spirit duty was systematically evaded. The Belgians are striving to find a way out of their present difficulties respecting the sugar duties, but class interests appear too strong to allow of the matter being speedily or easily settled; and the amount received for sugar duties is sufficiently small to enable the Belgian Government to bear with patience the present inequalities of the sugar tax, as the duty lost by the present assessment is not so large as to cause the authorities to insist upon an equitable adjustment at any cost.

The Commissioners of Inland Revenue also report they have been surprised to find that a trade in adulterated chicory exists; but this fact need occasion no surprise, for as long as there can be procured such cheap articles as mustard, husks, dog biscuits, roasted rye, locust beans, and other vegetable substances which handily lend themselves to the adulteration of chicory, so long will they be used for that purpose.

CINCHONA CULTIVATION IN INDIA.

MR. J. ELIOT HOWARD, writing to the *Gardeners' Chronicle*, says he has just received letters from Mr. M'IVOR stating that the harvest of Neilgherry bark may now be said to have begun with the year 1873. They are now preparing about 25,000 lb. of bark to be sent home from the Government plantations, as well as a small quantity of renewed bark, the whole being for sale in the London market, and in June or July it is expected that a further supply will be sent home.

Other large importations may be expected from private plantations in the course of this year. So that it appears a fair field for British skill and industry is being opened out in a mountain climate well suited to our race. There is also an equally promising future for this enterprise in the mountain districts of Ceylon and Jamaica.

The number of trees in the Neilgherry plantations of the Indian Government are estimated roughly at rather more than one million, nearly one-half of these being *Cinchona officinalis* and its varieties, the rest *C. succirubra* with a small number of other sorts.

Mr. Howard adds that he has received twenty-three samples of the various kinds of bark under cultivation from Mr. Money. Most of them have an exact resemblance to bark grown in South America, and he considers that they promise well. A novel feature of this consignment, mentioned as presenting a very good appearance, is the bark of a new variety of *C. officinalis* which is said to make extraordinary rapid growth, while it is very hardy and is not injured by wind.

The following remarks, which are taken from a recent number of *Allen's Indian Mail*, are confirmatory of the opinion that the experiment of growing Cinchona in India will prove a successful one financially:—

"The question of growing cinchona at a profit in various parts of India appears to have reached a very promising stage, in spite of the drawbacks incidental to most experiments of the kind. Mr. M'Ivor, Superintendent of the State plantations in Southern India, lately informed his Government that large harvests of the bark might now be reckoned upon, and advised the sending home of not less than 25,000 lb. as a first consignment, to be sold by public auction, with a view to test its quality and market value. It is still open, we believe, to question how often the same trees can be stripped of their bark without injuring the quality of the yield, and many persons predict some kind of deterioration in the trees themselves. Canker also has for some time been at work in several plantations on the Nilgiris and the Sikkim Hills; but its ravages seem to be confined mainly to plantations grown on unkindly soil or in climates more or less unsuitable. The *Darjiling News*, however, speaks with perfect confidence of the results already attained in the Sikkim Hills. It declares that the bark there grown "could be sold with a fair profit at prices which would be ruinous to the producers in any other country where it is cultivated." In South America, where the mere cultivation of the plant costs nothing, the cost of carriage to the sea-coast tends to check the export trade whenever a fall in the market price occurs In India the extent to which Government once carried their experiments in growing Cinchona is said to have frightened a good deal of private enterprise out of the field; but the few speculators who hold on in spite of every hindrance may now expect to "enjoy a golden harvest," after some ten years of anxious waiting. While the private gardens on the Nilgiris show little chance as yet of winning back the sums laid out on them for years past, it is reckoned that the Darjiiling planters will soon be reaping a dividend of 30 per cent. As no return, however, can be expected from a Cinchona garden for the first eight years or so of its existence, none but capitalists are likely to embark in a venture which demands a good deal of ready money combined with a very large stock of human patience."

SPONGE IN ORIGINAL PACKAGES.

The danger of loss resulting from the purchase of sand in original packages of sponge has recently been the subject of a discussion in the correspondence columns of this Journal, and the statements that have been made would appear to lead to the conclusion that, although it might sometimes turn out to be a profitable speculation to buy sponge in that way, the safer plan, especially for small buyers, would be to buy it cleaned from sand. A correspondent has just forwarded to us a further illustration in an *ex parte* statement of his experience in buying sponge in original packages. He says that he was recently induced by a traveller, who showed him a sample, to order a case and to sign a printed agreement to take the sponge in sand as imported at landing weights. A few days after he received an invoice describing the gross weight as 1 cwt. 21 lb., subject to a deduction for tare, draft and sand of 1 qr. 19 lb., leaving a net weight of 3 qr. 2 lb. The following day, the case of sponge arrived, when the carrier's note showed that it had been received in London as 2 qr. 9 lb. gross, or 21 lb. below the net weight given in the invoice, and 2 qr. 12 lb. less than the gross weight given therein. Our correspondent states that he refused to receive the package, and that it now lies at the railway station pending the decision of a London County Court. Without entering into the merits of this particular case, it is evident that a system under which such a proceeding is possible is open to a large amount of fraud, and that the dealings must, in many instances, partake of the nature of a lottery.

THE SALE OF POISONS IN THE SIXTEENTH CENTURY.

"History repeats itself" is a well-worn observation, although probably not entitled to quite so much reverence as is claimed for it by some who quote it. But the following curious letter from Queen Mary to the College of Physicians, requesting them to carry out more efficiently the Act 32 Henry VIII. c. 40, bears a remarkable resemblance to certain more recent documents, and might be fairly cited in support of the theory. We are indebted for the quotation to 'Brabner's Almanack for 1873,' a local almanack published in the Kingsland Road. In the letter the authorities of the College are directed to—

"'Call and convent' before them 'the Wardens the Grocers and all the Apothecaries,' and 'streightly to charge and commande by authoritie that from tyme to tyme hensforthe neither thei nor anye of them do entreprice to sell or retayle any such wares, drugge or druggs as hath in theim any spice of venome or suspicion of poyson, or such other as by receivying of them at the handes of anie unlerned or of anie malitiouse or evyll disposed persons maie by anie means grievously hurte or put in perille or daunger of lief anie of our Subjectes of what estate or degre soever he or thei be, On lesse the seller of any of the said druggs be well assured of the honestie, true dealying, and good intent and skill of the byar; And first examyn the same for what intent or purpose he buyeth the same, and therewithal to note the name of the byar and time of the buying; Or else that the said grocer or apothecarie have with him remaining the handwritting of some discrete, lerned and authorised Physician for his discharge. Willing and streightly commandying the said grocers and apothecaries and every one of them not to faile herof as thei tendre our pleasure, &c., &c. Given under our Signet at our Manor of *St. James* the xxiii daye of *June* in the fourthe and fifthe years of our reignes'" (1557).

In a letter recently received from Baron Liebig he directs attention to the advertisement of a preparation bearing the title of 'Liebig's Invigorative Nervine Essence;" and thinking the association of his name with it likely to impose upon the public, he requests us to state that he is not in any way connected with that preparation.

Transactions of the Pharmaceutical Society.

ERRATA.

Page 628, col. 2, line 26, for Johnson, Edward Eli, read Johnson, Edwin Eli.

Page 629, col. 1, line 25, for Hearne, read Hearn.

NORTH BRITISH BRANCH, EDINBURGH.

The third meeting of the present session was held in the Society's rooms, St. Giles Street, on Friday evening, January 31st, at half-past eight; Mr. Gilmore, vice-president, in the absence of Mr. Baildon, president, from indisposition, in the chair. There was a full attendance.

The following is an abstract of an interesting lecture "On Paraffin Oils, with, special Reference to their testing and illuminating Power," by Dr. Stevenson Macadam:—

After referring to the manufacture and rectification of mineral oils, it was stated, that under the Petroleum Act, all mineral oils which evolved inflammable vapour at a temperature less than 100° F. were held to be included under the general term of petroleum, and were subject to certain restrictions as to safe keeping or storage, and sale or exposure for sale. The present plan of testing was in an open vessel surrounded by an outer vessel containing water which is heated by a lamp, and through which the heat is communicated to the inner vessel containing the oil to be examined. The Act provides that the "outer vessel shall be filled with cold, or nearly cold, water;" and that "a small flame shall be applied to the outer vessel." There is a want of precision in the instructions, and hence great irregularities occur in the testing of the same sample of oil by different experimenters. As a general rule, the quicker the oil is heated, the lower the temperature at which sufficient inflammable vapour is given off at one time to take fire or flash when a light is drawn across the surface of the vessel containing the oil; and the more slowly the oil is heated, the higher is the temperature at which the oil flashes, for during the slow heating the oil evolves vapour, little by little, and not sufficient for some time to exhibit the flash when a light is brought near. Another source of difference in the testing is in reference to the *cold* or *nearly cold* water which is required to be in the outer vessel not being rigidly defined, for the instructions might be carried out with water at 32°, 40°, 50°, 60° and even 70° or 80° F. Even the screen which is to surround the apparatus is loosely defined, for it is said "to surround it about two-thirds and to reach several inches above the level of the vessels."

The new testing apparatus which is likely to be introduced during the coming session of Parliament will probably remove all the sources of error. It is covered or is a close vessel, with a small cover which can be removed every now and again for the purpose of drawing the flame across and observing the flash-point. Specific instructions will probably be given as to the temperature of both the water and oil at the commencement of the experiment, and the exact rate of heating, say 2° F. per minute. These precautions will admit of uniformity being obtained in the results of the testing of the same oil by different experimenters.

The illuminating power of paraffin oil was then considered, and the value of mineral oils as sources of light in common or house lamps and in lighthouse lamps was fully discussed. The paper was illustrated throughout by many experiments.

A vote of thanks to the lecturer, proposed by the chairman, seconded by Mr. Young, was carried by acclamation.

Provincial Transactions.

LEEDS CHEMISTS' ASSOCIATION.

The fourth meeting of this society was held in the Clergy-room, Church Institute, on Wednesday, January 22nd; the President, Mr. E. Brown, in the chair.

The minutes of the last meeting having been read and confirmed, Messrs. R. Stevens, W. Denham and Thos. Harpham were elected associates.

The paper of the evening was read by Mr. Thomas Fairley, F.C.S., Consulting Chemist to the Yorkshire Agricultural Society, on "Bone and some of its products," of which the following is an abstract:—

In the lower animals, as the mollusca, oyster, crab, etc., the bone forms the outer protective covering, while in higher animals it is the inner framework. In the case of the skull, spinal column, etc., it also serves as covering for the inner soft parts.

Bone consists of mineral substances, chiefly phosphate and carbonate of lime, and of an organic cartilaginous substance, ossein, which remains when bones are digested in hydrochloric acid, the mineral substances being dissolved by the acid. Ossein is a flexible, comparatively soft substance, forming bone-glue when boiled with water.

The mineral substances remain when bone is burnt in air. In the lower animals carbonate of lime predominates, while in the higher animals we find chiefly the phosphate. In young animals also we find more phosphates than in old.

When bones are heated in close vessels, ammoniacal and oily products distil over, and bone-charcoal is left. The ammoniacal and other products consist of ammonia and its salts, and volatile organic bases, amongst which we find pyridine C_5H_5N, and substances belonging to the same or analogous series. (Exp. showing distillation of bone.)

Bone-charcoal is used for decolorizing sugar syrup, on account of its property of absorbing vegetable colours from their solutions. (Exp. solution of litmus was nearly decolorized by filtration through bone-charcoal.) Its cost requires that the bone-charcoal should be used over and over again. This is effected by re-burning it, by which its properties are restored. After using repeatedly in this manner it becomes clogged, etc., by the lime salts which it also absorbs from the syrup. By treating with dilute acid, these are removed. Hydrochloric acid has been used for this purpose, but it is liable to leave a little chloride of calcium which on burning glazes the charcoal and prevents its action. A recent improvement proposes to use acetic acid. Any acetate of lime then left would form carbonate on burning, which would not interfere.

Bone-ash is valuable as a manure, depending on the phosphate of lime which it contains, and it is our chief source of phosphorus for the manufacture of matches.

It is treated first with sulphuric acid and water when sulphate of lime is separated, and a phosphate rich in phosphoric acid remains. Thus:—

$$\underbrace{Ca_3\,2\,PO_4}_{\text{Bone Ash.}} + \underbrace{2\,H_2SO_4}_{\text{Sulphuric Acid.}} = \underbrace{2\,CaSO_4}_{\text{Sulphate of Lime.}} + \underbrace{CaH_4\,2\,PO_4}_{\text{Acid or Soluble Phosphate of Lime.}}$$

The soluble phosphate is evaporated to dryness, mixed with charcoal and distilled at a white heat. The vapour of the phosphorus is condensed in water.

$$\underbrace{3\,(CaH_4\,2\,PO_4)}_{\text{Soluble phosphate.}} + \underbrace{4\,C}_{\text{Charcoal.}} = \underbrace{Ca_3\,2\,PO_4}_{\text{Bone Ash Regenerated.}} + \underbrace{2\,H_2O}_{\text{Water.}}$$
$$+ \underbrace{4\,CO}_{\text{Carbon Monoxide.}} + \underbrace{4\,P}_{\text{Phosphorus.}}$$

The density of phosphorus vapour is exceptional, and shows that its molecule in the free state instead of being P_2, like most other elements, is P_4. An inference from this is that phosphorus possesses the property of combining with itself in a greater degree than many other elements. Phosphorus like oxygen, carbon, etc., exists in several states. Thus we have red phosphorus quite different from the well-known yellowish, semitransparent, waxlike form of ordinary phosphorus. Now in the case of oxygen, we know that its peculiar form of ozone is produced by a condensation of the atoms into a heavier molecule. Ordinary oxygen has the density 16, and its molecule is O_2. Ozone has the density 24, and its molecule is O_3. The peculiar forms of phosphorus and other elements are probably susceptible of a similar explanation.

Red phosphorus is a brittle, brick-red solid, obtained by heating ordinary phosphorus to 235°–250° C. in carbon dioxide or other inert gas for many hours. A little iodine added greatly quickens the change. (Exp. showing the conversion of ordinary into red phosphorus by heating with a little iodine.) Red phosphorus changes back into the ordinary form when heated above 260°, and does not inflame under that temperature. Hence its use in "safety matches." It is also non-poisonous when purified from any mixture of ordinary phosphorus by washing with bisulphide of carbon, in which the latter is soluble—common phosphorus being exceedingly poisonous.

Phosphorus exists in plants, especially in the seed or in parts such as the bulb of the turnip and other biennials, which are afterwards to supply nutriment for the development of seed. Besides the bone, it exists in the tissues and specially in the brain of animals. Some have associated its presence there with the thinking power of the brain, and others assert its presence wherever animal life in any form is generated. Phosphates are certainly widely diffused, in all rocks, soils, and hence in drinking water; and it has been shown that water, deprived of phosphates, does not develope animal life.

The presence of phosphorus as phosphates is most readily shown by the molydic acid test. Arsenic acid being the only substance which gives similar indications. (Exp. showing the precipitation of the yellow phosphomolydate from a phosphate solution.)

In the absence of iron and alumina, phosphates may be estimated by a standard solution of uranium, which gives a yellow phosphate insoluble in dilute acetic acid. The presence of the slightest excess of uranium salt is shown by the red-brown precipitate which a drop of the solution gives with a drop of prussiate of potash solution placed on a white plate. (Exp. showing the estimation of phosphoric acid in a solution of bone material.)

The estimation of the nitrogen in bone materials is also a problem often occurring. The soda-lime process is that generally used. The weighed finely pounded substance is heated with a mixture of soda and lime, when all the nitrogen is given as ammonia, which is absorbed in an acid bulb apparatus. (Exp. showing the estimation of nitrogen by the soda-lime process, using a test-acid to absorb the ammonia.)

The phosphates in food plants are used by animals, and again restored to plants to be used afresh. At one time this and similar facts in the case of other elements furnished a serious difficulty to believers in the Christian doctrine of the resurrection, but if we remember that the resurrection must be miraculous quite as much as the creation itself, this difficulty disappears. The true scientific spirit consists in doing our duty to the utmost of our ability; in acknowledging that many things are beyond our comprehension; in a sure faith that in due time we shall see all things clearly, and in cultivating the faith and childlike simplicity of the Christian student.

A vote of thanks to the lecturer was proposed by Mr. George Ward, F.C.S., seconded by Mr. S. Taylor, and carried unanimously.

BRISTOL PHARMACEUTICAL ASSOCIATION.

The fourth general meeting of the present session was held at the Museum and Library, Clifton, on the evening of Friday, the 24th of January. The announcement that a lecture on "Musical and Sensitive Flames," experimentally illustrated, would be delivered by Thos. Wills, Esq., F.C.S., of the Royal Institution, London, attracted an attendance which filled the lecture-room to overflowing. The audience included a large number of ladies and several prominent members of the medical profession, and of the literary and scientific world, of the neighbourhood.

The President, Mr. Chas. Townsend, said he had much pleasure in introducing Mr. Thos. Wills, of the Royal Institution, London, who had kindly prepared a lecture upon "Musical and Sensitive Flames." This subject had of late attracted considerable notice in consequence of the interesting researches of Professor Tyndall, but he (the President) believed that it had never before been brought before a scientific audience in Bristol. Mr. Wills had at one time resided in the city, and on that account, also, they were glad to welcome him, and hoped to derive both instruction and pleasure from his address.

Mr. Wills, who was cordially greeted on coming forward, then delivered a lecture on "Musical and Sensitive Flames," of which the following is an abstract:—

"There are some natural facts and phenomena brought to light by scientific inquiry and investigation which, though not occupying an important place in that "Interpretation of Nature" which is called Science, nor, apparently, serving any useful or practical purpose, may, nevertheless, be considered valuable as giving us a glimpse into the inner working, and more subtle influences of nature.

Such facts have already revealed a marvellous susceptibility of matter, when under certain conditions, to the influence of even the weakest forces; the certain conditions, probably, being only necessary so to raise and exalt the effect as to make it perceptible to our somewhat rough senses.

Further, they have shown that the unity—*the oneness*—of nature is traceable, not to any uniformity in its construction, but in reality to the dissimilarity of its various parts, this dissimilarity giving rise to and maintaining the truest form of harmony; this being so, we may, without unduly exercising the imagination, conceive that every atom of the whole universe is influencing and being influenced by every other atom.

These few remarks will find an illustration in the present subject, and will, it is hoped, be a sufficient answer to any who may be inclined to value scientific knowledge only by the direct practical results accruing therefrom, or to limit its scope to those particular branches that bear most fruit to the *commercial* prosperity of mankind.

"Musical Flames" is by no means a new subject, many eminent men having contributed to its history during the greater part of a century. So far as we can make out, the first observations in this direction were made by a Dr. Higgins, of Dublin, in the year 1777, and were mentioned in a letter to the first volume of 'Nicholson's Journal,' published in 1802. Dr. Higgins was a Professor of chemistry, engaged in the tuition of a class of students. While endeavouring, at one of his demonstrations, to show the—at that time—novel experiment of the production of water by the combustion of a "slender stream of hydrogen gas" in air, he inverted over this jet several glass vessels, in order to obtain an effective deposition of water; on doing this with some of the vessels, "several sweet tones were produced;" in fact, almost any vessel, provided it were closed at one end, was found to be capable of giving a musical tone, the only condition, according to Dr. Higgins, being that the vessel should have only one opening; this being fulfilled, the experiments might be repeated.

at pleasure. [The lecturer here placed some glass vessels—bottles, flasks, and closed tubes—over a small jet of burning hydrogen, when the musical tones were immediately produced.]

About 1800, two Italian philosophers, Messrs. Brugnatelli and Pictet, published some experiments upon this subject, and showed that closed vessels were not by any means essential, open tubes with a little care in the manipulation being as successful; to ensure this success, however, they believed that the surrounding vessel or tube must be made of a sonorous or elastic substance, such as glass, earthenware, metal, or dry polished wood; they also further observed the effect of lengthening or shortening the tube, upon the tone produced. [Open tubes of glass, metal, etc., were here placed over the previously used hydrogen flame, when shrill musical notes were emitted; a tube, capable of being lengthened and shortened at pleasure, was also placed over the same flame, when the falling and rising of the note was very evident.]

In 1802, De la Rive published in the *Journal de Physie* some researches upon "The Sounds Produced by Hydrogen Gas in Tubes." This was by far the most elaborate and exhaustive essay upon the subject up to this time, and it contains many new facts, setting forth at the same time a theory which endeavoured to account for the production of these sounds, no explanation having been attempted by either of the previous experimenters. The principal statements in De la Rive's paper were, 1st, it was essential that the tube, or vessel, should be elastic —"suitable for an echo"—capable, that is to say, of reverberation; 2nd, the flame to be obtained from hydrogen gas, all other inflammable bodies being found unsuccessful; 3rd, his conception that the condensation and reformation of aqueous vapour was the origin of the sound vibrations.

All sound of whatever nature is produced by vibration, the body sounding being in a state of rapid motion. In the case of sound that appeals to our sense of hearing as noise, the motion is irregular, and not very rapid. In the case of a musical note, the motion is perfectly regular, periodic, and is also sufficiently rapid. A noise repeated after regular intervals more rapidly than thirty-two times in a second becomes lost or merged in a musical note, the pitch of this note depending upon the rapidity of such vibrations, up to about 40,000 vibrations per second, when most ears lose their power of distinguishing sounds. [These points were well illustrated by the rattling of nails upon a tin tray, and the musical note produced by a vibrating tuning-fork, also by the musical note obtained by the oscillation of a grooved block of hot copper upon the edge of a cold block of lead.]

By De la Rive's supposition these periodic and sufficiently rapid vibrations were set up and maintained by the condensation and rarefaction of aqueous vapour, produced by the combustion of the hydrogen in the air. This theory might possibly have been rejected at once had it not been supported by a most ingenious and favourable experiment. De la Rive was able to succeed in producing a musical note by aqueous vapour alone. Placing a small quantity of water in the bulb of a thermometer tube, and rapidly boiling the water, the steam which was thus formed was unable to issue entirely from the tube, but was to a great extent condensed into drops of water in the stem, whence falling back into the bulb, it became immediately reconverted into steam, this alternation being sufficiently rapid to give rise to a distinct musical note. It was supposed by the author that these primary vibrations were taken up, exalted, and reverberated by the walls of the tube, the final result being quite perceptible to the ear.

The German philosopher Chladni observed in 1802 that the sounds emitted by these "musical flames" were identical with the notes given out by the tubes surrounding the flames when sounded by themselves. He also obtained in one experiment a note and its octave from the same tube.

[A tube being placed in front of the lips, and blown across gave out a certain note which was heard to be identical with the note produced when the same tube was inverted over the burning hydrogen flame.]

Up to this period very little systematic attention had been bestowed upon this subject, but in 1818 Mr. Faraday was requested by some of the members of the Royal Institution to investigate it, and with his invariable care and completeness in work, was speedily able to explain most of the facts hitherto observed in the most satisfactory manner.

De la Rive's theory of aqueous vapour was criticized, and found wanting. Faraday, proving that the tones might be produced as easily, at a temperature far too high to allow aqueous vapour to condense, as at a lower one. Further, he succeeded in obtaining the same sounds from a burning jet of carbonic-oxide, which as it contained no hydrogen was incapable of producing any aqueous vapour whatever. Other inflammable gases and substances were found to yield musical notes, with some little difference of arrangement and care in manipulation; all the inflammable gases—ether, alcohol, and even wax and tallow—being found effective.

The belief held by all previous experimenters that the tube must necessarily be formed of an elastic or sonorous substance was found to be erroneous; tubes of paper, cardboard, and soft wood, answering as perfectly as those of glass or metal.

[A coal gas flame produced these notes as easily as the previously used hydrogen flame, and a sheet of foolscap paper rolled up to form a tube was shown to be effective.]

These experiments enabled Faraday to indicate the true nature of these sounds, which he did by showing that the flame itself was the true origin of the vibrations. When a flame is introduced into a suitable tube, the current of air passing over its surface is sufficiently strong to draw it upwards to such an extent as to sever its connection with the jet; an explosive mixture is at once formed of the air and the issuing gas; this mixture is inflamed, and for a moment the flame and jet become once more united; this action is repeated with sufficient rapidity as eventually to produce a musical note. These vibrations are taken up and exalted to this note, not by the tube, but by the column of air enclosed within it. Faraday called attention to the fact that a similar result to a less extent might be observed in ordinary lamps with chimneys, and in furnaces and fires, burning under tall shafts,—the roar of which was an approach to a musical noise.

[Most of the above points were successfully illustrated as they were mentioned. The vibration of a flame, or its intermittent partial extinction during its song, being strikingly shown by means of its reflection from a rotating mirror on to a white screen, when the flame was quiescent a straight uninterrupted band of light was apparent, but on sounding, this band was broken up into a series of distinct images of the flame, separated from each other by periods of darkness.

Dr. Tyndall commenced his experiments in 1856, and they were published in 1857, but he has frequently returned to the subject since, and by a series of interesting and careful experiments has much elaborated it. Attention was immediately directed by him to the analogy existing between the "Musical Flames" and organ pipes, the two being strictly comparable. In an organ pipe the impinging of a strong current of air issuing from a slit, against a sharp piece of an elastic body called the lip, is the primary cause of vibration; the vibrations thus produced vary in rapidity and in amplitude, but the column of air enclosed by the pipe picks out only those which coincide with its own length, and compels them to vibrate more and more in unison with itself. By this means the result is to strengthen and exalt them to a musical tone. If we now substitute a flame for the first rush of air against the lip of such a pipe, the analogy becomes apparent, the vibrations of the flame being selected by its tube and raised to a note of a definite pitch. Further, an open organ pipe vibrates in two halves when sounding its lowest note, the centre being a node, a place where the air is not in lateral motion, but where its density only is changing, but an open pipe is also capable of vibrating in 4–6–8, etc., divisions, and sounding what are called its harmonics or overtures, in which case the nodes alter their position and number. [This was effectively shown with an organ pipe having three little gas jets at its side, communicating with its interior by means of membranes; on sounding its fundamental note the centre one was extinguished while the two side ones remained burning; on the first harmonic being sounded the two side-jets were extinguished, while the centre one remained alight.] The same result is obtainable with a musical flame, several notes being produced from one tube.

[The connection existing between a sounding, and an exalting or resounding body was here treated of, and by a series of experiments it was shown that a definite relation, depending upon the length of the sound wave, must be maintained between the embouchure of an organ pipe and the column of air enclosed in the pipe,—between a tuning fork and its box or cylinder of air,—also, between a flame and the tube which surrounds it; but in the case of the flame, on account of its great mobility, it was found to be capable sometimes of determining this relation itself, the size of the flame altering the pitch of the note, and being also capable sometimes of even accommodating itself to variously lengthened tubes.]

During Dr. Tyndall's experiments he observed the extreme sensitiveness of a flame on the point of singing to external sound. Just before the point at which a flame would begin to sing in its tube, it stands, as Dr. Tyndall puts it, "on the edge of a precipice" over which any sound in unison with the note it would emit if singing, pushes it, and it at once begins to sound. The external impulse for this effect need not be strong, but it must be in unison, or, at least, so near unison as to produce the effect of musical beats with the flame itself, which is a result of the interference of the sound waves. [A flame was here introduced into a tube and placed in this condition, which, on being sung to from a distance of several yards, or with the back turned, immediately commenced to sound; the note emitted by the flame was D sharp, and it was found to be perfectly indifferent to D natural sounded on a flute, but the D sharp of the same instrument immediately caused it to sing, although the interval between these two notes corresponds to only half a tone.]

Musical flames may be enlarged indefinitely, provided a due relation be kept between the flame and the tube, some very large tubes being caused to sound and giving rise to notes similar to those obtained from 16-feet organ pipes. Considerable credit is due to Count Schaffgotsch, of Berlin, for the independent discovery of some of these effects.

All the flames hitherto experimented with have been enclosed in tubes; some of them have been shown to be very sensitive to certain external sounds, but the general title "Sensitive" Flames has been applied to phenomena more especially connected with unenclosed, or naked flames.

Professor Leconte, of the United States, observed in 1858 the pulsation of two fish-tail gas flames, under the influence of certain musical notes emitted from various instruments, and also observed that these pulsations were not perceptible until the gas flame approached its flaring point, and were further not produced by other external noises. This effect was again observed independently by Mr. Barrett, at the Royal Institution in 1866, who, together with Dr. Tyndall, was able to pursue the experiments to a much greater extent. A jet of gas issuing from almost any orifice becomes sensitive when the pressure is increased to a point just below that at which it would flare; some jets are extremely sensitive to a whistle, dropping down at the sound from a height of about twenty inches to about twelve inches; others are most responsive to a hiss or chirp.

These effects are not the result of the impact of air, which may be easily proved, but depend entirely upon the sonorous vibrations. A gas flame issuing from a jet under pressure is probably thrown into a state of vibration on its passage through the orifice; if this vibration be very pronounced, the flame flares, but just below this point, the flame is sensitive to such vibrations as are synchronous with its own, and which would, if added to those it already possesses, cause it to flare; thus it is seen that a sensitive flame flares only during the continuance of certain sounds, these sounds being equivalent to an increase of pressure. The nature of the sound causing this effect is by no means a matter of indifference; a hiss or chirp is very effective, also the sound of the letter S, the vowels having hardly any effect upon such a flame; shrill notes give a greater result than low ones. If the orifice be very small, and the pressure correspondingly great, extreme and surprising results are obtained.

[A remarkable flame of this kind was exhibited, about twenty inches high; at the sound of a hiss it dropped to half its height, the crumpling of paper, the rustle of a dress, produced the same effect; a musical-box caused it to dance to the tune, and the effect of the ticking of a watch was distinctly seen; further a watch was placed in the focus of one concave mirror and the flame in the focus of a similar mirror, the slight ticking of the watch was thus reflected through a distance of about eight feet, yet its effect upon the flame was distinctly visible.] It was incidently mentioned that many of the so-called facts of spiritualism were not more wonderful than the behaviour of this flame, which, without the key to the explanation, would itself appear almost supernatural.

In conclusion, attention was called to the fact, that flames were not the only things sensitive to slight impulses. The continual observed change produced in nature being, probably, due to infinitesimal movement amongst the molecules of which bodies are composed. This movement—utterly outside the bounds of our perception—being evident to us sometimes, as one of those forces which we recognize as "modes of motion." Innumerable illustrations of this appropriation and exaltation of exceedingly small motion occur. For instance, the growth of plants is dependent mainly upon the power possessed by them of shaking apart the carbonic acid gas present in the air, and of utilizing its carbon in the building up of their tissues and stems. This power is conferred by sunlight and by sunlight alone. The great luxuriance of vegetation almost everywhere, would seem to require the whole power of the sun to be expended in this direction only. But on analysing the sun's rays, we find only a portion of them to be capable of conferring this power; and it has been estimated that at any given time the chemically active portion of these rays present in sunlight only amounts to the $\frac{1}{2300000000}$ of the total energy of the sun given out at that time.

Fermentation, putrefaction, decay, are all due to the presence and growth of the most minute germs of living matter, far beyond the power of the best microscopes to reveal. The "Germ Theory" of disease now gaining ground so rapidly, holds for one of its principal tenets, that the body to contract a contagious disease must be in a certain state of harmony and sympathy with the disturbing cause—like a sensitive singing flame, only susceptible to those vibrations which coincide with its own. Lastly, to take an illustratiom from that profession with which this Association is more intimately connected. It would appear that medicine itself is only availing when the system is in harmony with it, and capable of responding to its counteracting influence.

At the close of the lecture, which was frequently applauded throughout, the President said, "After the hearty reception given to Mr. Wills, it seemed almost needless to present a formal vote of thanks; and yet he felt he should be neglecting his duty if he did not thank Mr. Wills most heartily, on behalf of the Pharmaceutical Association, and the audience, for his most able and interesting lecture. The experiments were not only striking and successful, but many of them were entirely new; and he was glad that Mr. Wills had been favoured by the presence of so appreciative an audience, and amongst them, of so many ladies. It was often difficult to obtain the presence of ladies at scientific lectures, in any number; but he was glad to feel that their interest in science was really awakening; and he hoped the time was not far distant, when that interest would induce them always to be present on such occasions as the present.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The fourth general meeting of the association was held in Anderson's University on 5th February, 1873, at 9 p.m.; Mr. Thos. Davison, president, in the chair.

The minutes of last meeting having been read and approved of, Mr. Alex. Kinninmont brought forward his motion to the effect, "That the subscription fees be reduced, and certain rules of the association be altered." But as it was pointed out that according to the constitution of the association such a motion was out of order, it was left aside to be again taken up at the next annual business meeting.

Mr. J. J. Weir then moved, "That this association instruct their Council to take immediate steps for the formation of such an Assistants' Branch of the Association as is advised by their sub-committee in minute of Conference of date May 20th, 1872."

This was seconded by Mr. J. M. Fairlie, and agreed to.

Mr. Fairlie, then proposed, "That this association instructs Mr. Weir to convene a meeting of the assistants, members of the association, to form an Assistants' Branch, in accordance with his motion."

This was seconded and agreed to.

Mr. J. J. Weir then delivered an interesting and somewhat amusing lecture on "Health."

At the close of the lecture, on the motion of Mr. Fairlie, seconded by Mr. Kinninmont, the lecturer was awarded a hearty vote of thanks.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The half-yearly meeting of the above association was held at the Rooms, Halford Street, on Thursday, Feb. 6th; the president, Mr. S. H. Cadoux, in the chair.

Some preliminary business having been transacted, the honorary secretary, Mr. W. Thirlby, read the following report:—

"In presenting the usual report at the conclusion of their term of office, the committee beg to state what the association has been able to accomplish during the past session. In consequence of the disappointment felt in the previous session at some of the lectures promised not having been delivered, it was found necessary to devote the whole of the meetings to class work. This arrangement has been followed out with the exception of one lecture, which was given by Mr. John Burton. It is hoped that this example will induce others to give the association the benefit of their knowledge. The attendance has been encouraging throughout the term. Forty-five meetings have been held. The average attendance of each class has been as follows:—Materia medica, 13; Dispensing, 11; Chemistry, 10; Botany, 9·5. Two prizes were offered for general proficiency in the subjects taught in the four classes. The first was gained by Mr. Lomas; the second by Mr. Shakespeare. The prizes offered for attendance were obtained by Messrs. J. N. Butler, Mann and Lomas. The preliminary class has been carried on through the kindness of Mr. Walker, and the committee take this opportunity of expressing their appreciation of that gentleman's honorary services. During the session one member has passed the Minor examination, and three have succeeded in the Preliminary. The total number of members has been twenty-nine, viz., fifteen assistants and fourteen apprentices. The library continues to be a source of interest, the books being in constant request. The embryo museum is still in confusion, the valuable specimens of materia medica being nearly useless through the want of a proper cabinet. To meet this want an application has been made to the Pharmaceutical Society for a grant, but up to the present time no definite answer has been received."

The report having been read, a unanimous vote of thanks was accorded to the retiring committee for their past services, special reference being made to the honorary secretary for his assiduous attention to the interests of the society on all occasions.

The names of the gentlemen nominated to serve on the new committee having been read, and Mr. W. B. Clark, vice-president, declining to stand for re-election, the vote of the meeting was taken and the elected members withdrew to choose the officers by ballot, with the following result, Mr. Cadoux persistently declining the honour of re-election as president; Mr. W. Thirlby, A.P.S., President; Mr. S. H. Cadoux, A.P.S., Vice-President; Mr. E. H. Butler, A.P.S., Treasurer; Mr. E. J. Bishop, Hon. Secretary; Messrs. T. W. Elkington, A. Sawden, C. B. Lomas.

It was announced that the classes for the ensuing session would be conducted by the following gentlemen:—Chemistry—Mr. W. P. Clark, P.C.; Botany, Mr. S. H. Cadoux, A.P.S.; Dispensing, Mr. J. J. Harvey; Materia Medica, Mr. C. B. Lomas; Preliminary, Mr. Walker.

BRIGHTON ASSOCIATION OF PHARMACY.

The usual monthly meeting of this association was held at the Hanover Lecture Hall, Church Street, on Friday evening, February 7th; the President, Mr. W. D. Savage, in the chair.

There was a good attendance of members.

A paper "On Water" was read by Mr. W. H. Smith, Dispenser and Teacher of Pharmacy at Sussex County Hospital.

A short discussion ensued, and a hearty vote of thanks to Mr. Smith for his interesting and instructive paper, brought the proceedings to a close.

The gift of books presented to the association by the Executive of the Pharmaceutical Conference, from the Bell and Hills' Fund, were exhibited at the meeting.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, February 6th, 1873; Dr. Williamson, F.R.S., vice-president, in the chair.

After the usual business of the society had terminated, a communication was made by Dr. H. G. Armstrong, "On the Action of Sodium on Aniline."

A paper "On Anthrapurpurine," by Mr. W. H. Perkin was then read by the author. Anthrapurpurine is a colouring matter which accompanies alizarine in the crude "artificial alizarine," now so largely manufactured and employed in dyeing instead of madder. Like alizarine, it is capable of imparting brilliant and fast colours to cloth mordanted with alumina or iron.

The last communication on "Isomerism in the terpene family of hydrocarbons" was also read by the author, Dr. C. R. A. Wright. In it he gives an account of his experiments with oil of nutmegs and oil of orange peel.

The meeting finally adjourned until the 20th instant, when the following papers will be read—"On Aurin" by R. S. Dale and Dr. C. Schorlemmer, F.R.S.; "Researches on the Action of the Copper-Zinc couple on Organic Bodies. I. On Iodide of Ethyl," by Dr. Gladstone and A. Tribe; "Solidification of Nitrous Oxide," by Mr. Wills; "Action of Hydrochloric Acid on Codeine," by Dr. C. R. A. Wright.

ROYAL INSTITUTION OF GREAT BRITAIN.

Friday, January 17th, 1873.

On the Old and New Laboratories at the Royal Institution.

BY WILLIAM SPOTTISWOODE, ESQ., L.L.D., M.A.

A time when, through temporary absence from one chair, and through a change of occupancy of the other, we are deprived of the presence of our two professors, seems to offer an opportunity for reviewing the past history, the scientific results, and the future prospects of our laboratories. A time when, through circumstances which cause us much regret, we are deprived, at our evening meetings at least, of the presence of our secretary, offers perhaps the only occasion when the task of such a review could fall into other hands than his. The fact that it has fallen into mine is attributable to the office in which your votes have placed me, rather than to any individual qualifications of my own; and it would have been impossible for me to undertake the task, had he not placed at my disposal his wide-spread information upon many branches of science, as well as his intimate knowledge of the history of the Institution, to the well-being of which his care and devotion have so largely contributed.

The first dawn of our history is to be sought among those stormy years with which the last century drew towards its close, and out of which many new thoughts and aspirations of men took their birth.

Its character, in accordance with the views of its early promoter, Count Rumford, was at first far more industrial than it eventually became. Its two great objects were "the general diffusion of the knowledge of all new and useful improvements, and teaching the application of scientific discoveries to the improvement of arts and manufactures, and to the increase of domestic comfort and convenience." The Institution was to contain models, or actual specimens of fire-places and kitchen utensils for cottages, farm houses, and large dwellings; a complete laundry for a gentleman's family; grates and chimney-pieces; brewers' boilers; distillers' coppers; ventilators, lime-kilns; steam-boilers; spinning wheels; agricultural implements; bridges, etc. etc.; and at one time some eighteen or twenty young mechanics were actually boarded and lodged in the house. The records of our early proceedings give an instance, illustrating the views of the founders. In January, 1800, when the designs for the theatre, model-room and workshops were formed, the architect proposed that the laboratory should occupy the position which it ultimately held. But with a view to giving more room to the workshops, the proposal was set aside in the very next month, and the space in the basement under the theatre assigned to the purpose. Happily, however, before the building had reached the first floor, this position was found unsuitable; and further consideration devised the laboratory, which we have all known so well as that of Davy, of Faraday and of Tyndall. A staircase leading to it from the front hall, although long since closed, was removed only in 1866, to make room for Tyndall's smoke chamber.

From Count Rumford's final departure from England in 1802 we may date the decline of the industrial element, some echo of which still rings in our motto, "Illustrans commoda vitæ;" and early in the following year a definite proposal to give up that part of the original plan was made.

From a report to the managers in 1803, it appears that, although chemistry had always been a primary object of the Institution, yet from motives of economy nothing more had been done in the way of either laboratory or apparatus than was necessary for the immediate purpose of the lectures. It was consequently proposed that the workshop should be added to the laboratory and fitted with seats for 120 persons, and the forge adapted to chemical purposes. The report ends as follows:—"This laboratory will be equal, or indeed superior, to any in this country, and probably to any on the Continent."

The chemical laboratory was altered in accordance with that report, and remained unchanged until 1863, when, on the appointment of Dr. Frankland to the Professorship of Chemistry, the lecture seats were removed so as to adapt the room more properly to purposes of scientific research.

It is interesting to contrast the verdict of 1873 with that of 1803. "Originally built," to quote Dr. Bence Jones's own words, "as a workshop for blacksmiths, fitted with a forge, and furnished with bellows which only last summer left the Institution, our chemical laboratory was probably the very worst in London."

The physical laboratory remained unchanged; and although Professor Tyndall for himself desired nothing more than to continue his researches in a place which his imagination filled with the recollections of his predecessors, he still acquiesced in the proposal for rebuilding, for the sake of his successors, and in the interest of the sister science of his colleague.

Thus much about the material fabric of our laboratories. Next as to the scientific work of which they have been the birthplace.

Of the great names connected with this building foremost in order of time, and very high in scientific rank, stands that of Dr. Thomas Young. His "Theory of Light and Colours' will always stamp him as one "whose genius has anticipated the progress of science," and whose reputation has risen as men have better understood his worth. His first paper on the subject was presented to the Royal Society in November, 1801; but the earliest printed account of his views is to be found in his 'Syllabus of Lectures at the Royal Institution,' dated January 19th, 1802.

With the criticisms of his theory published in the 'Edinburgh Review,' with the circumstances which led to his withdrawal from the Institution, with his researches in Egyptian hieroglyphics, we are not here concerned. But it is not too much to say of him, that without the Wave Theory of Light (of which he was one of the prime and main founders) to serve as a guiding-thread through the labyrinth of phenomena, the long series of discoveries which have in this place culminated in those of Tyndall in radiation and absorption, would have been impossible.

It is often remarked that little rills, which have threaded their way from distant mountains, ultimately discharge themselves as mighty streams into the sea. Yet between these two stages they flow quietly, but not therefore less usefully, past smiling meadows and the haunts of men. And here is a little scientific pastoral—if it may be so called—flowing out of the highest conceptions of the theory of undulations, and furnishing—to use his own words—a simple instrument "for measuring the diameters of the fibres of different kinds of wool."*

* The King at this time had his flock of merino sheep, and Sir Joseph Banks had the care of them at Kew. On his recovery from his first mental attack the King would only call the P. R. S. his woolstapler.

[The lecturer then described and exhibited on the screen the principle of Dr. Young's eriometer.]

Our next name is that of Davy, an account of whose discoveries would require a volume, and a bare recital of them would be long. I quote the following notes from the pen of our Secretary, and wish that he had been here to give life to the dry bones.

In 1806, when twenty-eight years of age, Davy did the work which formed his first Bakerian lecture, 'On the Chemical Agencies of Electricity.' Six years previously he had written, "Galvanism I have found, by numerous experiments, to be a process purely chemical." In the interim, water had been decomposed by electricity, and Davy began his researches with an inquiry into the changes produced in water by electricity. His main conclusion was that "the kind of polarity of each element determined the electrical and chemical actions shown by it." The French Academy awarded him a medal for this work; and from these discoveries the fame of our laboratories took its rise.

The next year Davy began a new series of experiments on polarity. He exposed different substances to the action of platinum wires coming from a battery of 100 cells; and on October 6th he wrote in his note-book, "Remarkable phenomena with potash." On the 19th he made the following entry:—"A capital experiment proving the decomposition of potash." He worked at the decomposition of other alkalies until the 23rd November, when he was attacked by a fever which proved nearly fatal to him.

The importance of these decompositions to the recent science of spectral analysis, although not dreamt of at the time, can hardly be overrated; and I will therefore venture to interrupt my narrative for a moment by an experiment,—a very well-known one, with a slight modification, which will serve to illustrate the point. [The speaker then exhibited the dark absorption-line of sodium; but so arranged as to show the dark line *in the centre of*, and not entirely obliterating, the bright line; proving that a certain density of vapour is necessary for complete absorption.]

In 1808 Davy began to work on the composition of muriatic acid; and with a new battery, provided for him by subscription, he attacked different substances with increased energy. In 1810 he sent to the Royal Society his researches on oxymuriatic acid and the elements of muriatic acid, on what is in fact now known as chlorine.

In 1811 he made the acquaintance of Mrs. Appreece, and in 1812 wrote to his brother, "In a few weeks I shall be able to return to my habits of study and research. I am going to be married to-morrow, and have a fair prospect of happiness with the most amiable and intellectual woman I have ever known." The issue of these hopes has been written by his biographers; but the disappointment of the last seventeen years of his life is illuminated by the invention, not less original in its conception than benevolent in its object, of the Safety Lamp.

The great value of this contrivance, and of questions arising out of it, will, I trust, be sufficient apology for diverging again from my story in order to mention some very important experiments now in progress by Mr. Galloway. Explosions, it is well known, occur even in cases where the safety lamp is used. And it has been noticed that in these cases they occur most frequently after the firing of a blasting shot in the neighbourhood; and as it was almost certain that the penetration of the fire-damp through the gauze of the lamp was not due to a sudden flow of gas from one part of the mine to another, experiments have been instituted to determine whether the transmission of the sound wave, or wave of compression, may not have been the means of producing the mischief. Through the kindness of Mr. Galloway we have here a tube arranged for making such an experiment. At one end there is the inflammable current enveloping a safety lamp; in the centre is a loose diaphragm, and at the other end a pistol will be fired, by the explosion of which a sound wave will be propagated along the tube. On the arrival of the sound wave at the extremity of the tube, the combustion will penetrate the safety lamp. But I here leave the matter in the hands of Mr. Galloway, of whose experiments we hope to hear more hereafter.

Of the next great name connected with our institution, namely, Michael Faraday, of his life and his discoveries the history has been already written, so far indeed as it can be written, by Bence Jones, by Tyndall, and by Gladstone. "Si monumentum quæris circumspice." These volumes of notes, from 1831 to 1856, will give some idea of the amount of work which he did in our laboratory; and their value will be better appreciated through the consideration that before these notes were made, no less than sixty of his scientific papers had been printed, nine of them in the 'Philosophical Transactions.'

Those of us who were present at Tyndall's two memorable lectures on "Faraday as a Discoverer," are not likely to forget the impression of the man left by them on our minds; and for those who were not present, it would be an office thankless to your lecturer and burdensome to his hearers, to contribute a feeble reproduction of those life-like memoirs. For our present purpose it will be sufficient to say that the entire fabric of those brilliant and manifold contributions to human knowledge were wrought out within the walls of the Royal Institution.

His great experiments have been so often and so well exhibited in this theatre, that some apology is needed for bringing any of them before you again; but in repeating for my own instruction some of those which bear more particularly upon the subject of light, I have been tempted to reproduce one of them here. In doing this I have been perhaps moved more by a fascination of the phenomenon, and by a piece of instrumental good fortune which enables me to introduce an old friend under a new garb, than by any better reason. The experiment in question is that which Faraday called "the magnetization of light, and the illumination of the lines of magnetic force;" we should now term it the rotation of the plane of polarization under the influence of the magnetic field. But in order that we may not even by inadvertence confuse the rotation here produced with that due to quartz, or oil of turpentine, I will draw your attention, by way of memorandum, to the nature of the magnetism produced by spiral currents in given directions, and of the rotations of free currents produced by magnets.

[The lecturer then showed the opposite rotations of two sparks discharged about the two poles respectively of an electro-magnet, and the reversal of those rotations, first by a change of the poles, and secondly by a reversal of the direction of the sparks.]

You now see upon the screen an image of the figures produced by a magnificent piece of heavy glass under the action of polarized light. Its size enables me to make use of about four times the amount of light usually available in this experiment; and I have taken advantage of the figure which its imperfect annealing produces, to vary the effect upon the screen. The dark parts of the figure indicate the parts of the beam in which the vibrations are perpendicular to those transmitted by either polarizer or analyser, and which are consequently cut off. Now if anything should intervene to change the plane of those vibrations a portion of them will be transmitted, and a partial illumination of the screen will ensue. This turning of the plane of vibration is effected by the magnet as soon as its force is developed by the electric current sent through its coils.

[The lecturer then "dispersed" the dark lines of the figure by means of a plate of quartz; and after turning polarizer and analyser so as to colour the centre of the field with the tint intermediate between red and violet (*teinte sensible*), he showed that when the magnet was excited the field was rendered red or green according to the direction of the poles.]

Professor Frankland before coming to us had isolated the compound radicals methyl, ethyl, and amyl, and had proved their resemblance to hydrogen. He had also combined them with the metals zinc, tin, mercury, and boron. By this means he had obtained a very powerful chemical reagent, which proved of eminent service in subsequent operations. An instance of its power will be found in zinc-ethyl, which by its rapid combination with oxygen of the air, bursts into spontaneous combustion as soon as the flask containing it is opened.

In conjunction with Mr. Duppa, Professor Frankland worked in our laboratory at the artificial formation of ethers. They treated acetic ether with iodine and with the iodides of methyl, ethyl, and amyl; and by their means they arrived at a method for the formation of many organic substances which had previously been obtained only through the agency of animals or of vegetables.

In 1866 Dr. Frankland determined by a long series of calorimetric experiments the maximum amount of force capable of being developed by given weights of the different foods commonly used by men.

In the following year he investigated the effect of pressure (up to 20 atmospheres) upon the luminosity of flames of hydrogen and of carbonic oxides. He found that these flames, so feebly luminous at ordinary atmospheric pressure, burn with brilliant light under pressures from 10 to 20 atmospheres, and that the spectra of these brilliant flames is perfectly continuous.

From the latter circumstance he infers that solar light may be derived from glowing gas and not from incandescent solid or liquid matter.

As these researches have so important a bearing upon spectral analysis and solar physics, I will venture to repeat one or two of the experiments. Here are three closed tubes filled respectively with hydrogen, oxygen, and chlorine, at atmospheric pressure. The densities of these substances are in the proportions $1 : 16 : 35\frac{1}{2}$; and if the spark from an induction coil be made to pass through them, the luminosity of the discharge will be found to be nearly in the same proportions.

That this result is really due to the density, and not to the chemical constitution of the gases, may be proved by allowing the discharge to pass through this tube, and by pumping air into it during the discharge. It will then be seen that the brilliancy increases with the pressure.

These researches were suggested by an old experiment of Cavendish's, in which he exploded a mixture of oxygen and hydrogen, first under atmospheric pressure and then under a pressure of from 10 to 12 atmospheres. In the first case there is much noise and little light; in the second, a brilliant flash and no noise. The labours of Dr. Frankland have rendered this experiment intelligible, and have correlated it with other phenomena.

(*To be continued.*)

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

Juries Bill.

On Monday night, February 10, the Attorney-General moved for leave to bring in a Bill to consolidate and amend the law relating to juries. He said that he proposed to introduce the Bill exactly in the shape in which it was left by the labours of the Select Committee which sat last session. That committee sat many days and made many important alterations in the measure. He did not think it would be right for him, without consulting the house, to make any alterations in the Bill as it came from the Select Committee. There were, indeed, several important changes which he desired to effect in it; but, with the permission of the house, he would reserve his statement with reference to them till the second reading.

The motion was agreed to.

Prosecution for the Sale of Laudanum without a Label.

At the Summons Court, Belfast, on Friday, February 7th, Thomas Brennan, grocer, Great George's Street, was summoned by Head-Constable Irwin for having sold, within the last six months, a quantity of opium to one Edward Harkley without having the bottle containing the commodity distinctly labelled with the name of the article and the word "poison."

Mr. M'Lean, jun., prosecuted, and Mr. Sheals appeared for the defendant.

Mr. M'Lean stated the sections of the Act of Parliament under which the prosecution was brought. The defendant had sold a quantity of laudanum in a bottle without complying with the requirements of the Act. A child had died in the General Hospital from the effects of taking that poison, and the defendant had admitted that he had sold the article without having labelled the bottle. He did not press for a heavy penalty, as this was the first case of the sort, but he wished to prevent another infringement of the law.

Head-Constable Irwin remarked that the Coroner had said that grocers should scarcely be allowed to sell such commodities at all.

Dr. M'Gee (who was on the Bench) said the matter was taken up at one time by the Apothecaries' Society in Dublin.

Mr. M'Lean: It is not a proper commodity for a grocer's shop at all.

Mr. Sheals said he submitted his client had sold the laudanum without labelling the bottle which contained it, but it was through ignorance of the law, and he had gone before the Coroner and candidly admitted that he had sold the laudanum. He hoped that the case would be a warning to others not to sell these poisonous ingredients without complying with the law. He would ask their worships to inflict but a mitigated penalty.

Dr. M'Gee (to Mr. M'Lean): Do you press for a high penalty.

Mr. M'Lean: No, your worship; but I want a fine inflicted as a precedent.

Dr. M'Gee: I will impose a fine of 10*s.* and costs, and I hope it will deter others from infringing the law. The fine was paid.

Adulteration of Milk.

At the same sitting of the above Court three cases were heard, where milk sellers were charged with having sold adulterated sweet milk. In one case, in which Dr. Hodges deposed that the specimen contained 13 per cent. of water and but 11 per cent. of solids, and nothing prejudicial to health, it was demanded that a sample should be produced in Court, and the hearing was adjourned for that purpose. In another case, where the certificate of Dr. Hodges stated that the sample contained 22 per cent. of water, but did not give the percentage of solids, or state whether it contained anything injurious to health, it was objected that the certificate did not give sufficiently full details. The objection was allowed and the case dismissed. It was stated that as a result of the prosecutions it was difficult to get farmers to send milk to Belfast.

Robbery by an Assistant.

At Worship Street Police-court, on Tuesday, Feb. 4, Jonathan Kitchen, 36, described as a chemist's assistant, living in How Street, Kingsland Road, was charged before Mr. Bushby with having stolen a quantity of spirits of wine and other things, the property of his employers, Messrs. Charles Bewlay and Son, surgeons, of 174, Kingsland Road.

It appeared from the evidence of Mr. Bewlay, jun., that the prisoner had only recently been engaged as shop assistant, and on Saturday, about two days after he had commenced his duties, a quantity of spirits of wine was given into his care. On Monday when it was wanted it was gone, and the prisoner in explanation said that he had made eau-de-cologne of it. The explanation was accepted, and nothing more was thought of it at the time. Later in the day, however, the prosecutor having left his purse on a table, the prisoner was seen by the shop boy to take some stamps from it and put them into his own pocket. The prosecutor then made inquiries, and found that no eau-de-cologne had been made with the spirits of wine. The prisoner, too, had made false entries in the books, and other drugs were missing. His defence now was, that if drinking the spirits of wine was stealing, he was guilty.

The prosecutor recommended the prisoner to mercy, and Mr. Bushby sentenced him to three months' imprisonment, with hard labour.

Poisoning by Carbolic Acid.

An inquest has been held at the Central London District Schools, Hanwell, upon the body of a lad named John Winter, who was poisoned through drinking carbolic acid from a bottle placed in a cupboard in No. 6 ward. It appeared from the evidence that one of the nurses in No. 6 ward, had in her possession several ounces of the poison for the purpose of cleaning the closets. She placed the bottle in a cupboard where she usually kept her food, leaving the door unlocked. She stated that she had frequently known the lads to take her victuals from the cupboard and go away and eat the food. The deceased is supposed to have reached the cupboard by the aid of a chair, and to have drunk some of the poison in ignorance of its deleterious qualities. He was found insensible upon the floor, half way between his bed and the cupboard. The doctor was sent for, but the lad died in a few hours. The jury, after some consultation, returned a verdict of "accidentally poisoned," adding that for the future more care should be exercised by the nurses in the use of poisons, and that the rules of the establishment should be strictly complied with.

Death from an Overdose of Laudanum.

The death of Dr. Curran, of Wadebridge, from an overdose of laudanum, is reported in the *Western Daily Mercury*. It appears that on the evening of Tuesday, February 4th, the deceased gentleman requested his attendant to fetch him from the surgery the bottle containing laudanum. He then poured some into a wine-glass, and drank it, remarking that he felt it necessary to take a sleeping draught. Afterwards he poured into the glass another smaller quantity, and drank it, remarking that he thought the first was not sufficient to effect the purpose he desired. Soon afterwards he complained of being unwell, and said he feared he had taken too much. Medical assistance was immediately procured, but the unfortunate sufferer gradually sank, and expired at four o'clock the next morning.

Death from an Overdose of Hydrate of Chloral

On Tuesday, February 4th, Mr. Clarke Aspinall, the borough Coroner, held an inquest on the body of John Richards (34), a chemist, at 41, Paradise Street. The deceased had for the last six years complained of his heart, and had for some time been taking hydrate of chloral to make him sleep. He took a dose on Tuesday night, and between eleven and twelve o'clock, as he was sitting smoking in his chair, his pipe fell from his hand. He became insensible, and before a doctor could arrive he was dead. The doctor was of opinion that death resulted from an overdose of hydrate of chloral, and the jury returned a verdict accordingly.—*Liverpool Daily Courier.*

Obituary.

Notice has been received of the death of the following:—

On the 21st December, 1872, Mr. Peter McCrackan, Chemist and Druggist, of Vauxhall Road, Liverpool, aged thirty.

On the 5th February, 1873, Mr. John Watkins, Chemist and Druggist, of Globe Road, Mile End, aged sixty-eight. Mr. Watkins was elected an annuitant on the Benevolent Fund in October, 1871.

On the 7th February, 1873, Mr. George Stevenson, Chemist and Druggist, of Burnley, Lancashire, aged fifty-one.

Reviews.

Year-Book of Pharmacy and Transactions of the British Pharmaceutical Conference. London. 1872.

A Year-Book of Therapeutics, Pharmacy and Allied Sciences. Edited by Horatio C. Wood, jun., M.D. New York. 1872.

Once more a handsome volume containing an abstract of the Pharmaceutical progress during the past twelve months from July '71 to June '72 has been presented to the members of the British Pharmaceutical Conference. It is divided as usual into two distinct divisions; the first portion of four hundred pages being devoted to the Year Book proper; and the remainder to the Transactions of the Ninth Annual Meeting held at Brighton.

Its compilation is highly to the credit of the editor Mr. Charles H. Wood, though he apparently labours under the impression that he is required to produce so large a quantity of matter. If this assumption be correct we strongly suggest to the Committee of Publication to be content with one hundred pages less. If well digested abstracts are provided of communications or discoveries of importance the readers would, we think, have reason to be better satisfied—as it is, whole passages which are in every one's hands and may be consulted with facility are necessarily reprinted. A well digested record, the main facts of which are clearly arranged and conscientiously reported, would prove of the utmost value, and the editor with restricted space would be able to concentrate his energies on his very difficult task.

We are also decidedly of opinion that his editorial duties might be lightened. No one man can possibly know everything. A Pharmacist skilful to the last point in Materia Medica cannot be expected to give us the last best résumé of modern chemistry; neither could an accomplished Chemist offer to his readers a digest of current Botanical investigations such as might be rendered by a Professor of that science. Why cannot certain members of our Conference furnish reports on those subjects with which they are intimately connected, and thus with little trouble to themselves and with great gain as far as others are concerned, increase beyond measure the interest of publications such as the one just now before us. So while we regret the large infusion of republished microscopical characters, and other notices of similar description, we turn with unmixed satisfaction to Mr. Wood's own work. The introduction is beyond praise—it recounts concisely the various novelties that have recently appeared. Abstaining from either censure or approval, it puts the reader in full possession of memorabilia—such as Condurango, Xylol, Guaiacol (Mr. Williams' preparation); the applications of Oleic Acid; the therapeutic uses of Sulphovinate of Sodium; Chloral and its modification; Crotonic Chloral; Glycerine and Aconitia. In our humble opinion the Introduction is the most scholarly portion of the book. The chief points treated of throughout are Materia Medica, Pharmaceutical Chemistry, and Pharmacy, concluding with Sundry Notes and Formulæ. The Materia Medica is arranged in sections under the various Natural Orders without reference to alphabetical system. A strong feature of the volume is the portion allotted to Pharmaceutical Chemistry—but our warmest commendation must be bestowed on the translations from foreign authors and on the numerous abstracts of their investigations.

In the department of Pharmacy we are overwhelmed with American suggestions—good probably, but we can hold our own; though there is a feeling of distress, that we ourselves seem to have contributed so little to advance the trade-science by which we get a living.

'The New York Year Book of Therapeutics and Pharmacy' is a totally different publication. It is devoted to Therapeutics, Materia Medica, Toxicology, Prescriptions and Formulas, and General Receipts, and is mainly a collected reprint of such articles appearing in various Medical and Scientific Journals that have been deemed worthy of notice and preservation. As already suggested to some extent in reference to the Conference Year Book, we are in doubt as to the usefulness of this class of literature. Those who are really interested, have the documents here republished in their possession—those who read simply for trade purposes are not thankful for treatises in extenso.

As regards ourselves and our own particular Year Book, we cannot but think that a short well-written epitome of things and doings Pharmaceutical, would be infinitely more acceptable than the products of the modern mania for presenting a big book as a sort of tangible equivalent for the money paid by subscribers and the benefits derived by association. Meanwhile on one point we shall all be unanimous. Mr. Wood has admirably succeeded in his Editorial capacity, while to Professor Attfield there is due no small credit for the accurate manner in which he has presented the Transactions of the British Pharmaceutical Conference.

Healthy Houses: A Handbook to the History, Defects and Remedies of Drainage, Ventilation, Warming and Kindred Subjects. By William Eassie, C.E., F.L.S., F.G.S. London: Simpkin, Marshall and Co.

The question of constructing houses on more correct sanitary principles has long commanded the attention of medical and scientific men. It is, however, deplorable to find that the public and the individual householder are still but ill informed on all that pertains to healthy houses and healthy towns. The avowed object of the little book now under our notice, is to provide a record of facts, to give the result of acquired experience, and a *résumé* of published inventions relating to house construction. Our homes are too frequently badly built, and situated on unwholesome soil. The drains are often ill-constructed, and the rooms are either insufficiently ventilated or continually swept by uncomfortable draughts of cold air, while poisons lurk underneath the basement and flow around the drawing-room and library. The consequence is that a man's house is too often his greatest enemy, and not until fever runs riot within the walls do many persons become aware of the dangers to which they have possibly for years been exposed.

As a manual for householders and a text-book for builders we know of no work equal to this of Mr. Eassie, whose wide experience at home and abroad has peculiarly fitted him for writing it. In it are described and illustrated all the various forms of tile used in drainage; the latest improvements in ventilation are intelligibly discussed; the modern systems of warming are commented upon; in fact everything from basement to roof that relates to sanitation or the comfort of the inmates of a house in town or country is treated in a popular and at the same time scientific manner. The book exhibits much research; every page contains either valuable information or some novel suggestion. The numerous patent devices in filters, and the use and abuse of disinfectants, also come within the writer's range; and a useful novelty in works of this class is the introduction of the names of vendors of sanitary articles of all description, and the prices at which they can be bought. We cannot enter into any detailed criticism of a book embracing such a vast variety of subjects. The author in concluding his work says, "I have endeavoured on all questions pertaining to my subject to give the best information and the results of the most recent inquiries. My object has been to write a popular treatise which shall embrace all the sanitary requirements of a modern habitation, and to offer the result of my labours in this direction in a work at a price within the reach of every one." We congratulate Mr. Eassie on his labours, and confidently recommend his book to our readers. As far as the price of the book is concerned, we certainly may be allowed to say that it is marvellously cheap, and within the reach of every one. It is a volume of 224 pages, with upwards of 300 illustrations, and the cost only one shilling!

Notes and Queries.

[330.]—"CURIOSITIES IN DISPENSING."—A correspondent forwards the following copy of a prescription which he thinks deserves a place among the curiosities:—

℞	Infus. Ergotæ ad	℥ vj.
	Quinæ Sulph.	gr. xv.
	Acid. Sulph. Dil.	ʒ j.
	Tr. Cinchon. Co.	
	Syrup. Aurant. aa	℥ vj.!!
	Aq. ad.	℥ viij.

Mft. mist.

He says it bears the stamp of a respectable chemist. He would esteem it a favour if some of our pharmaceutical *savants* would say how they would dispense it. The sign for 6 oz. of Tr. Cinchon. and Syr. Aurant. is unmistakable.

[329.]—LIQ. AMMONIAT. VALERIANÆ.—A prescription has been presented containing Liq. Ammoniat. Valerianæ ℥ ij. May I ask if such a preparation is recognised by any authority? A caution was enjoined that it was not to be the brown but a white milky kind of mixture, to be produced by the ammonia. Nevertheless we dispensed tinct. valer. am., and trusted it would produce the desired effect.—J. W.

STYPTIC COTTON.—Dr. Rohland describes (*New York Medical Record*) a styptic cotton for arresting passive hæmorrhage from extensive surfaces. It is prepared by boiling the cotton in a solution of alum and gum benzoin; the cotton is then dried and picked, and afterwards saturated with solution of perchloride of iron.

APPOINTMENT.

Mr. W. T. Crew has been appointed dispenser to the Chorlton-upon-Medlock Dispensary, Manchester, vice Orton, A.P.S. etc., resigned.

VACANCY.

A Resident Dispenser and Secretary is required for the Horton Infirmary, Banbury, to enter on his duties the first week in April. For particulars see Advertising Sheet, p. 18.

Correspondence.

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

Percolation.

Sir,—The prominent position and the sharp criticism of Mr. Saunders' communication from America, in your Journal of February 1st, compel me to say a few words in reply.

I may state at once that leaving such words as *surprise, sweeping, clumsy,* etc., out of consideration, I feel rather flattered than otherwise by Mr. Saunders. The principal feature in my paper on percolation consisted in the recommendation of certain concentrated solutions to serve for the preparation of proof tinctures, wines, etc., and I feel pleased to hear that in America "*many fluid extracts in use are made practically in the manner suggested by Mr. Schweitzer.*" I have no desire to discuss in your paper mere matters of opinion between Mr. Saunders and myself. It is evident that the American way to arrive at a conclusion is different from ours; Mr. Saunders finds, for instance, "*that pressure has nothing to do with the solvent power of the liquid, and, in some instances, acts injuriously by causing the operation to go on more rapidly than is advisable.*" To us here this looks like proving a nigger to be white because he is so very black. Mr. Saunders also thinks that the subject of percolation is almost overdone and exhausted, but "*hardly used amongst druggists as the great advantages it offers demand.*" I feel grateful for new information, though not quite new in this instance, for Professor Markoe, of Boston, speaking at Philadelphia, is stated to have said, Pharmaceutical Journal, January 25th, page 594, "*Percolation, which is so well understood and so indispensable in the United States, is little known and practised in England.*" It is wonderful how these American professors obtain information! I have lived twenty years in England; practised the process all this time; have learned a great deal from other English pharmacists; know a great many who use the process daily, and never was aware of that deplorable state of affairs until discovered by Professor Markoe in his seven days' stay in England. I always thought we knew a little about percolation, just enough for our purpose, and something to spare, and that we did not neglect it by any means. How excessively grateful we ought to feel to these Transatlantic visitors! Mr. Saunders is unfortunate in those instances where he feels wrath against me, and works himself into an unnecessary rage by misunderstanding me. If Mr. Saunders has to percolate quantities where, instead of adding the menstruum by the ounce from a little glass vessel, he has to pour it from a one or two gallon measure, he will find the addition of a layer of glass stoppers over his blotting-paper anything but a clumsy expedient; and should Mr. Saunders ever prepare purified extract of liquorice I may tell him that no process is better than percolation, and placing layers of solazzi juice between layers of whole straw; while in making tinctura opii from fifty pounds or more of powdered opium or extractum ergotæ liquidum from over twenty pounds of finely powdered ergot, he will find some admixture absolutely necessary, and the residue of extract of opium and rye chaff better than anything else.

But I suppose my reply ought not to occupy more room in your Journal, besides, I think I have sufficiently proved that there are occasions when the introduction of a *little chaff* is the most handy thing for finishing percolation.

J. Schweitzer.

Tinctures and Percolation.

Sir,—I was present at the Brighton Conference and heard Mr. Stoddart's paper on Tinctures read and the arguments that followed, which very much interested, in fact, almost converted me from a very firm faith in the process of maceration and the use of a very powerful press. As the omission of the process of packing made it more likely that a uniform result would be attained, I determined to try an experiment. I therefore proceeded as follows to make a gallon of essence of vanilla with an ordinary tin percolating coffee-pot as the sole apparatus. The pods were bruised in a mortar with an equal bulk of fine sand, and well wetted with the menstruum; a piece of filtering paper having been placed over the bottom of the percolator, and secured by some fine muslin, the marc and menstruum were then transferred to the percolator, and the remainder of the menstruum gradually passed through the marc. The result was most gratifying; I have shown the product to many of my friends, and they agree with me that it is the finest sample of essence of vanilla they have seen for some time. I may observe, that by thus percolating I have obtained one-third more in quantity of a superior essence to that I have procured by the ordinary macerating process. I continued passing the menstruum through the marc till I found it was totally exhausted.

I quite agree with Mr. Saunders in his deductions in his paper on "Percolation," concerning the chaff and glass stoppers, and the proposed concentrated tinctures; but I should like to ventilate another notion, that of using the ordinary extract. What objection can there be to making tinctures from extracts of belladonna, hyoscyamus, gentian, nux vomica? The extracts are prepared in the most approved ways according to the latest scientific knowledge, for obtaining the active principles of the various roots and drugs. Thus, for instance, I have prepared for a medical man, Tinct. Belladonnæ in this way:—

Ext. Belladonnæ,
Spt. Tenuior. ℥j.
Macerate 24 hours and then filter.

The product resembles ordinary B. P. tinct. of belladonna exactly, and in action answers all the purpose. The mode of calculation was to take the doses of the extract and the tincture, and use the corresponding quantity of extract. I should always prefer and use in my business the tinctures as ordered in the B. P.; at the same time I should like this idea to be ventilated, and find out by collating the experience of others, what objections there may be to this process. One can fancy how exceedingly convenient it would be in a country place to feel at liberty to extemporize tinctures in this way.

T. Haffenden.

Brighton.

Milk Testing.

Sir,—Will you kindly permit me to make a brief reply to Mr. Bottle's letter on this subject in your last week's issue. It will, I hope, be clearly understood that in suggesting the volumetric estimation of the sugar which it contains as a convenient test for the quality of milk, I was quite unaware that the method had been published in the Journal nearly a quarter of a century ago. It is well known that scientific discoveries have been occasionally ushered into public notice by more sponsors than one; and in the more humble field in which I aspire to be a worker—the application of known principles to new uses—instances of this are still more frequent.

An apposite illustration is furnished on the page partially occupied by Mr. Bottle's letter, in Professor Redwood's statement of the preparations proposed for admission into the Pharmacopœia.

The employment of acetic acid to obtain an efficient and permanent solution of the active principle of ipecacuanha is there credited to Dr. Dyce Duckworth and Mr. Carteighe, whereas a reference to the paper read by the former gentleman at the evening meeting, March 6th, 1872, will show that the merit of the suggestion is rightfully due to Mr. G. Johnson, of Birmingham, who urged it on the notice of pharmaceutists as long ago as November, 1860; and my own earliest contribution to the Journal, April, 1867, was the formula for a syrup of ipecacuanha prepared as syrup of squills, which I still make and find satisfactory.

I am indebted to Mr. Bottle for pointing out an error in your quotation from my letter, on page 482; since a reference to Attfield will at once show that ·5, not 5 grains of lactose are equivalent to 100 grains of the copper solution; but I can scarcely admit that the question of the reducing power of sugar of milk is finally disposed of by that gentleman's *ex cathedrâ* assertion. Such a point can only be settled by careful experiment, and I can only assure Mr. Bottle that, in the full persuasion that I was entering upon a path hitherto untrodden, I scrupulously tested the strength of the solution employed with a definite weight of pure and dry sugar of milk.

Mr. G. Brownen, on p. 501, and Mr. Ekin on p. 560, both speak from actual experience of this method of testing milk, and they will, no doubt, gladly corroborate, or, if need be, correct, my assumption that lactose equals cane sugar in its reducing power over cupric salts.

J. Fred. Brown.

4, *Market Square, Dover, February* 9*th*, 1873.

THE PRELIMINARY EXAMINATION.

Sir,—We are informed through the reported discussion of proposed bye-laws that there is a general impression the Preliminary examinations as conducted "in the country," are so unsatisfactory that it is desirable to abolish the arrangement.

I will not enlarge on the question beyond saying that I feel personally insulted, and unless the two gentlemen making the statement can qualify or explain it, I would suggest that the local secretaries for the future decline the duty.

John Whitfield, F.C.S., Local Secretary.

Scarborough.

PHARMACEUTICAL WOMEN.

Sir,—In the report of the Council Meeting on the 5th, I find that on the motion that three ladies be elected apprentices or students of the Society, Mr. Sandford moved an "amendment" that those three ladies "be not elected apprentices or students of the Society." I should be glad to know what constituted this proposition an amendment. It appears to me a simple negative of the original proposition which should have been rejected by the President as an amendment, which ought to introduce some condition which would not be decided by a simple vote upon the motion before the meeting.

Henry H. Pollard.

140, *High Street, Ryde, I. W.*
February 10*th*, 1873.

THE NEW BYE-LAW.

Sir,—You would greatly oblige by allowing me through the medium of your columns to ask your readers to *erase* the words "*of the Society*" from the form proposed by me in my communication to the Council upon the new Bye-law, and published in this week's Journal, on page 636. By so doing it will read correctly according to my suggestion, one of the main objects of my letter to the Council having been to point out the error in the use of those three words.

Edwin B. Vizer.

63, *Lupus Street, Belgravia South, February* 8*th*, 1873.

SPIRITUALISM *v.* RHEUMATICS.

Sir,—There has been a great deal of talk of late about spiritualism, and people have wondered what good it was going to do.

It seems at last poor suffering humanity is going to reap a benefit from it in a form little expected. The other day a customer of mine was commissioned by a member of the spiritual community, to obtain some drugs for the preparation of a recipe which had been revealed from the Spirit-land, to cure rheumatics. I was very anxious to get a look at this prescription, but it was so jealously guarded that they had even taken the precaution of getting only part of the ingredients at one shop. The customer informed me they were all vegetable preparations, as *they* believed in herbs. I suppose he meant the spirit, but whether from actual experience of their beneficial results or only from observation, I was unable to learn. Perhaps some of your readers can throw some further light on the subject of spiritual pharmacy.

A Chemist.

J. McKnight.—You will find formulæ in the present series of the Pharm. Journ., vol. I. p. 1042.

W. C. W.—A recipe for "Peppermint Cordial" was given in vol. I. of present series, p. 497.

"*Cecil.*"—Ethyl is the radical of the alcohol series of compounds, and methyl the radical of the wood spirit series. You will find a description of them in Attfield's 'Chemistry' or any elementary work on the same subject.

"*A Working Country Chemist.*"—If you will state definitely your difficulty we will endeavour to remove it.

W. Wood.—(1) Youatt 'On the Horse.' (2) Blaine's 'Veterinary Art.'

R. Emment Charles.—Clause 16 of the Pharmacy Act, 1868, provides that nothing "thereinbefore contained" shall extend to or interfere with the dealing in patent medicines; but clause 17 declares it to be unlawful to sell any poison—either wholesale or retail—unless the box, bottle, vessel, wrapper, or cover in which such poison is contained be distinctly labelled with the name and address of the seller of the poison, and unless the further regulations applying to poisons in the first part of the Schedule A are complied with. At the end of this clause certain exemptions are specified, but patent medicines are not among them; and accordingly, to our apprehension, the provisions apply to such patent medicines as contain poisons belonging to the first part of Schedule A. This subject has already been incidentally mentioned on several occasions, and we may refer to an article in the Journal, vol. II. p. 975.

Messrs. Kay Brothers' communication has been received and the enclosure handed to the Secretary. We are sorry we cannot comply with their request.

A. H. Mason.—We are obliged for the communication.

J. W. Watson.—Apply to Messrs. Butler and M'Culloch, Covent Garden.

"*Tolu.*"—"Cough Lozenges" have been exempted from the provisions of the Act, but probably the recommendation for "relieving hoarseness, bronchitis, asthma," etc., might place them outside the exemption. It would be better, therefore, to communicate with the Inland Revenue authorities and ask their permission to use the label.

M. M. B.—The section on "Physics" in Fownes's work, if thoroughly mastered, will be amply sufficient for the purpose you mention.

"*Pilosus.*"—*Verbascum Thapsus*, Linn., or the Great Mullein.

"*Inquirer.*"—No. Red oxide of Mercury and Ammoniated Mercury are included in the Schedule of Poisons, and it is unlawful for any one to sell them unless he be a pharmaceutical chemist or a chemist and druggist within the meaning of the Pharmacy Act, 1868, and unless he be registered under that Act.

J. S. W.—We are unable to read the name of the article to which your question refers.

Mr. Joseph Leay.—The insertion of your letter would give rise to much angry correspondence, so we prefer not to publish it.

T. F. J.—The Minor examination is conducted entirely *vivâ voce*. According to the published Regulations of the Board of Examiners, which may be had on application to the Secretary, it appears to be not so much the ability to repeat from memory a description of the characteristics of various plants and drugs as to practically apply such knowledge in the recognition of plants and drugs that is required. The arrangement of marks is a matter arranged by the examiners only, but we believe that a certain amount of proficiency is required in each subject.

L. S. A.—Globules of mercury would generally be visible on making such a mass as you mention; the smaller globules have a tendency to aggregate on "working," into a firm pill mass. It shows much of the mercury in the grey powder to be in the metallic state, as it ought to be, and not much oxidised.

T. B. (Lynn).—We believe that a label for "Cough Lozenges" and similar preparations may be used without a stamp, provided it does not contain any words suggesting that it is a secret or proprietary preparation, or recommending it for any disorder. It is doubtful whether the label sent complies with this provision; it would, therefore be better to submit it to the Inland Revenue authorities.

H. F.—Probably you refer to the price list issued last year by the Glasgow Chemists and Druggists' Association, of which, we believe copies may be obtained upon application to the secretary of that association.

F. K.—The latest edition of the Codex was published in 1866, and could be obtained through Messrs. Williams and Norgate, Henrietta Street, W.C., or any respectable foreign bookseller.

George Adams.—Yellow Prussiate of Potash is not a poison, and therefore it is not necessary that its sale should be entered in a "poison book."

G. L. Napier.—We believe its therapeutic qualities to be little inferior to the Pharmacopœia preparation, but it would not be admissible to substitute it in ordinary dispensing for the latter, which is naturally more pure. It is used in many hospitals where cost is a matter for consideration.

Communications, Letters, etc., have been received from Messrs. G. L. Napier, Dr. Muter, J. Squire, Pocklington, Rawlinson, "Spes," "Two Inquirers," H. F., E. B.

PROPYLAMINE OR TRIMETHYLAMINE.

Attention has recently been directed by Dr. Sydney Ringer in some notes in the *Medical Record*, to the revival of the use of a compound ammonia as a remedy for rheumatism, and the use of the substance has been the subject of discussion at some of the French medical societies, as well as the Paris Société de Pharmacie, as will be seen by the report at p. 670, 671. Since the first introduction of this remedy in 1854 by Awenarius, of St. Petersburg, it has also been employed both in this country and in America to some extent, though without any very decided knowledge having been acquired respecting its physiological action and medicinal virtues. However, its use being now a prominent subject of discussion, the chemical history of the substance has an immediate interest for the pharmacist, and this is especially the case since there is considerable uncertainty both as to what precise compound is indicated by the term propylamine, and also what has been used medicinally under that name. Some account of the substance will therefore be useful to the readers of this Journal.

Propylamine is a compound or substituted ammonia in which one of the three molecules of hydrogen belonging to ordinary ammonia is replaced by the radicle propyl (or trityl) C_3H_7, the third member of the ethyl series of radicles; its constitution being represented by the formula—

$$N\begin{cases}C_3H_7\\H\\H\end{cases}$$

It is described by Mendius, who first prepared it, as a very mobile, colourless liquid, possessing a strong ammoniacal odour, boiling at 50°, dissolving in water with evolution of heat, specific gravity ·7134 at 21° C.

With acids, propylamine forms crystallizable salts, the sulphate being deliquescent, and the hydrochlorate NC_3H_9HCl very deliquescent, freely soluble in alcohol, but almost insoluble in ether.

The method first adopted to obtain propylamine was the hydrogenation of ethyl cyanide or propionitrile, a compound intermediate between the ordinary alcohol of the alcohol series and the propionic acid of the parallel series of acids. For this purpose 36 parts by weight of ethyl cyanide, 500 parts alcohol, 200 parts water, and 500 parts of a 20 p.c. solution of hydrochloric acid were mixed and made to act upon metallic zinc added in excess, the whole being distilled and the distillate mixed with 400 parts more hydrochloric acid and poured back again upon the zinc remaining undissolved. After again distilling to get rid of alcohol, excess of caustic soda is added to the residue, and then the propylamine is distilled off together with water.

Besides this normal propylamine there is another compound of the same composition called isopropylamine

$$N\begin{cases}CH\ (CH_3)_2\\H\\H\end{cases}$$

This boils at about 32° C. The hydrochlorate crystallizes in cubes, while that of the normal propylamine forms square plates.

Another isomer of propylamine is trimethylamine, an ammonia in which each of the three molecules of hydrogen is replaced by methyl, its constitution being represented by the formula—

$$N\begin{cases}CH_3\\CH_3\\CH_3\end{cases}$$

This substance was formerly mistaken for true propylamine or tritylamine; and it seems probable that in regard to the remedy now proposed to be used in the treatment of rheumatism, the same kind of confusion still prevails. Trimethylamine is, however, a substance very different from propylamine. It is an oily liquid with a strong odour of stale fish, and boils at 9° C. This substance was first obtained by Hofmann, by the action of ammonia upon methyl iodide. It also exists in herring brine, ergot of rye, and several plants, and is apparently one of the products of the putrefaction of nitrogenous substances, such as urine, guano, dough, fish, etc.

The directions given in Wood and Bache's United States Dispensatory for the preparation of propylamine from herring brine, on the authority of Professor Procter, clearly point to trimethylamine, and it was from the same source that in 1850 Wertheim obtained the base to which he gave the name of propylamine in the first instance. It would appear, moreover, from the accounts given of the substance used under the name of propylamine that it was really its isomer trimethylamine that was referred to. The physical characters of these two substances are very distinct, and the smell of even propylamine is said to be very different from the herring-like odour of trimethylamine, so that there would not be much difficulty in settling this point.

At a recent meeting of the Paris Société de Pharmacie a committee was appointed to inquire into the subject, on the ground of the uncertainty attending it. The price hitherto charged for the material in the state of aqueous solution appears to have been about 5*s.* per ounce; but at a recent meeting of the Société Médicale des Hôpitaux it was stated that it would be procurable at about one-third that cost.

M. Adrian and M. Dassaigne recommend the use of an hydrochlorate of the base as being more convenient than the solution.

SULPHOVINATE OF SODA.

BY CHARLES RICE.

Having prepared this salt some time, and having tried several methods for obtaining it, I can recommend the following, as yielding a good product at a moderate price:

Take of alcohol (sp. gr. 0·815), sulphuric acid (sp. gr. 1·830), each 64 fl. oz. Add the acid to the alcohol, contained in a large flask, in portions, at short intervals. At first the temperature of the mixture rapidly rises to 212° F., and violent ebullition takes place at each successive addition of acid, but this gradually ceases as the specific gravity of the mixture increases, and the last portions of the acid may be added quite rapidly. Cover it well, and allow it to stand for two or three days. The mixture of alcohol and acid should not be raised to the boiling point, since the yield of sulphovinic acid is thereby considerably diminished, while that of oil of wine, ether, etc., is proportionately increased. Pour the mixture slowly, while stirring, into five times its bulk of water, and saturate the acid liquid with carbonate of lime. Strain the liquid, wash the precipitated sulphate of lime, and add the washings to the filtrate, which now contains sulphovinate of lime. Add to the latter a solution of carbonate of soda, until it just ceases to give a precipitate. Instead of carbonate of soda, I have also used oxalate of soda, which, although requiring considerably more water for solution, and consequently a longer time for the final evaporation, has this advantage, that it effectually removes the whole of the lime salts, thus making filtration during evaporation unnecessary. Filter the liquid through filtering paper free from iron, to remove the precipitated carbonate of lime; wash the latter, and evaporate the filtrate until it measures about 70 fl. oz. Filter again from a small quantity of separated sulphate and carbonate of lime, and evaporate until a pellicle forms. Then set it aside for a few days, and remove the crystals. It is very difficult to obtain more than one or perhaps two crops of well-defined crystals; the last mother-liquors deposit a number of hemispherical, knob-like crystalline masses, of a pasty consistence and exceedingly difficult to drain. I now prefer to evaporate the liquid at once to a syrupy consistence, and then, under constant stirring, to evaporate to dryness.

The product is a white granular salt, of a faint ethereal odour, and a cooling, somewhat aromatic taste; it is very deliquescent, soluble in 0·7 parts of water, at 60° F., also soluble in alcohol, with which it is capable of forming a crystalline compound. When pure, BaCl solution should throw down no precipitate, or at least produce only slight cloudiness.—*American Journal of Pharmacy.*

THE MEDICINAL PLANTS OF NEW ZEALAND.

BY JOHN R. JACKSON, A.L.S.

Curator of the Museums, Kew.

New Zealand is a colony especially interesting to Englishmen, not only on account of the variety of its resources, but also on account of the illustrious Englishmen who have visited the island and given us accounts of its geographical features, geological formation and natural history. New Zealand has been particularly fortunate in having amongst its explorers names honoured in the roll of history as bold and intelligent adventurers, as also among the natural history collectors who have visited the colony some of the best that ever left these shores, and as much may be said of those who at the present time are the prime movers and supporters of science in the colony.

The New Zealand Institute, which includes amongst its members such names as those of Dr. Hector, Dr. Haast and others equally well known, has done so much scientific work of a high order that it may justly be compared to our own Royal Society. It needs only to point to the 'Handbook of the New Zealand Flora,' undertaken by Dr. Hooker at the instigation of the Colonial Government, to show with what a liberal hand and enlightened mind that Government has encouraged science in the colony. Nor is the knowledge of the botany of New Zealand confined to a mere list of the plants inhabiting the country, for the properties and uses have also been inquired into and properly recorded. The medicinal plants are those in which the readers of this Journal have most interest, and to which I desire to draw attention.

In a carefully compiled essay on the botany of the North Island of New Zealand, we are told that "it is highly doubtful whether the New Zealanders ever used any vegetable as an internal medicine before their intercourse with Europeans; for severe burns, however, they applied outwardly the ashes and charcoal dust of burnt fern fronds (*Pteris esculenta*) and the fine reddish dust of the large decaying fungus pukuvau (*Lycoperdon Fontanesii*). The blanched leaves of the harakeke (*Phormium*), and the roots of the rengarenga or maikaika (*Arthropodium cirrhatum*), were sometimes roasted and beaten to a pulp, and applied warm to unbroken tumours and abscesses. As a cataplasm for ulcers they used the leaves of the koholio or poroporo ((*Solanum aviculare*); and for wounds and old ulcerated sores, they used the large leaves of the pukapuka or rangiora (*Brachyglottis repanda*), and also the pappus down of the large bulrush (*Typha angustifolia*), but merely as a protection against dust." The stems of this plant are extensively used in New Zealand for making walls and roofs of houses, and the yellow pollen is made into a kind of bread or cake. "Layers of dry totara bark (*Podocarpus Totara*), and the lower parts of stout green flax leaves (*Phormium*) served admirably as splints in cases of broken bones, the New Zealanders being far better surgeons than physicians. And the leaves of several particular plants were in request for their rude steam or vapour baths for rheumatic and other stubborn and chronic complaints, but it is highly questionable whether the benefit derived from such baths did not arise entirely from the warm vapour. They sometimes rubbed the fresh juice of the ngaio (*Myoporum lætum*) over their skin to keep off the persecuting sandfly; and for several years they have used as purgative medicines the juice of the root of the New Zealand flax and the bark of the kowhai (*Sophora tetraptera*); as a tonic, the leaves of the kohekohe (*Dysoxylum spectabile*); as a demulcent in colds, etc., the bark of the houhue (*Hoheria populnea*); as a diaphoretic, *Mentha Cunninghami*; and as slightly alterative a decoction of the bark and stems of the pikiarero (*Clematis hexasepala*) and the root of the tatarahake (*Coprosma acerosa*)."

It is interesting to note that some of the plants here mentioned as being used by the New Zealanders in their rough system of medicine, belong to orders throughout each of which a characteristic principle prevails, and some members of which are acknowledged articles of utility in this country; thus, for example, as the demulcent properties of *Hoheria populnea*, a plant belonging to the well-known natural order Malvaceæ. Some of the plants have, moreover, been tried by Europeans in the colony, and reported upon as being likely to prove valuable in regular practice. Amongst them may be mentioned the root of *Phormium tenax* as an anthelmintic and cathartic; the leaves and bark of *Dysoxylum spectabile* as a tonic, the roots of *Rhipogonum scandens* as an alterative. This plant is a very near ally to the commercial sarsaparilla, and its roots, it is said, "have been beneficially used in New Zealand instead of that medicine, which is so commonly adulterated." The climbing wiry stems are, moreover, used both for cord and for basket work by the natives. Besides the above, the bark of *Hoheria populnea* has been successfully used as a demulcent;

Mentha Cunninghami as a diaphoretic; the aromatic leaves of *Angelica rosæfolia* as a diuretic and remedial in syphilitic cases; and the roots of *Taraxacum Dens-leonis* as an alterative. From these facts, and from the fact that the Flora of New Zealand includes many plants belonging to natural families noted for their medicinal properties, we might expect many at present unknown to prove valuable. In the admirable essay from which we have quoted, the author, speaking on this part of the subject, selects the following as examples:—"The spicy bark of the horopito (*Drimys axillaris*), a species ranking next to the well-known *D. Winteri* of Cape Horn, which produces the valuable Winter's bark; the intensely bitter bark of the kowhai (*Sophora tetraptera*),—it is worthy of notice that both African and East Indian kino is produced by plants of an allied genus of the same sub-order; the leaves of the wharangipiron (*Melicope ternata*), as allied naturally to the genus *Diosma*, species of which genus produce the well-known buchu leaves, which the New Zealand *Melicope* also resembles in taste and smell; the kawakawa (*Piper excelsum*),—many closely allied species of this genus (and of the next genus *Cubeba*) are extensively used as medicinès in various parts of the world; the aromatic succulent stems and roots of various species of *Panax* and of *Aralia*, of which several species are used in medicine, and the roots of *P. quinquæfolium*, are sold by the Americans to the Chinese for real ginseng root; the astringent bark and diuretic seeds of *Sapota costata*; the roots of the two mountain gentians, which are just as purely bitter as those of the officinal *Gentiana lutea*; the aromatic bark of the tawa (*Nesodaphne Tawa*), a plant belonging to the same natural order with those producing the cinnamon, cassia, sassafras, benzoin and camphor of commerce; and lastly the wainatua (*Euphorbia glauca*) may also prove useful as a medicine, seeing so very many species of the same genus have long been medicinally employed."

THE MICROSCOPE IN PHARMACY.

BY HENRY POCKLINGTON.

(*Continued from p.* 582.)

CUSPARIÆ CORTEX.—This bark is readily examined after a few days' maceration in cold water, and presents hardly any difficult features. Commencing with the exterior we find flattened cubic cells, thin walled and devoid of contents, and of no special interest whatever. Beneath these are the more important parenchymatous layers, with specialised cells and liber bundles. The outer cells of this layer are compressed somewhat, are thin walled and contain a yellowish-colouring matter. A few liber bundles and raphide receptacula are seen in these outermost layers, but these latter are much more numerous in the layers of uncompressed cells next in order. These cells are also thin walled, of varied shape, and contain only starch, a little colouring matter, and a granulated nitrogenous substance. They are remarkably irregular in size and shape, and their adhesion to each other by no means complete. Apparent intercellular spaces exist, and are filled with a brown resinoid substance. Special cells containing raphides, acicular and intensely doubly refractive, are frequent in portions of this layer, and require a little care in examination, as at first sight their raphidian contents are not to be distinguished. Rupture of the enveloping membrance of course sets the matter at rest. Interspersed with the raphide-bearing cells are large cells with thin walls, containing a brown colouring matter similar to that already spoken of. Unless care be taken in removing this matter by means of ether, or bisulphide of carbon, and alcohol, the specialised character of the cells containing it will not be evident. Their walls are exceedingly thin, and the whole cell is frequently torn away by the cutting instrument employed, leaving a hole that might be mistaken for a large intercellular space. It is best to watch the action of the solvents employed under a magnifying glass. The cell walls of these receptacula stain intensely with magenta, and are best seen when so stained. On the innermost margin of these layers of large parenchymatous cells are seen large liber bundles, very distinguishable in a magenta stained transverse section, but best studied in a vertical section. The liber cells are of very considerable length, are wholly filled with secondary deposits and not specially interesting. Within these are the newer layers of the bark containing large oval resin-receptacula, a few raphide cells and a variety of granular substances. The medullary rays, extending as far as the liber bundles, are formed of cubic cells filled with a nitrogenous substance which stains intensely with magenta, and containing also small quantities of starch.

The starch present varies in quantity, and is in single, minute, obovate granules with indistinct hilum. It is feebly doubly refractive, and the black cross can only be seen by aid of careful manipulation. And here I will digress a short space for the benefit of those friends who fail to find the black cross in wheat starch, and in Portland arrowroot (*arum maculatum* starch), although they are successful with such starches as those of canna (*tous les mois*) and potato. Certain starches are generally said, even in good text-books, not to give the cross, and this is given as a characteristic feature. It, therefore, is of importance that the matter should be inquired into, and the cause of the error found, if error it be. I have for some years devoted such of my leisure as I could spare from more pressing scientific work to the examination of starches under nearly all possible circumstances, and I find that, rightly treated, nearly all are doubly refractive, and give a cross by polarized light. And further, I am much disposed to think that in the few cases where I have failed to see the cross, it has been from want of sufficiently skilful manipulation. Anyhow, the starch of wheat (as I have before observed) and the starches of arum and rice do give a very distinct cross, but not unless immersed in balsam or dammar. Different starches require different treatment in preparing; some must not be heated in the slightest degree, others will bear a considerable temperature. A few give a decided cross if examined in water or alcohol, others in glycerine. Many require, as wheat, to be immersed in balsam or dammar, and a few others are best in oil of anise or even carbon disulphide. It will be seen from this that the refractive index o the medium, and probably also its penetrative pro perties as regards the starch, seriously affects the optical reactions of the starch, and that we are not justified in saying that no cross can be seen, unless we have tried the effect of fluids of various refractive powers upon the starch in question. This point is so generally overlooked that the digression may be forgiven. It would have been mentioned before had I not supposed it was more generally recognized. One other point is more generally known—it is this, an eye-piece of low power (that known as "A") should be employed, and in doubtful cases the analyser used above the eye-piece. A very thin film of mica, too thin to give colour with the help of the starch, is sometimes useful.

Cascarillæ Cortex.—This bark requires a somewhat more prolonged maceration than the last named, and care must be taken not to place it in an iron or imperfectly tinned iron vessel. Commencing with the exterior, we have cells closely similar to the corresponding cells in Cusparia and not calling for special notice. The layer within this consists of small, somewhat regularly shaped cells, far less angular than the cells usually found in this position, and containing, besides colouring matter, starch. Within this layer are the larger parenchymatous cells, the liber cells, and certain well-defined latex vessels. All of these require careful treatment in order to see them properly. The best plan is to allow a properly-cut vertical section to remain for a considerable time in warm alcohol, then in ether, back to alcohol, and finally stain it in an alcoholic solution of magenta, and having well washed it in alcohol, transfer it to oil of anise and mount in dammar or balsam. In such a section the ramification of the latex vessels can easily be made out, and certain other features distinguished that are not easily seen in an ordinary section. The inner layers of cells are chiefly more or less cubic or oblong cells, many of them containing colouring matter, and becoming black on the addition of solution of an iron salt, whence the necessity for not soaking the specimens in water contained within an iron vessesl. Besides starch, these cells contain an interesting form of raphide, large rhombic prisms intensely and beautifully doubly refractive, but not easily seen excepting in well-prepared specimens by the aid of polarized light. These crystals appear to be situate always in ordinary cells with various other cell contents, and not in special cells, as in cusparia and many other barks, etc. The starch granules are small, doubly refractive, and give a well-defined cross by polarized light.

The most interesting feature of the bark undoubtedly is the system of latex vessels, or resinoid canals, situate between the two layers of cells just mentioned. These are apparently true vessels formed by adhesion end to end of cylindrical cells and absorption, not always complete, of the thin cellulose septa. They are always thin walled, and contain various substances coloured and otherwise. Lying side by side with these vessels are considerable quantities of the raphides, frequently minute and agglomerated into sphæraphides. These vessels are best seen in a section cut parallel with the surface and vertical. The sections had better be cut successively, and each examined until the right one is found. Magenta and Tinct. Ferri Perchloridi are the best reagents for their demonstration, and may be used together or singly, the section being thoroughly washed after the application of each.

(*To be continued.*)

Indelible Writing Ink.—The *Pharmaceutische Zeitung* states that an indelible writing ink may be prepared by adding ferrocyanide of potassium to ordinary ink. The attempt to remove such an ink by use of an acid would cause the formation of prussian blue.

SULPHUR MINES IN ICELAND.

In a recent report upon the trade and fisheries of Iceland, drawn up by Arthur de Capel Crowe, Esq., Her Majesty's Consul at Copenhagen, he states that large deposits of sulphur exist in some districts, which at different times have been the object of commercial speculation. The sulphur mines at Krusavik in the south are at present worked for foreign account, but, owing probably to their partial inaccessibility and difficulty of transport, without much success.

The right of working sulphur mines at Myvatn, in the northern portion of the island, has recently been conceded by the Danish Government to an Englishman on a fifty years' lease. They were worked some years ago for account of a Copenhagen house, but were abandoned in 1851, since which time they have remained closed. Many causes contributed to this result, the chief of which, doubtless, were ignorance of the proper method of gaining the sulphur, the cost of transport on horseback to the seaboard, and the want of remunerative demand.

Since then these conditions have changed, and there exists no reason why these mines should not be worked profitably. They extend over a large tract of country, and their position is most advantageous in the middle of a flat country within an easy distance of Husavik, a convenient shipping port, and during the many years they have been closed the deposits must have very greatly accumulated, and should yield abundantly; indeed, so strong was this conviction in the minds of the natives that they long opposed the leasing except on very onerous terms, although quite unable themselves to work them.

As these mines are now likely to remain in English hands for many years, a short account of their former history may be read with some interest.

They are situated between 65° 20′ north latitude and the Arctic Sea, or more definitely speaking, lying in the tract between Myvatn (Great Lake) on the east, and Iokulsa (Glacier River) on the west. The right of working them was bought from private owners by the Danish King Frederick the Second, in 1563, and this right has ever since been in the possession of the Danish Crown (now the State). During the reign of this king a considerable quantity of sulphur was extracted, amounting to as much as 400 tons annually. In the reign of his son and successor, Christian the Fourth, the produce appears to have fallen off, and his Majesty was unsuccessful in his endeavours to lease them to foreigners. To the falling off of their supply of sulphur in this reign, and the consequent scarcity of gunpowder, the Danes attribute their defeat by the Swedes in Holstein in 1644.

In 1665 the Crown granted a concession for "digging sulphur" to a foreigner, who is stated to have exported large quantities up to the year 1676; since which date no special mention appears to have been made of them until the early part of the eighteenth century, when two foreigners, apparently Germans, acquired in 1724 the right of exporting sulphur from Iceland of which they also shipped considerable quantities during the succeeding five years, when the death of the lessees put a stop to this commerce.

After this date, and up to the beginning of the present century the Danish Government worked the mines for their own account, at times it appears with considerable profit, until 1806, when they were again leased to a foreigner, and subsequently have at times been worked by private speculators up to 1851, since which date, as already mentioned, they have remained untouched.

In 1840 they were visited by some scientific travellers, who calculated that these northern mines might easily yield an annual net profit of £1000 or £1200; but ten years later they were specially examined by a Danish mineralogist, who discredited this statement, and reported them to be less valuable; but in speaking of the Krusavik mines in the south, he says, "these might easily be made to yield 200 tons annually;" and yet they have always been considered inferior to the northern mines. A French geologist, Eugène Robert, who visited Iceland in 1835, and afterwards published a treatise on its geology, calls the attention of the Danes to the value of the Myvatn mines, and advises them not to lease them to the Englishmen (who were then applying for them), as the property might become of great consequence in the event of the sulphur mines of Sicily falling off, of which he affirmed symptoms had shown themselves.

It will thus be seen that opinions are divided as to the productiveness and present richness of these mines, but so much is certain, that they have for several centuries been worked at intervals with varying results, at times with considerable profit, and the history of the country and the experience of so many years points to the conclusion that, if properly worked, they would become a valuable property. The mines, for instance, at Reykjaklidar-Námar are the richest to be found in all Iceland, and produce large deposits of the purest sulphur.

The reproduction is incessantly going on from upwards of a thousand small eminences, called solfatarar, which are found on the ridge along the sides, and at the foot of Námar-fjall. Rich sulphur deposits are also found at the Ketill crater (called Fremri-Námar), while the least rich are the Krafla-Námar, but at all these there is a continual deposition of sulphur going on. They all have the great advantage of lying in the track of one of the few practicable roads in the island, leading to an accessible shipping port.

A NEUTRAL SOAP.

In a recent communication to the French Academy, M. Miahle described a soap which he states combines the advantages of being prepared without heat, and thus avoiding the loss of the glycerine in combination with the fatty matters, and of being free from that alkalinity generally present in soaps prepared in the cold. In its preparation the ordinary toilet soap, made without heat, is cut into shavings and exposed, in a properly closed chamber, to the action of carbonic acid gas. The soap absorbs a quantity of the gas proportional to the quantity of caustic soda which has escaped saponification, and by the transformation of the free alkali into bicarbonate it loses all its causticity. It then constitutes a perfectly neutral soap, containing all the glycerine of the fatty bodies employed in its manufacture, and a certain quantity of bicarbonate of soda.

THE NATIONAL HERBARIA.

The question of the positions which should be occupied by the great national herbaria at Kew and at the British Museum is one which has of late engaged a large share of the attention of the scientific world. The subject was for a time brought under the notice of the general public last year by the attempt at interference on the part of Mr. Ayrton, as Chief Commissioner of Works, with the internal management of Kew Gardens. With the memorial from seven of the foremost scientific men in the country, addressed to Mr. Gladstone, in support of Dr. Hooker's administration, and the abortive debate at the very close of the Parliamentary session, the discussion appeared to have died away; when it was suddenly revived by a letter from Professor Owen, published in the columns of our contemporary *Nature* for November 7th last, hinting at the desirability of incorporating the herbarium with that at the British Museum. Though we cannot but regret the personal element which has been introduced, yet the controversy is one not without its importance, and one which should be fairly and impartially discussed. The plans of the Science and Art Department of the Privy Council, when complete, contemplate the removal of the Natural History collections, and with them the herbarium, from their present locality in the British Museum to the new range of buildings to be erected at South Kensington; and the question naturally presents itself whether, when these arrangements are carried out, there will still be room for a rival establishment at Kew.

The arguments in favour of the amalgamation of the two establishments are sufficiently obvious. The saving of expense by the abolition of one or two of the curatorships or subcuratorships will probably weigh little with the public at large, and still less with the scientific world, if any compensating disadvantages can be shown. A far more forcible line of reasoning is based on the gain which would accrue to the student from the incorporation of the two herbaria, and the consequent great increase in the number of specimens of any one species which he could have under examination at one time, and the filling up of gaps in one collection which might be supplied by the other. In the present state of systematic botany, it is absolutely necessary that any one engaged either in referring a plant to its correct species, describing a new species or genus, or preparing a monograph of a group, should have as large a series as possible of specimens before his eyes at a glance. Our best colonial floras, as those of Australia, New Zealand, Hongkong, British India, the Cape of Good Hope, etc., published under the auspices of the colonial Governments, are, in fact, not drawn up by colonial botanists, who have small series of the living plants before them, but by home botanists from large series of dried specimens. Another argument of less weight is the desirability of having the opportunity of comparing the series of specimens of recent plants with those contained in the British Museum in a fossil condition.

That this, however, is not the view adopted by those most conversant with the practical uses of herbaria is sufficiently shown by a memorial recently presented to Mr. Gladstone, bearing the signatures of nearly all the scientific botanists in the country, unconnected officially with either of the national herbaria, including all the botanical professors at the leading universities. The principal arguments therein presented in favour of the retention, in its integrity, of the magnificent herbarium now at Kew, are the great importance of keeping at least one great herbarium in immediate connection with the botanic gardens and library at Kew, and the greater facilities for scientific work afforded by such a situation as Kew than by one more metropolitan. With regard to the first, one of the duties of the officials at the Kew herbarium which is daily brought into exercise, is the naming, from dried specimens, of plants brought to or flowering in the gardens. The series of botanical works published under the superintendence of the officials at Kew, and consisting of descriptions, with drawings, of new or little known species, monographs of groups, and scientific accounts of the botanical collections brought home by different explorers, would of themselves form a considerable library of great value in systematic botany. Every one also who has worked at systematic botany, and especially at preparing monographs of groups, knows the importance of being able to compare the dried specimens with the nearest allies to be met with in the living state; and still more to have the freest access without delay or interruption to every botanical work which it may be necessary to consult—an advantage enjoyed by the student at Kew, from the unrivalled library there, and not to nearly the same extent anywhere else. On the second point, though it is impossible to consider the arrangements at Kew as perfect, yet the facilities for dissection and microscopic examination of specimens are greater than those afforded by any other establishment. There are also some other advantages in the separation of the two establishments which are alluded to in the memorial; and it is not probable that so great an agreement among the practical scientific men would exist on the subject were not the balance very decided in this direction. It is satisfactory at all events to find from the reply of the Treasury that the Government will make no alteration without ample notice of its intention being given to those concerned. Presuming that this will be the final decision, we venture to make one suggestion for increasing the usefulness of the two herbaria. It is the custom with all the leading continental herbaria for the curators to permit the loan of all the specimens representing a certain group to any botanist engaged in monographing that group, in return for the specimens being worked-up and named by him. Any English botanist, therefore, has access, practically, not only to the herbaria at Kew and the British Museum, but to those also at Paris, Brussels, Vienna, Berlin, Munich, and other continental towns, while continental botanists have not the same access to our collections without coming over to this country. Would it not be possible for one or the other of these two herbaria to permit its specimens to be made use of in the same manner with suitable restrictions?

The enormous value to science of the maintenance of national herbaria will have been sufficiently indicated by the above remarks. A few particulars may be given with regard to the two which we possess. The old palace at Kew combines under its roof the richest botanical library and the richest collection of dried plants in the world. The latter is computed to include from 105,000 to 110,000 species, arranged in 450 cabinets averaging 16 shelves each. The nucleus of this magnificent collection was the private herbaria of the late Sir Wm. Hooker and of Mr. Bentham, President of the Linnean Society, the latter alone numbering between 60,000 and 70,000 species, to which have been made additions from Government expeditions and private explorers from all parts of the world. A very extensive system of exchange is also carried on with continental herbaria, series of authentic "type" specimens being constantly sent out from Kew in return for similar series from those continental collections with which we are in correspondence. The herbarium at the British Museum is estimated to possess 77,400 species of flowering plants, arranged in 306 cabinets of 8 shelves each. The number of duplicates is much larger in the Kew herbarium than in that of the British Museum, but the latter is peculiarly rich in the products of certain districts of the globe and in fossil botany. In both establishments, the energies of the limited staff are severely taxed in adding and incorporating the additions which are constantly coming in, and in preparing the parcels of exchanges to which we have alluded; and both are scientific collections of which the country may well be proud.

THE SALE OF VERMIN KILLERS.

Meeting of Chemists and Druggists at Whitehaven.

A meeting of the chemists and druggists of Whitehaven, called by Mr. A. Kitchin (local secretary to the Pharmaceutical Society), was held on the 15th of February in the Whitehaven Scientific Association's Room, Queen Street, kindly lent for the occasion. The object of the meeting was to consider the conditions under which vermin killers are to be sold with a view of entering into an arrangement as to the scale of charges for and registration of such articles. Most of the chemists and druggists in the town were present. Mr. W. Kitchin was elected to take the chair.

In opening the proceedings the Chairman said that he was not well acquainted with the matter to be brought before the meeting, but no doubt the local secretary was prepared, and he should therefore call upon him. He would only remark before he sat down, that at one time they used to mix together one ounce each of brown sugar, arsenic, and Spanish brown, which was put up in quarter-ounce packets, and sold to poison flies. Thousands of these packets were sold, and yet nobody was ever poisoned by them.

Mr. A. Kitchin (local secretary of the Pharmaceutical Society) said the meeting had been called to take into consideration the sale of vermin killers. Most vermin killers contained either strychnine or arsenic, and came under the regulations laid down for the sale of poisons included in Schedule A of the amended Pharmacy Act of 1868. The law was very clear upon this point, although not generally understood. In the Pharmacy Act, 1868, certain poisons, specified in part 1 of the Schedule, had to be registered; while in the additions to the Schedule sanctioned by the Privy Council in 1869, the preparations of these poisons are required to be registered also. Now vermin killers being mostly preparations of strychnine or arsenic came under, and are included in part 1 of the amended Schedule. It appeared that certain chemists and druggists have been proceeded against and convicted for selling vermin killers without registering them. One or two chemists having spoken to him about the matter, he thought it best to call a meeting, where opinions might be freely expressed, and some arrangement arrived at with respect to the quantity to be sold and the charge to be made for the additional trouble of registration. It was an unpleasant thing for a chemist to be hauled up before a magistrate, even were he not convicted and fined.

Mr. Goss said that in Lancashire chemists and druggists had been registering the sale of vermin killers for some time. He had been informed that the least quantity they sold was threepennyworth. He himself had been registering the sale of vermin killers for the last fortnight or three weeks, and made his lowest charge threepence.

Mr. Hartness said he had been registering vermin killers for some time, and the lowest charge he made was fourpence. People grumbled a little sometimes at the price, but when told that chemists were compelled by Act of Parliament to register, they purchase without further comment. He did not remember ever having lost a customer on that account.

Mr. Grayson asked what Mr. Hartness would do if he had a stock of threepenny vermin killers.

Mr. Hartness said it was the threepenny packet he generally charged fourpence for.

Mr. A. Kitchin remarked that two threepenny packets might be put together and sold for sixpence to those who wanted a larger quantity.

Mr. Hunter asked whether it would not be better to charge a registration fee of, say, twopence, and make the lowest quantity to be sold two pennyworth, which would be twopence for the poison, and twopence for registration? The lowest quantity registered would then be fourpence; and in that way a sixpenny packet would be sold for eightpence, a shilling packet for fourteen pence, and so on.

The Chairman thought there was something tangible in Mr. Hunter's suggestion.

Mr. W. H. Kitchin was of opinion that they would often have some old farmer finding fault and grumbling at being charged twopence registration fee for a twopenny packet of vermin killer when he could buy a sixpenny or shilling packet for the same.

Mr. Grayson and Mr. Goss also objected to this plan.

Mr. Hartness said that seeing Mr. Hunter's suggestion of a registration fee did not meet with much favour, he would propose that a charge of fourpence be made for any vermin killer requiring registration, and that this be the lowest charge.

Mr. Hunter seconded Mr. Hartness's proposition.

The chairman having put this proposition to the meeting, it was carried unanimously.

A vote of thanks having been proposed to Mr. W. Kitchin for presiding, the meeting, which was marked throughout with harmony and cordiality, was brought to a close.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 22, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

OUTSIDE IDEAS.

THOUGH it was one of the chief hopes of the founders of the Pharmaceutical Society that it should eventually become a body representative of the entire trade, and although this aim has since that time repeatedly become apparent in the course of events, evidence is too frequently to be met with that the attainment of this object must yet be a work of some time. Of such a nature is the letter we publish this week from "AN OLD DRUGGIST," in which he justifies his right to be what is called an "outsider," by the remarks he offers as to the advantage of being a member of the Society. The letter to which we refer is indeed calculated to serve as a practical commentary on the suggested reduction of the entrance fee payable by persons becoming members of the Society, and to raise some serious doubts whether the proposal discussed at the last Council meeting would be found to augment the roll of members.

The writer of the letter candidly confesses to being amused by the discussion of this question, and regards with obvious astonishment the idea that membership involves any privilege beyond what he terms "the very shadowy advantage of voting once a year for a few gentlemen of whom you know little or nothing." The state of mind indicated by these expressions appears to manifest a strange disregard of the fact that the functions now exercised by the Society through its Council are of vital importance to all engaged in the business. If it had not been that our correspondent writes from a town claiming to be foremost in its efforts to secure universal suffrage, the fact might have been less surprising, but in any case if the views he advances are at all representative of those entertained by other "outsiders," there seems to be little cause to regret their relation to the Society, however much we may deplore the existence of a section of the trade which takes no part in supporting its efforts to advance the condition of British Pharmacy. If such be the case indeed, we do not hesitate in answer to another of our correspondent's questions to say that it would be more to the advantage of the Society not to receive the outsiders, for putting aside altogether the idea of a duty to be fulfilled by those who enjoy the right to select the governing body, we should be sorry to see the privilege of voting for members of Council exercised under the influence of such indifference as that indicated by "An Old Druggist."

We believe, however, that this feeling is not general even among those who are not in "the ranks of the Society," though it must be remembered that the necessity of respecting "vested interests" at the passing of the Pharmacy Act involved the registration as members of the trade of a very mixed class. We believe also that the system now in force of reporting the proceedings of the Council will tend to excite an interest in the Society much more general and hearty than has prevailed heretofore. The part taken by individual members of Council in regard to any measure is now month by month ascertainable from the published reports; and if any one who has the right of voting for the election of Councillors neglects to avail himself of this means of information, and of thus becoming acquainted with those who offer themselves for election, the fault will be his own as regards himself; and as regards the general interests of the calling he follows, he will have rendered himself chargeable with a failure in his duty.

VERMIN KILLERS.

IT is with much pleasure that we direct the attention of our readers to the report on a previous page of a meeting of Chemists and Druggists, held at Whitehaven, to consider the conditions under which vermin killers should be sold, and to enter into an arrangement as to the scale of charges for them. The Local Secretary, Mr. A. KITCHIN, in opening the proceedings took it for granted that most vermin killers contained either arsenic or strychnine, and that they consequently were subject, as preparations of Arsenic and Strychnine, to the regulations laid down for the sale of poisons included in the first part of Schedule A of the Pharmacy Act. In taking this view, we think that he acted most wisely; and it is satisfactory to find that this was the general feeling of those present. This having been agreed to, it only became a question *how* the sellers of vermin killers should be remunerated for the additional trouble of registering the sales; and for the settlement of this point Lancashire furnished a precedent, inasmuch as it appears to have been the custom there for some time past to register sales of vermin killers, and to make threepence the smallest charge for them. We believe that the action taken in this matter by the Chemists and Druggists of Whitehaven will have the effect of removing the difficulties that have prevailed; and they have earned the thanks of the trade at large by adopting the principle acted upon in Lancashire, and having thus made a move in the right direction.

THE MEDICAL RECORD.

Professional journalism is well represented in all the three faculties. But of the three, medicine probably has the most numerous as well as the best conducted organs. The *British Medical Journal*, the *Lancet*, the *Medical Times and Gazette*—to say nothing of certain minor journals—are periodicals of which the profession may well be proud; and indeed their circulation not only within but beyond its area is proof positive of their ability to assert for professional subjects an ultra-professional interest. At the same time there was room for another interpretation of the medical journalist's duties. Depending mainly for their contributions on English schools, the journals we have named reflect that insularity of idea and practice which, justly or unjustly, has been advanced as an imputation against English medicine. To gather up, select, and epitomize for the English practitioner, above all for the general practitioner, the latest results of continental observation, research, and induction,—to keep him *en rapport* with the newest principles and practice recognized in the great European, Transatlantic, and colonial schools,—was a task imperfectly performed by the existing journals, and still remaining for a fresh-comer to discharge.

In the *Medical Record*, of which six numbers are now before us, we have an admirable fulfilment of the desideratum. In its dexterously-conducted pages insularity is replaced by catholicity of idea. It gives from week to week a careful digest of medical and surgical opinion and practice as they prevail from Dorpat to San Francisco, from Utrecht to Melbourne. The authorities from which the *Medical Record* quotes are all well-considered and accurately-estimated ones; and nothing but the pith or marrow of the multifarious sources on which it draws is placed before its readers. It is quite astonishing to consider the amount of matter which it compresses into its well-printed columns. The absence of prolixity; of "the vanity of petty authorship;" of the self-satisfied citation of personal and local successes; of the features, in short, which make so much of our medical journalism wearisome and unprofitable, is one of its most effective recommendations.

Fortified by its perusal, no medical practitioner, in whatever department, or even specialty, need blame himself for being behindhand in the theory or practice of his profession; while the suggestiveness of its matter will often indicate and inspire new ideas, methods, or processes in the emergencies which occur to every busy practitioner. We cannot conclude our notice of the *Medical Record* without commending its exceeding elegance of production in matters of arrangement, printing, and even paper. It is, in more senses than one, to medical, what the *Pall Mall Gazette* has been to general, journalism.

THE PRELIMINARY EXAMINATION.

Some letters which appear in another page on this subject, and in reply to Mr. Whitfield, furnish evidence in support of the opinion that the mode of conducting these examinations is not satisfactory, and suggest the propriety of their being handed over altogether to competent bodies whose business is more to deal with such general educational matters. We do not perceive that the views expressed at the Council meeting, or even the remarks of our correspondents, convey anything that can reasonably be construed as insulting to our local secretaries.

The conduct of the Preliminary examination is more a matter for the schoolmaster than for the pharmacist, a fair knowledge of English grammar, arithmetic and Latin being all that is required; and though we have reason to be thankful to those who, in the capacity of local secretaries, have given their time and attention to the conduct of these examinations,—sometimes no doubt at much inconvenience to themselves,—we think that it must be obvious to all, that in the absence of any need for the technical knowledge of the pharmacist on the part of the examiners, it must be only a matter of time when the principle involved in the acceptance of examination certificates from accredited non-pharmaceutical bodies shall become the general rule in the Preliminary examinations of the Pharmaceutical Society.

Of the 12,128 samples reported to have been examined at the Inland Revenue Laboratory during the year ending March 31st, 1872, 2241 were received from the Customs, and 933 from the Board of Trade. We learn that the Admiralty and India Office also have applied for permission to have some commercial samples examined, with a view to guarding themselves against any fraud through contractors sending in goods worse than sample. Complaint is indirectly made of the want of room for practical work and storage of samples, and it is a wonder that such a large amount of work has been done in so limited a space. Any one who compares the well-fitted laboratory of the Pharmaceutical Society, or that recently built at South Kensington Museum, with the inconvenient and badly arranged place where so much and such important work is done for the Government, must feel surprised that better rooms have not been set apart for one of the most useful and important departments of the Inland Revenue.

We are glad to find, from a note appended to the Secretary's list of subscriptions to the Benevolent Fund received during the month of January, that a suggestion made in a former number of this Journal has been carried into practice. Were other of our readers to follow the example there set, they would be able to exercise the double privilege of assisting to educate the public to abandon a very objectionable custom, and of contributing towards the alleviation of the sorrows of some who have suffered from it.

Transactions of the Pharmaceutical Society.

MODIFIED EXAMINATION IN LONDON.

February 14th, 1873.

Examiners present—Messrs. Allchin, Barnes, Carteighe, Cracknell, Davenport, Edwards, Gale, Haselden, Ince, Linford and Martindale.

Thirty-eight candidates presented themselves, of whom *eleven* failed. The following *twenty-seven* passed, and were declared duly qualified to be registered as Chemists and Druggists:—

Andrews, John William ...... Burslem.
Ball, Samuel .... Oxton.
Brown, Roger .... Skipton.
Busby, Henry Horton .... London.
Bush, George .... Chelmsford.
Cooper, Thomas .... Crewe.
Costerton, Horace Arthur .... Oundle.
Courtenay, Alexander .... New Cross.
Dodridge, Thomas Mitchell .... Kensington.
Edwards, John E. .... London.
Edwards, Thomas Roberts .... London.
Fisher, James .... Bourne.
Godolphin, George Frederick Alfred, Notting Hill.
Hancorn, John Thomas ...... Lydbrook.
Hayland, Charles Philip ...... Hereford.
Hough, William .... Doncaster.
Jagg, John Henry .... New Cross.
Lund, William .... Dunnington.
Rawlings, Francis Charles .... Monmouth.
Sharman, William .... London.
Smith, John .... Banbury.
Taylor, William Henry ...... London.
Trick, William Borrow ...... Stoke Newingten.
Turner, Henry Prosser .... Ledbury.
Watson, William .... London.
Welton, Henry .... Coventry.
Westlake, John .... Brixton.

Preliminary Examination.

Certificates of Examination of the undermentioned were received in lieu of the Preliminary:—

Certificates of the College of Preceptors.

Hull, Walter .... Sutton.
Mann, William .... Leicester.

Certificates of the University of Cambridge.

Griffin, James Mold .... Eastbourne.
Robins, George Norman ...... Highgate.

Certificates of the University of Oxford.

Whewell, William Edmund .. Birmingham.
Williams, Frederick .... Bath.

BENEVOLENT FUND.

Subscriptions Received during January, 1873.

SUBSCRIPTIONS.

London.

	£	s.	d.
Attfield, Professor, 17, Bloomsbury Square, W.C.	1	1	0
Churchyard, Robert L., 112, Camden Road, N.W.	0	10	6
Doubell, James, 17, Archer Street, Notting Hill, W.	0	5	0
Forrest, Richard, 20, Cork Street, Bond Street, W.	1	1	0
Hampson, Robert, 205, St. John Street Road, E.C.	1	1	0
Heathcoat, Thomas, 30, Downspark Road, Hackney, E.	0	10	6
Humphreys, Richard, 9, Upper Belsize Ter., Hampstead*	0	12	6
Jones, Henry S., 139, Fulham Road, S.W.	0	10	6
Kernot, George Charles, 6, Chrisp Street, Poplar, E.	0	10	6
Lewinton, Alexander B., 14, Cleveland Street, W.	0	10	6
Meggeson, George	1	1	0
Plummer, George, 185, High Street, Peckham, S.E.	1	1	0
Rutter, Edmund Y., 35, Moorgate Street, E.C.	2	2	0
Thompson, George Alfred, 7, Poultry, E.C.	0	5	0

* Being one-half of extra charges made for drugs and medicines supplied after ordinary hours, and on Sundays, in accordance with a suggestion which appeared in the Pharmaceutical Journal.

Country.

	£	s.	d.
Alfreton, Robinson, Joseph Spencer	0	10	6
Arbroath, Milne, Patrick	1	1	0
Ashford, Ingall, Joseph	1	1	0
Aylesbury, Dickins, Rowland	0	5	0
,, Field, Henry	0	5	0
,, Turner, John	0	5	0
,, Wood, Edmund	0	5	0
Banbury, Falkner, Richard	0	10	6
Banff, Ellis, Bartlet	0	10	6
Bedford, Anthony, John L.	0	10	6
,, Ekins, John	0	5	0
,, Taylor and Cuthbert	0	10	6
,, White, John L.	0	5	0
Bishop's Stortford, Speechly, George	0	10	6
Birmingham, Lucas, Joseph	0	10	6
Blandford, Groves, Wellington E.	1	1	0
Brighton, Smith, Walter Henry	0	10	0
,, Robson, Thomas	0	10	6
Bristol, Ackerman, Theophilus	1	1	0
Burnham, Ellis, William	0	5	0
Cockermouth, Bowerbank, Joseph	1	1	0
Coventry, Hinds, James	0	10	6
Cranbrook, Sissmore, Henry T.	0	10	6
Croydon, Stannard, Frederick John	0	5	0
Diss, Cupiss, Francis	0	10	6
,, Gostling, Thomas P.	0	10	6
,, Smith, Thomas W.	0	5	0
,, Thrower, Edward A.	0	10	6
Doncaster, Atkinson, Stephen	0	10	0
Durham, Burdon, John	0	10	6
,, Hunter, Frederick N.	0	2	6
,, Rollin, John George	0	10	6
,, Sarsfield, William	0	10	6
,, Seawin and Wortley	0	10	6
Edinburgh, Brown, David Rennie	1	1	0
Edmonton (Lower), Jefferson, Thomas	0	10	6
Flint, Jones, Michael	0	10	6
Grantham, Gibson, John B.	0	10	6
Gravesend, Spencer, Charles	1	1	0
Guildford, Bingley, Frederick B.	0	10	6
,, Martin, Edward W.	0	10	6
,, Shepherd, George P.	1	1	0
,, Thompson, Thomas	0	5	0
Guisborough, Bancks, Alfred	0	10	6
Harleston, Muskett, James	0	10	6
Hastings, Bell, James A.	0	10	6
,, Wright, William John	0	10	6
Heckmondwike, Booth, John	1	1	0
Honiton, Turner, George	0	10	6
Hull, Grindell, John	0	10	0
,, Hammond, William H.	0	2	6
Hyde, Brocklehurst, James	0	5	6
,, Oldfield, Henry	0	10	6
Inverary, Rodger, John	0	5	0
Jersey, Ereaut, John, jun.	1	1	0
,, Millais, Thomas	1	1	0
Kendal, Bateson, Thomas	0	10	6
,, Hind, Thos. W. L.	1	1	0
*,, Metcalfe, John S.	0	5	0
,, Severs, Joseph	0	10	6
Kirby Lonsdale, Harrison, William	0	10	6
Landport, Tryon, William George	0	5	0
Leominster, Davis, David F.	1	1	0
Liverpool, Maskery, Samuel	1	1	0
Manchester, Jackson, Thomas	0	10	6
Maryport, Cockton, John	0	5	0
Matlock Bridge, Hodgkinson, John Samuel	0	10	6
Mayfield, White, Edward A.	0	5	0
Melbourne, Curtis, Charles	0	2	4
Needham Market, Harrington, Allen	0	10	6
Nether Stowey, Ham, John	1	1	0
Newport, Mon., Cherry, Edwin	0	10	6
,, Edmunds, James	0	5	0
,, Faulkner, Henry	0	2	6
,, Gratte, Henry J.	0	5	0
,, Jones, H. W. B.	0	5	0
,, Morgan, William	0	5	0
,, Pearman, Henry	0	10	6
,, Phillips, Jno.	0	10	6
,, Young, John	0	10	6
Newton Abbot, Poulton, John	0	10	6
Norwich, Arnold, Mrs.	0	5	0
,, Robinson, James	0	5	0
Northallerton, Warrior, William	0	10	6
Norwood (Upper), Prime, Thomas R.	0	10	6
Otley, Pratt, Richard M.	0	10	6
Portsmouth, Parsons, Wm.	0	10	6
Retford, Baker, William	0	10	6
Rugby, Garratt, John C.	0	5	0
,, Garratt, Samuel	0	5	0
,, Lewis, Thos. C.	0	10	6

	£.	s.	d.
Rye, Smith, Alfred W.	0	10	6
Sale, Smith, Allen	0	5	0
Scarborough, Smart, John	0	10	6
Sleaford, Heald, Benjamin	0	10	6
Southport, Ashton, William	0	10	6
,, Ellis, George	0	5	0
,, Sykes, Thomas H.	0	10	6
,, Walker, William Henry	0	10	6
Sowerby Bridge, Stott, William	0	10	6
St. Austell, Geldard, John	0	5	0
St. Day, Corfield Charles.	0	10	6
Stirling, Duncanon, William	0	10	6
Stockport, Shaw, Alex. H.	1	1	0
Stowmarket, Wright, Alfred	0	10	6
Teignmouth, Mandley, William R.	0	5	0
Tunbridge, Millidge, Thos. E.	0	10	6
Tunstall, Keightley, Joseph	0	10	6
Twickenham, Bishop, Thomas	0	10	6
,, Peake, Henry F.	0	10	6
,, Shelley, Henry	0	10	6
Wallingford, Payne, Sidney	1	1	0
Walton-on-Thames, Power, Edward	0	10	6
Wellingborough, Thorne, John	0	10	6
West Hartlepool, Cooper, S. H.	1	1	0
Whitehaven, Wilson and Kitchin	1	1	0
Winchester, Powell, Edward	1	1	0
Wyke, Drake, William	0	3	0
Wymondham, Skoulding, William	0	5	0

Provincial Transactions.

HALIFAX AND DISTRICT CHEMISTS AND DRUGGISTS' ASSOCIATION.

At a meeting of this society on Thursday, February 13th, Mr. Jonathan Jessop, president, in the chair, the treasurer read a report respecting the state of the finances, which showed a balance in favour of the societ, of £5. 15*s*. 10*d*. The report was adopted.

The President then drew the attention of the members to a circular referring to the Pharmaceutical Conference to be held at Bradford, and suggested that either individually or as an association the members might do something to assist the Local Committee in that town.

Mr. Farr was of opinion that the society should subscribe to the fund which is being raised, and stated that at the next meeting he would move that the sum of two guineas be voted for that purpose.

On the motion of Mr. Dyer it was resolved that the secretary take steps to ascertain the opinions of the country members as to substituting October for December in which to hold the annual meeting and dinner, so as to obtain a better attendance of members for the future.

Proceedings of Scientific Societies. *

PARIS SOCIÉTÉ DE PHARMACIE.

This society met on Wednesday, January 8th, when M. Stanislas Martin ceded the presidential chair to M. Regnauld, in the absence of M. Grassi, who was unable to attend. After the preliminary business M. Planchon read some letters which had been received from Messrs. Phoebus, of Giessen, and Flückiger, of Bern, relative to the proposed Universal Codex. A discussion ensued, and the society added MM. Buignet, Lefort, Mayet, Jungfleisch, Duquesnel and Méhu to the commission already nominated to consider this subject. M. Bussy was also nominated president of this commission.

M. Limousin brought under the notice of the society a new method which he had devised for the administration of pulverulent medicines. It consisted in enclosing them in envelopes of unleavened bread about the size of a five-franc piece, and closed at the edges. Some specimens were shown containing sulphate of quinine, subnitrate of bismuth, and rhubarb.

M. Jungfleisch communicated to the society the result of his researches upon the various transformations of tartaric acid and of the synthesis of that body by means of bibromosuccinic acid. Starting with a substance of mineral origin, so to speak, and which did not possess rotatory powers, he had obtained tartaric acid, having an action upon polarized light.

M. Buignet called attention to the importance of this result which might lead at some future time to the synthesis of the active alkaloids.

M. Bourgoin having remarked that he had not been able to obtain bibromosuccinic acid at a temperature below 170° C., M. Jungfleisch said that by taking the precaution of placing the tubes transversely instead of vertically, in the oil bath, he had obtained it at 130° C.

M. Latour read a note upon the preparation of the syrups of tolu and of tar.

At the sitting of the society on Wednesday, February 5th, under the presidency of M. Regnauld, a note from M. Husson was read upon a combination of iodine and blood, and proposing the therapeutic employment of iodine combined with hæmatoglobulin, a dry product in the form of spangles, and according to the author very easily assimilated. M. Coulier was appointed to report upon the note and the product.

M. Saint-Martin presented a specimen of concrete aromatic oil, extracted from Tonqua beans, which he had had occasion to prepare during a comparative study of the wild and cultivated beans.

M. Boudet in calling the attention of the society to the subject of propylamine, expressed a regret that medical men should be using so variable a substance, and proposed that it should be remitted to the investigation of a commission.

M. Adrian shortly described the communication that he had made to the Société de Thérapeutique (printed at p. 671); after which the proposition of M. Boudet was agreed to, and Messrs. Baudrimont, Bourgoin, Jungfleisch, Adrian, and Boudet were nominated members of the commission.

PARIS SOCIÉTÉ DE THÉRAPEUTIQUE.

Sulphovinate of Quinine.

At the meeting of the above society on Friday, January 24th, M. Limousin exhibited various specimens of Sulphovinate of Quinine. One, which was in the form of scales, was obtained by decomposing sulphovinate of baryta with sulphate of quinine. Another, which was very white and well crystallized, was obtained by treating an alcoholic solution of sulphate of quinine with an alcoholic solution of sulphovinate of soda. M. Limousin pointed out that this last process, besides yielding a very fine product, had the great advantage of avoiding the use of a salt of baryta in the preparation, especially since the poisonous effects of baryta would be very dangerous in hypodermic injections. He said that he had profited by the labours of M. Schlagdenhauffen, professor in the new School of Pharmacy at Nancy,—who had, in a recent paper on the comparative solubility of the salts of quinine, indicated the sulphovinate as dissolving in the largest proportions,—to prepare the present specimens as especially suitable where it was desired to administer a large dose of quinine subcutaneously. The sulphovinate is so soluble that it deliquesces if exposed in a humid atmosphere, and he thought it would be of great advantage to have a salt sufficiently soluble without the necessity of having recourse to an acid.

M. Bourdon said that he had successfully employed sulphate of quinine acidulated by tartaric acid in subcutaneous injections. The solution so obtained did not provoke inflammation around the puncture, as was often the case when a solution acidulated by sulphuric acid was used.

M. Constantin Paul said that by the use of the sulphovinate of quinine, a very large dose of the alkaloid could be administered; five or six times the quantity of water, even when acidulated, being required to dissolve the sulphate. He had found a solution of the sulphovinate to keep well without undergoing alteration, and it presented the great advantage that it could be used immediately in cases of urgency.

M. Bourdon remarked that salts of quinine administered hypodermically were rapidly absorbed, and were found in the urine much more quickly than when they were administered by the mouth.

PROPYLAMINE AND HYDROCHLORATE OF PROPYLAMINE.

M. Adrian presented to the society specimens of propylamine or trimethylamine, and the hydrochlorate of those bases. The first of these specimens was a solution of propylamine, or rather of trimethylamine, a compound of the ammonia type, which may be looked upon as an artificial alkaloid (C_3H_9N). It may be obtained from herring brine, from ergot of rye, and also from the *Chenopodium vulvaria*, which possesses in a high degree the repulsive and characteristic odour of this compound. It is also found in urine and putrefied blood. M. Adrian said that when this product was obtained from herring brine, which contained it in considerable proportion, it was always accompanied by a large quantity of ordinary ammonia. When commercial propylamine was saturated with hydrochloric acid, a mixture of hydrochlorate of trimethylamine and chloride of ammonium was produced. Moreover, the commercial liquid was far from being always of the same degree of concentration, different specimens having yielded very variable proportions of crystallized salt. He thought, therefore, for medical purposes, there would be great advantage in preparing the hydrochlorate of trimethylamine, free from chloride of ammonium, and he exhibited a definitely crystallized specimen which had been prepared in the laboratory of the Société Française. He showed that when its solution was treated with caustic potash, the characteristic odour of propylamine was given off without ammonia; while from a commercial specimen of propylamine, ammoniacal vapours were plentifully disengaged.

M. Dujardin-Beaumetz, reported that he had repeated with success the experiments of Professor Awenarius, of St. Petersburg, and Dr. G. Namias, of Venice, who have recommended this substance in the treatment of rheumatism: he expressed his agreement with the remarks of M. Adrian, and said that the difference in the degree of concentration of the commercial liquid had attracted his attention. He was desirous to have a pure and definite preparation, in order that he might complete his therapeutic experiments. If the hydrochlorate of trimethylamine should prove to possess the same properties as the solution, which was very probable, there would be no doubt that it should have the preference.

M. Martineau remarked that he had administered this remedy to several patients at the Hôtel Dieu; they had been able to take the solution in doses of two grammes per day, and the results obtained were such as to encourage him to continue his experiments.

ROYAL INSTITUTION OF GREAT BRITAIN.

Friday, January 17th, 1873.

ON THE OLD AND NEW LABORATORIES AT THE ROYAL INSTITUTION.

BY WILLIAM SPOTTISWOODE, ESQ., LL.D., M.A.

(*Concluded from page* 656.)

Of Faraday's successor, John Tyndall, I am greatly at a loss how to speak. In this place his presence seems so near to us, his thoughts so subtle, his words —even when rung back to us from those busy cities far away on the other side of the Atlantic—so familiar and yet so stirring, that it behoves us that ours should be wary and few. Few men have brought so large a burden and bulk of contribution to the common stock of knowledge; but still fewer have inspired in his hearers so strong a love, such ardent enthusiasm for the subjects of his research.

It is now twenty years since Professor Tyndall began his researches in our laboratory. During the first thirteen years he produced no less than thirteen papers, which were printed in the 'Philosophical Transactions:' on Sound, on Diamagnetism, on Glaciers and Ice, on the Radiation and Absorption of Heat, and on Calorescence.

In these he established the important fact that if the various gases be arranged in order according to their power, first of radiating heat and secondly of absorbing radiant heat, the order will be the same in both cases. He further proved that the chief absorbing action of our atmosphere on non-luminous heat is due to its aqueous vapour. He applied his discovery to the explanation of many meteorological facts, *e.g.*, the great daily range of the thermometer in dry climates; the production of frost at night in the Sahara; the cold in the table-lands of Asia, etc.

He discovered also the means of separating the invisible from the visible radiations, and proved that in the case of the electric light the former is no less than eight times as powerful as the latter. He also made the daring experiment of placing his eye at a focus of dark rays capable of heating platinum to redness.

Since 1866 his attention has been largely occupied in examining the action of heat of high refrangibility (instead of low), as an explorer of the molecular condition of matter.

In this investigation one obstacle to be overcome was the presence of the floating matter in the air. The processes of removal of these particles became the occasion of an independent research, branching out into various channels; on the one hand, it dealt with the very practical problem of the preservation of life among firemen exposed to heated smoke; and, on the other, it approached the recondite question of spontaneous generation.

He subjected the compound vapours of various substances to the action of a concentrated beam of light. The vapours were decomposed, and non-volatile products were formed. The decompositions always began with a blue cloud, which discharged perfectly polarized light at right angles to the beam. This suggested to him the origin of the blue colour of the sky; and as it showed the extraordinary amount of light that may be scattered by cloudy matter of extreme tenuity, he considered that it might be regarded as a suggestion towards explaining the nature of a comet's tail.

[The lecturer then exhibited the polarization of light scattered by small particles suspended in the medium traversed by a beam from the electric lamp, employing for the purpose the chromatic effects due to the circular polarization of quartz.]

His volume of contributions to molecular physics in the domain of radiant heat, which contains only his original investigations on this subject, would alone suffice to show what is doing in the laboratory of our institution.

If we compare him to Faraday at the same time of life, he has still many years of intellectual energy, the conversion of which into its scientific equivalent may, perhaps, be effected within these walls.

No one has regretted the destruction of the laboratory of Davy and of Faraday more than Professor Tyndall. He almost prayed for the preservation of the place where their discoveries had been made; but as soon as he saw that in our struggle for existence such material aids as improved buildings would conduce alike to the progress of science and to the permanence of the institution, he withdrew his objections, and threw all his powers into making the new laboratories as perfect as possible for the good of his successors.

I add a few words on the reasons which led the managers to recommend the rebuilding our laboratories, and the consequent demolition of the place where the great discoveries that I have touched upon were made. In the opinion of those best qualified to judge, our chemical laboratory was badly ventilated, badly lighted, badly drained, and quite unfit to be occupied for many hours daily. It was probably the very worst, and certainly all but the worst chemical laboratory in London; and compared with more modern ones both at home and abroad, it was nowhere. The physical laboratory had remained for nearly seventy years in its original state. At first it was said to be equal to any laboratory; but then there were hardly any in existence in this country; and during the last few years such splendid edifices have arisen in London, in Oxford, in Cambridge, in Manchester and in Glasgow, and elsewhere, that the laboratory of Davy, of Faraday, and of Tyndall was much inferior to the private laboratories of the professors who carry on their course of instruction in public rooms of still greater size and extent of resource. The main purpose of our laboratories is research, and instead of offering by their excellence an inducement to professors to come and to stay, the one was a mere makeshift, the other a noble relic. Neither offered facilities which were not offered in a larger measure elsewhere. And those only who know what is going on both at home and abroad can form an adequate idea of the competition which, in this respect alone, will prevail for a generation to come.

By the construction of new laboratories this material disadvantage will be removed. Future professors will have buildings constructed to aid research. Your liberality has spared no judicious expense; and, so far as the site would admit, our laboratories will be as perfect as the skill of our architect and the advice of our professors can make them.

In conclusion, let me lay before you what must still be done, in order that there may be earned for the new laboratories a reputation comparable with that which has hitherto proved both our glory and our support.

Our first and foremost object, beyond bricks and mortar, and money and apparatus, must be to find a succession of professors of the old type; men who love research. But even Faraday would perhaps have been compelled to leave us, on account of the smallness of the sum which we could afford him, had not the endowment of the chemical chair, with £100 a year, by the late Mr. Fuller, happily intervened. This timely endowment was probably a critical turning-point in the history of the institution. We may not easily find successors worthy of the great names who have gone before them; but we may do much toward preventing mistakes in future appointments by keeping steadily in view, that the promotion of natural knowledge is our main object; and that instruction and amusement, and brilliant audiences are all secondary to our principal purpose. Not that these subsidiary purposes are to be neglected or despised;—and I, as your treasurer, should be the last to undervalue them, but we feel confident that if the main purpose is effected, all the others will follow as a simple sequence.

Secondly, when we have found professors of the type that I have described, our next need is that we may be able, from independent resources at the disposal of the institution, to offer them a remuneration which, all things taken into account, shall be an equivalent to what they would receive elsewhere. So that neither Government appointments, nor University professorships, nor the liberality of mercantile men, should be able to lure them from the path of discovery, to tuition, to arts, or to manufactures.

The one act of wisdom, among the many aberrations of an eccentric member of Parliament, saved Faraday to us, and thereby, as seems probable, our institution to the country. The liberality of a Hebrew toy-dealer* in the East of London has made the rebuilding of our laboratories possible.

It is said that Mr. Fuller, the feebleness of whose constitution denied him at all other times and places the rest necessary for health, could always find repose and even quiet slumber amid the murmuring lectures of the Royal Institution; and that, in gratitude for the peaceful hours thus snatched from an otherwise restless life, he bequeathed to us his magnificent legacy of £10,000. If this evening's discourse shall have ensured one such blissful hour to any of his audience, your lecturer's efforts will not have been altogether in vain. But to each such happy individual he would express the hope that, as you have resembled Mr. Fuller in your experience of life, so may you emulate him in your liberality at death. In short, I would conclude almost in the words of old Bishop Andrews: Unum operæ meæ pretium abs te peto, hoc autem vehementer expeto, ut mei peccatoris meorumque in precibus interdum memor sis. Which being interpreted is:—

For these my efforts I beg but one thing in return, and this I beg most earnestly, *viz.* that you will now and then remember me a sinner against your patience and forbearance in your prayers, and that you will also be mindful of our professorships in your wills.

The following table of the principal items of original work done by our professors, taken in connection with their long series of laboratory notes, forms a monument of the intellectual activity, the manual dexterity, and the persevering industry, developed in the laboratories of the Royal Institution:—

Davy.

1806	Chemical Agencies of Electricity.
1807	Decomposition of Potash.
1810	Chlorine.
1812	Discourse on Radiant or Ethereal Matter.
1813	Iodine.
1815–6	Researches on Fire-damp and Flame.
1817	The Safety Lamp.

Faraday.

1820	Alloys of Steel.
1821	History of Electro-magnetism.
,,	Magnetic Rotations.
1823	Liquefaction of Chlorine and other Gases.
1825–6	New Compounds of Carbon and Hydrogen.
1825–9	Manufacture of Optical Glass.
1831	Vibrating Surfaces.
,,	Magneto-Electricity.
1832	Terrestrial Magneto-Electric Induction.
1833	Identity of Electricities.
1834	Electro-Chemical Decomposition.
,,	Electricity of the Voltaic Pile.
1835	The Extra Current.
1837–8	Frictional Electricity.
,,	Specific Inductive Capacity.
1845–8	Magnetization of Light.
,,	Lines of Magnetic Force.
,,	Magnetic Condition of all Matter.
,,	Diamagnetism.
,,	Magne-Crystallic Action.
1849–50	Magnetism of Flame and Gases.
,,	Atmospheric Magnetism.
1856	Relations of Gold and other Metals to Light.
1860	The Regelation of Ice.

* Mr. Alfred Davis, after paying his composition of sixty guineas, as a Member of the Institution, and three annual donations of twenty guineas for the promotion of research, at his death in 1870 bequeathed £2000 for the same purpose. His deafness prevented him from deriving any benefit from the lectures.

Tyndall.

1853	Transmission of Heat through Organic Substances.
1854	Vibrations due to Contact of Bodies at Different Temperatures.
1855	Researches on Diamagnetic Force.
1856	Slaty Cleavage.
1857-8	Physical Properties of Ice and Glaciers.
1859-63	Absorption and Radiation of Heat by Gases.
1865	Calorescence.
1866-7	Action of Heat of high Refrangibility.
1868-9	Formation of Clouds.
,,	Colour and Polarization of the Sky.
1870	Smoke and Dust Respirator.

Frankland.

1863-6	Synthesis of Acids of the Lactic Series.
1863	Mercury-methyl, Mercury-ethyl, and Mercury-amyl.
1864	Transformation of Organo-Mercury Compounds into Organo-Zinc Compounds.
,,	Combustion of Iron in Compressed Oxygen.
1865	Synthesis of Acids of the Acrylic Series.
,,	Synthesis of Fatty Acids.
1866	New Organic Radical Oxatyl.
,,	The Source of Muscular Power. Potential Energy in various kinds of Food.
1867	Source of Light in Flame. Effect of Pressure upon Luminosity of Flame.

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

The Juries Bill.

In moving the second reading of the Juries Bill on Monday night, the Attorney-General stated that, although he had introduced the Bill in exactly the same form in which it left the Select Committee, he should feel bound to take the sense of the House upon two points in which he differed from their decision. He considered that in every common jury there should be a definite proportion of higher educated men to that of what he might call less educated men. The other point was that he did not think it necessary to insist upon unanimity in juries as to their verdict except in cases of treason, treason-felony, and murder.

In the discussion which followed, the proposal in the Bill to reduce the number of jurors from twelve to seven, was opposed by Mr. Chambers, Mr. James, and Mr. Alderman Lawrence. Eventually the Bill was read a second time and set down for committee on Thursday, with the understanding that it should not come on, but that the Attorney-General should then fix a day which would meet the wishes of the House.

In the Bill, which has just been issued, the portion of the clause relating to the exemption of chemists and druggists reads as follows:—"Apothecaries certificated by the court of examiners of the Apothecaries' Company, dental surgeons certificated by the board of examiners in dental surgery of the Royal College of Surgeons in England, and all registered medical practitioners and registered chemists, if actually practising as apothecaries, dental surgeons, medical practitioners and registered chemists respectively."

Supposed Death of a Pharmaceutical Chemist from an Overdose of a Narcotic.

On Tuesday, February 11, an inquest was held at Carlisle, before Mr. J. Carrick, deputy coroner, on the body of Mr. William Moss, pharmaceutical chemist, fifty-three years of age. Mr. Thomas Moss, a son of the deceased, said he was called by his mother about a quarter to four on Sunday morning to see his father, who was then in bed breathing heavily. His father occasionally, though not habitually, took a dose of compound tincture of chloroform when out of health, but he never took more than a drachm. He complained of a pain in his side on Friday, but was in his usual health on Saturday and continued in the shop all day. He was depressed in mind during last week, but witness did not think that his mind was affected.

Mr. Herbert Page said that he saw the deceased at twenty minutes past four, at which time he was in a state of perfect insensibility, and all the other symptoms were such as to induce the belief that he was poisoned by opium. The stomach pump was tried, but he did not expect much result from that, as a sufficient time had evidently elapsed to allow the opium to pass through the stomach. Antidotes were used and every effort made to arouse Mr. Moss from his state of coma, but none of them made the slightest impression upon him. His breathing gradually became worse and at times stopped altogether, when artificial respiration was applied. Mr. Page stayed at the bedside till half-past seven, when he left, sending a message to Dr. Hay to replace him. He was called again before eleven, when Mr. Moss was dead. On Monday afternoon he made a *post-mortem* examination of the body. He found the brain, lungs, heart, liver, and kidneys all healthy, but extremely congested. There was no poison found in the stomach, and no trace either of opium or morphia was found in the fluid drawn from the stomach on Sunday morning, but, as he had said before, they could hardly expect that when they applied the pump.

The Deputy-Coroner: Can you form any opinion as to the cause of death?

Mr. Page: I believe it was caused by opium poison, both from the symptoms before death and from the *post-mortem* examination. The extreme congestion of the viscera and their perfect healthiness were such as we would find under those circumstances, and the death also would take place during coma.

A brief consultation then took place between the Coroner and the jury, the former suggesting that the verdict should be open.

The Foreman: From what I know of him he was not a man who would take poison intentionally.

The Coroner's suggestion was agreed to, and a verdict was returned that the deceased died from an overdose of opium or some other narcotic poison, but how it was taken there was no evidence to show.

The Sale of Poison in Ireland.

On Friday, February 14th, Agnes Munroe was charged at the Belfast Police Court with attempting to commit suicide by poison, and there was also a summons against Dr. George Smith, charging him with having sold poison without complying with the requirements of the Act of Parliament regulating the sale of poisons in Ireland.

It was deposed that the prisoner went to a neighbour's house after quarrelling with a companion, and was seen to drink something out of a small bottle, declaring her intention to poison herself. Another bottle was taken from her by force. The prisoner became very faint and ill, but afterwards recovered.

Head Constable Irwin produced the two bottles which were taken from the prisoner, one of which had not been opened at all, and contained stuff for destroying vermin. He could not produce any evidence to show what had been in the bottle out of which the prisoner took the draught.

Dr. Smith said that Dr. George Smith, against whom the summons was issued, was his son, and acted as his deputy in their Donegal Street establishment. His son could give evidence with regard to the sale, and he himself could give evidence as to what was in the bottle out of which the prisoner took the draught. The defendant had not a drop of poison in his establishment, nor did he ever keep what was strictly speaking poison, such as corrosive sublimate or chloroform; therefore, the draught could not be chloroform. He, some days ago, sent his son over a bottle of chloric ether, when preparing a cough mixture for a gentleman who called. The bottle remained with Dr. Geo. Smith, and the chloric ether which it contained was made up of one drachm of chloroform to twenty drachms of spirits of wine. The chloric ether was quite innocuous, and in the full bottle produced there would not be 1-19th part of a drachm; therefore, it was perfectly innocuous, and would be so even to a child. Chloric ether was not precluded under the schedule of the Act of Parliament, and the Act of Parliament did not speak of chloroform preparation in the same way that it did of the preparation of opium.

Dr. George Smith said that the prisoner bought both bottles of him, and said that she wanted to poison rats.

Dr. Smith said he did not know if the vermin destroyer would kill human beings or not, but he thought it might. It would require to be spread upon bread for rats, and it would have been very difficult to have taken it. Whether the chemicals in question came under the Act of Parliament or not, he would not allow any of them to be sold again without the proper and necessary caution. As to the vermin destroyer, it was sent through the country by the maker in London just as produced there.

The prisoner was discharged, and the explanation of Dr. Smith being deemed satisfactory, the case was not proceeded with.

Inquiry at Sheffield.

An inquest was held on Friday, February 14th, at Sheffield, upon the body of a young woman, who it was supposed had died from the result of attempting to procure abortion. It appeared from the evidence that three weeks since deceased, appearing to be unwell from a cold, medicine was obtained from Mr. Collier, druggist, of Sheffield Moor, who was attending her father. Mr. Collier then saw her every day until the previous Tuesday, when a medical gentleman was called in, but she died the same evening. There was proof that deceased had had a miscarriage. In a *post-mortem* examination no marks of violence were observed, and it was found that death had been caused by intro-peritonitis.

On behalf of Mr. Collier it was stated that he was ready to answer any question the jury might think proper to put to him.

The coroner said there was no complaint at all against Mr. Collier's treatment of the woman, and the jury thought it was not necessary to call Mr. Collier.

The coroner, in summing up, said he was glad the surgeons agreed as to the cause of the death, as at first the case looked a rather suspicious one. Now, however, there did not appear to be blame attaching to any person. The question did not come before them whether Mr. Collier was justified in setting himself up as a surgeon and attending persons who had fever, as Mr. Collier had done, and he should advise them to return a verdict in accordance with the medical testimony. Accordingly the jury returned a verdict "That deceased died from intro-peritonitis."

Alleged Acceleration of Death by a Cough Mixture.

An inquest was held at Grange, Ulverston, on Wednesday, the 29th ult., before Mr. Holden, coroner, upon the body of the infant son of a farm labourer.

Eleanor Booth deposed: Deceased was my child, and he was ten weeks old. He was a very healthy child, but last Thursday he had a little bit of a cold, and I went to the shop of Mr. Downward, the druggist, and I asked for something for the child's cough. A bottle was given to me by some one in the shop, containing some mixture. It was given to me by Mr. Herbert George Forbrooke. He told me to give the child a teaspoonful two or three times a day. On Thursday evening, about six o'clock, I gave the child the first teaspoonful. It slept all Thursday night and all day on Friday, and to about one o'clock on Saturday morning. I went up to its bed four or five times on Saturday to try to rouse it in order to feed it, but it just opened its eyes and went to sleep again. It went without the breast or any food the whole of Friday. From the time it awoke on the Saturday morning it sucked the whole time until I got up at five minutes to six. I then gave it another teaspoonful. It slept all day on Saturday, and until about twelve o'clock on Saturday night. About five I tried it with the breast, but it just gave a draw, and went to sleep again immediately. It was very cross on the Sunday morning, and between four and five o'clock I gave it another teaspoonful of the mixture. It slept until it died at two o'clock in the afternoon. I sent for Mr. Beardsley about half-past nine on Sunday morning. His son came first, and examined it, but did not treat it in any way. He ordered me to give it a little brandy and water, and I did so. About half-past one o'clock he came again with the assistant, and gave it a teaspoonful of some medicine that had previously been sent up. The child died while they were there. During the Friday its breathing was short, but natural. During the Saturday its breathing was noisy, and there was rattling on its chest. On Sunday morning its breathing was short and noisy, and for some time before it died I could hardly tell whether it was living or dead. It opened its eyes before its death, and I tried to see if it was sensible to my touch, but it was not. Its hands were clenched from shortly after it took its first dose of the mixture to the time of its death.

Herbert George Forbrooke, of Ulverston, deposed: I am an apprentice with Mr. Downward, druggist, and have been with him two years and two months. I do not remember Mrs. Booth coming to the shop on the Thursday named. The bottle produced came from our shop, judging from the label and the bottle. I did not compound the syrup. It is kept in a pint bottle in the shop, and given out in small quantities to the customers. Either Mr. Downward or his assistant would make up the mixture. The pint bottle at present in use would be made up on Friday or Saturday week—the week before last Saturday. Looking at the mixture in the bottle, and judging from the colour of it, I would not give it to any customer for a child ten weeks old—if I knew what I was doing.

At the conclusion of this witness's testimony, the Coroner decided to adjourn the inquest till Friday, for the production of further evidence.

The inquiry was resumed on Friday last, when

Mr. C. H. Downward gave evidence as to the nature of the cough mixture sold at the shop of Mr. John Downward. Amongst other ingredients were two ounces of the syrup of poppies.

Dr. Lowther, of Cartmel, said he had made a *post-mortem* examination of the body. He ascribed death to congestion of the lungs with attendant congestion of the brain, which he said in all probability arose from natural causes, accelerated by the mixture administered, the dose being larger than ought to have been given to a child only ten weeks old.

Verdict accordingly.

Poisoning an Hospital Patient by Mistake.

On Saturday, February 15th, Mr. Bedford held an inquest at St. George's Hospital, touching the death of Mary Geary, aged 40 years, who died at the hospital on Thursday morning, from the effects of a dose of carbolic acid, administered to her in mistake for senna by Sarah How, a nurse in the hospital. Mary Keefe identified the body as that of her mother, whose husband is at present abroad.

Harriet Bord, nurse, said she had charge of the ward in which deceased lay. It was part of her duty to administer and to order the administering of medicines under the direction of the head nurse. On the morning of the 13th, when nurse How came to give her report, she inquired whether the draught of senna ordered for the deceased had been administered. How said she had forgotten it, but would administer it immediately. She went into the ward for that purpose, but returned in about a minute, crying excitedly, "Come, I have given the patient carbolic acid." Witness at once hurried to the ward, and ordered some warm water with salt in it, which was brought immediately, but they could not succeed in making deceased swallow it. In the meantime she summoned Mr. Brabant, the resident physician, who arrived in a few minutes. He ordered an emetic and about an ounce of olive oil, the greater portion of which was swallowed by deceased. Dr. Barclay came in soon afterwards, and by his orders the stomach-pump was applied repeatedly, but without effect, and deceased gradually sank, dying at five minutes to ten.

By the Coroner: The medicines are kept in a cupboard in the wall, the carbolic acid being generally placed at the bottom. All the bottles were labelled. Nurse How had 24 patients to attend to. She had been up all night, her hours on duty being from 9.30 p.m. to 9.30 a.m. Should certainly say that nurse How was sober.

Louisa Taylor, another of the nurses, said that she filled both bottles on Wednesday. They were exactly alike, but had each a proper label. (The bottles were then produced; they were precisely similar in make and as to the colour of the contents.)

Sarah How, the implicated nurse, having been duly cautioned, then volunteered a statement on oath to the effect that she found the bottle on the window-ledge above the cupboard, which was a usual place for medicines, but a very unusual place for carbolic acid to be kept. It unfortunately never occurred to her to doubt that the bottle contained senna. She poured out a measure for the deceased, who drank off a portion of the liquid, and then stopped suddenly; upon which she examined the bottle carefully and found the contents to be carbolic acid.

Mr. Todd, secretary to the institution, admitted that bottles of carbolic acid were left lying about in the manner described, but added that the authorities expected the nurses carefully to examine the labels.

The Coroner, having summed up the evidence, the jury, after some deliberation, returned a verdict exonerating the nurse from criminal neglect, at the same time strongly censuring the hospital authorities. The verdict was received with some applause.

The Coroner suggested that carbolic acid should be kept in strong stone bottles, which could be readily distinguished from those containing medicine.—*Standard.*

Poisoning by Essence of Bitter Almonds.

The Wandsworth and Battersea District Times states that on Monday, February 10th, an inquest was held at Battersea on the body of a woman who had died the previous Friday from the effects of essence of bitter almonds, taken while in an unsound state of mind. It was proved that deceased had previously threatened to commit suicide, and a verdict in accordance with the evidence was returned.

Poisoning by Spirit of Salt.

On Saturday, February 15, an inquest was held at the North Riding Pauper Lunatic Asylum on a patient who had drunk some spirit of salt which he found in a tinner's shop on the premises during the absence of the man in charge. Medical assistance was obtained and the stomach pump used, but the patient died a few hours afterwards. It was stated that the deceased was not a suicidal patient, but would eat or drink almost anything that came in his way. A verdict of accidentally poisoned was returned, and the man who had left the poison accessible was cautioned.

Suicide by Vermin Killer.

A case is reported from Driffield in which a young girl aged twelve years committed suicide by taking some Battle's Vermin Killer that had been purchased by her mother. From the evidence it appeared that the child assigned as a reason that she had been beaten by her mother, but there does not appear to have been any cruelty exercised. A verdict was returned accordingly.

Obituary.

WILLIAM MOSS.

On Sunday the 9th inst., Mr. William Moss, Pharmaceutical Chemist, English Street, Carlisle, died suddenly at the age of 53 years. Mr. Moss was the local secretary of the Pharmaceutical Society for that city, and much respected by his brother tradesmen and friends. He was always anxious and desirous of advancing the interests of pharmacy, as instanced by his exertions as local secretary, and also as honorary secretary of the recently formed Carlisle Chemists' Association. In connection with the latter, he undertook to conduct classes in materia medica and botany, but his labours, we regret to say, have been cut short by an untimely death under the distressing circumstances recorded in another column.

Notice has also been received of the death of the following:—

On the 18th February, 1873, Mr. David Russell, Chemist and Druggist, of Dundee. Mr. Russell was one of the Vice-Presidents of the British Pharmaceutical Conference on the occasion of its visit to Dundee in 1867, and exerted himself energetically to secure the success of the meeting.

On the 2nd January, 1873, Mr. Henry Jenkin Bennetts, Chemist and Druggist, of Helston, Cornwall.

Reviews.

A Handbook of Chemical Technology. By Rudolf Wagner, Ph.D., Professor of Chemical Technology at the University of Würtzburg. Translated by William Crookes, F.R.S. J. and A. Churchill.

So much has been said and written lately on the subject of technical education in England, and so many fears have been expressed of our being beaten in the race for commercial pre-eminence by our continental rivals, that the appearance of an English translation of Wagner's Chemical Technology is sure to create considerable interest. English literature is indeed not deficient in excellent works on technology, but, considering the enormously rapid development of applied science at the present day, it is obvious that a very few years are sufficient to render the best treatises on such subjects practically obsolete.

To a certain extent, general works on technology must always be behind the time, since they can only deal with those processes which have been patented or otherwise published by their inventors, and, in a vast number of cases, manufacturers find it more profitable to keep secret the methods of which they have become possessed by experimental investigation, and which give them an advantage over competitors. And even in other cases, a considerable interval must, of course, elapse between the original publication of new inventions and their incorporation in a work of this kind. To take an instance for the purpose of illustrating our remarks: a few years ago the art of dyeing underwent an extensive revolution, owing to the introduction of the coal-tar colours. Many dye stuffs which up to that time had been largely employed suddenly became practically useless, since they were unable to compete with the far finer aniline colours, to the use of which, moreover, fashion gave an enormous impetus. Now it is self-evident that no consumer of these articles could have afforded to neglect the study of them until such time as a complete treatise on the subject should be produced. It would be only in proportion to his avidity in seizing the earliest opportunities of obtaining information, that he would be able to keep his position at all under the severe strain of competition to which every manufacture is at the present day exposed. But this is not all; every manufacturer knows that a laborious attention to the most minute details of his operations is an essential element of success. Now, in a general work on technology, details are almost necessarily omitted; the reasons being, first, want of space; and, secondly, the fact that, as a rule, it is only those who have the practical conduct of the operations who can at all appreciate their practical difficulties. Indeed, so much is this the case that many processes proposed by men eminent in pure science, and apparently perfect both on paper and in the laboratory, have, when attempted on a manufacturing scale, been found so beset with difficulties that they have either been abandoned altogether, or have lain in abeyance till some one combining practical skill with theoretical knowledge (a rare combination by the way) has taken them up and succeeded in overcoming the obstacles. A third objection to such manuals is that to every manufacturer the bulk of their contents will be utterly irrelevant. An iron master does not require information upon brewing, or a tanner upon the making of gunpowder.

These remarks, while applying to technological works in general, are specially applicable to the book before us. Written by a professor of chemistry in a German university, it is impossible to assume a practical acquaintance with many of the branches with which it deals. Indeed, it is hardly surprising that the subjects should be treated very superficially considering the large extent of ground which has been enclosed. This will, perhaps, be best seen from a very brief summary of its contents. The first division consists of chemical metallurgy, and includes the various methods of obtaining and applying the metals,—iron, steel, cobalt, nickel, copper, lead, tin, bismuth, zinc, cadmium, antimony, arsenic, mercury, platinum, silver, gold, manganese, aluminium, and magnesium, with most of their commoner compounds, and a short section on electrometallurgy. The second division treats of the alkalies, acids, and non-metallic bodies, explosive compounds, etc. The third division,—glass, porcelain, pottery, bricks, mortar, and cements. The fourth,—vegetable substances, fibres, paper, starch, sugar (cane, beet, and grape), fermented liquids, bread, vinegar, wood, tobacco, essential oils, and resins. The fifth,—animal substances, silk, wool, leather, glue, phosphorus and lucifer matches, animal charcoal, milk, and meat. The sixth,—dyeing and calico printing, including the manufacture of the coal-tar colours. The seventh,—artificial illumination. The eighth,—fuel and heating apparatus.

This has been crammed (for we can use no other word) into a book of 745 pages; it need hardly, therefore, be a matter of surprise that the omissions are both numerous and important. A great deal more might, however, have been done to increase the value of the work if old and superseded processes had been omitted and replaced when possible by more modern ones. For instance, the space occupied by the mention of Heaton steel, the production of which has, we believe, been entirely unsuccessful, might have been more profitably used for a description of the Danks' puddling furnace, the use of which bids fair to revolutionize the manufacture of wrought iron; and Miller's admirable chlorine process for toughening gold certainly deserved more mention than two lines, while the obsolete methods of refining by antimony or sulphur occupy ten times as much.

This, however, is not the only fault in the book. The omission of details and processes may diminish its value, but actual errors are a more serious matter. A few only out of many can be mentioned. In the description of the Bessemer process, on p. 28 (a very short one considering the importance of the subject), first, "egg-shaped vessels made of boiler plate converters" is rather unintelligible; then, we never saw a converter with "five $\frac{3}{4}$ inch wide fire-clay tubes projecting through the bottom," generally, at least twenty tuyères are used, each of them pierced by numerous channels; thirdly, the apparatus is *not* (in England at least) placed in close proximity to a blast furnace, but the pig iron, which is generally analysed previously, is melted in a cupola before running into the converter; fourthly, there is no fire-clay plug in an aperture at the bottom of the converter, the iron being poured out at the mouth when the operation is finished.

Another instance, p. 112. We think any student would be puzzled by the following sentence and equation:—

"α. By the fusion of the potassium manganate and chloride of potassium—

$$\text{“}6\,MnO_2 + 2\,KClO_3 + 12\,KOH = (3\,K_2MnO_4) + KCl + 6\,H_2O.\text{”}$$

Or, again, p. 91:—

$$\text{“}Mg\,Cl_2 + Hg\,O = HCl + MgO.\text{”}$$

Numerous instances of this sort of thing might easily be pointed out. In fact, nothing so conspicuously indicates carelessness in editing as errors and misprints in formulæ. They are just the points which do not catch the eye on a hurried perusal, and for that very reason require to have more attention directed to them. We do not know how far the original is defective in this respect, but the translation evinces a serious want of that care which a scientific work, above all others, needs.

Whilst on the subject of the defects in the work, we may mention a few more. One is the almost entire absence of references to original sources of information, which is the more to be regretted as a considerable proportion of the book is evidently compiled from original publications. Another is the not unfrequent employment of unusual or little known technical terms without explaining them. The term "abraum salts," on p. 119, will puzzle a good many people.

But we must not be understood to condemn the book completely. Although we certainly consider that the hope expressed in the preface, that it will merit the confidence of the manufacturer and student, has not been fulfilled, yet there is a large class of readers who require information on technical subjects without any intention of making a direct and practical use of it. Science is every day becoming more and more incorporated with our ordinary life, so that in one way or another every one is brought more or less directly into contact with it. A work of this kind places within the reach of unscientific people a very fair knowledge of the manufactures to which they owe a considerable portion of their comforts and luxuries, and enables them better to appreciate any processes with which they may incidentally meet. The amount of information in its closely printed pages is as large as it is varied, and the 336 woodcuts are, as a rule, well drawn, and sufficiently accurate to illustrate the descriptions in the text; indeed, many of them have the appearance of having been drawn from the apparatus itself, instead of being, as is too often the case, mere fancy sketches.

In conclusion, the labour of compiling so highly condensed a treatise must have been very considerable, and probably the attempt to do too much is the principal reason why it has not been done better. If the author could be induced to rewrite it, and make it into five or six volumes of the same size, there is no doubt that it might become a really valuable work.

Health and Comfort in House Building. By J. Drysdale, M.D., and J. W. Hayward, M.D. London: E. & F. N. Spon. 1872.

The system of ventilation set forth in this volume of 114 pages is based upon the assumption that in *our* climate no direct admittance of external air can be made bearable for the major part of the year; that the fire-grates of our rooms can never act efficiently for both heating and ventilating the rooms, although some patterns, Galton's for instance, come very close upon effecting this; that no plans of ventilation for single rooms can supersede the necessity of one general plan for the whole house; that separate inlet and outlet openings are indispensable; that the primary inlet of air should be arranged at one place only and be large enough to transmit a supply sufficient to meet the strain of extra inmates (any excess of inflowing air in ordinary times being reducible by valves); that the incoming air should be warmed—say in the basement of the central hall; that this central hall or corridor should form the reservoir of freshly warmed air, and that the doors of all the rooms, offices excluded, should open out of this; that the fresh warm air out of this hall should be conducted into the rooms just below the cornice; that the vitiated air should be led by outlets in the ceiling of every room into one foul air chamber situated above the ceiling of the uppermost room, and, in order to obtain a regular suction, by a downcast shaft down to below the kitchen fireplace, and so up behind the fire there to a main upcast shaft in the kitchen chimney.

We will shortly describe a house in which this system is carried out. In a chamber below the staircase, containing coils of hot-water pipes—low pressure by the way—the fresh air is admitted, and one branch of these pipes leads round the skirting of the saloon out of which the reception rooms open, whilst another heats the conservatory and passage. The warming apparatus is a boiler heated by coke or gas, and the fresh air for combustion is supplied direct from the external atmosphere. The saloon is in this case made the chief reservoir of fresh warm air, and partly from this and from the staircase the air is admitted into the rooms, either by openings near the cornices, as in the case of the living rooms, or through gratings formed in the architrave lintels as in the case of the bedrooms.

The foul air is led from behind the ceiling ornament through a zinc tube between the joists into a foul air chamber, constructed of zinc, of about six feet diameter by five feet high, made thoroughly air tight, and into this chamber each room leads by a separate tube. The chamber which collects the foul air communicates in a duplicate manner with the bottom of the exhaust shaft in the kitchen chimney, and the vitiated air finds an exit below the coping of the chimney. The section of this exhaust shaft resembles the now stereotyped circular flue inside a square one, the corners outside the circle forming the foul air shaft, and obtaining its heat from the smoke flue inside.

One might naturally ask how the freshly warmed air in the hall, the saloon, or the passage which forms the chief reservoir is to be kept sweet and free from contamination, and so made equal in purity to the air which in an ordinary house is admitted by the open doors or windows, louvres or air-bricks. This is effected by placing the inlet where the air is purest, close to the basement walls. Or, it is done by leading down the fresh air from the level of the top of the house as likeliest to be least loaded with dust and blacks. *Query*, how would this work when the house drain and the soil pipes were all ventilated to the top of the house? A proper condition of atmosphere in the hall is also obtained by leading into the foul air flues and so on to the foul air chamber and down the siphon and eventually up the kitchen flue, all the products of gas combustion, all tobacco fumes, water-closet effluvia and so on. The servants' rooms especially are shut off from ordinary connection with the best rooms, and what is equally important the kitchen smells are withdrawn from their neighbourhood.

We admit that here is an almost perfect system of ventilation, and there can be no doubt that *if it were carefully carried out* the whole house could be replenished with even more fresh air than the conventional three times every hour. It is not attempted to necessarily warm the house by means of heated air, on the contrary, open fire places are recommended to be constructed in the corners of the rooms, and the incoming air heated only to about 65°, or sufficient to suit the requirements of ventilation. It is not a scheme which comes before one laboriously set to the tune of "Buy a broom which shall sweep all other ideas clean away." It is rather an auxiliary system, and does not even disdain the assistance of the now common ventilating globe lights, which are so constructed as to remove the carbonic acid, etc., generated around the burner on through separate tubes into its own foul air flues. If it suggest a fault, it is because the condition of pure comfort and perfect healthfulness is dependent, especially in winter, upon the direct superintendence of the owner, or the supervision of, *alas!* the servants, according as the varying weather, the wind, or the atmospheric pressure makes such attention necessary. Some one must govern the warming apparatus in proportion to the coldness, attend to the valves which regulate the current according to the number of indwellers, know how to occasionally isolate rooms, and how to divert the bulk of the fresh warmed air into certain other rooms occasionally—as, for instance, into bedrooms during a severe winter. But despite all this, there is no doubt whatever that, *if* the size of the primary air inlet in the outer wall be *properly* calculated, the area of the downcast shaft from the foul air chamber *carefully* computed, and the withdrawing capacity of the ultimate upcast shaft *accurately* arrived at,—a house built upon this principle can be made very comfortable indeed. And without doubt a house constructed with inlet and outlet shafts in this way, if not realizing spontaneous or automatic ventilation, *might* soon come to be understood by a responsible servant, and the sliding of the air bricks, which adjusted the inflowing and outflowing of the air fairly averaged by him or her. And we may here say that the application of this plan of ventilation is not necessarily confined to houses or blocks of houses, but can be made suitable for offices, churches, and other large buildings. In the latter cases, the chimney from the heating apparatus would have to contain the suction shaft. Besides, too, a special fire here all the year round, the upcast shaft might require the rarefaction yielded by a few gasburners.

We have entered into the plan of Messrs. Drysdale and Hayward at some length, for it deserves a fair explanation at our hands, holding as we do that hygiene is more a branch of medicine than of architecture, strictly so called. Whether architects will take kindly to the plan evolved will be due entirely to the amount of pressure put upon them by the building proprietors. An architect is very much like a merchant tailor, who will fashion a piece of cloth either into a cloak or a paletôt just as he is instructed. Some there are who will not be influenced by extraneous pressure, and it would be only one of this calibre who dared on all occasions adhere to so gigantic a subversion of what has gone before. The majority will declare, as David declared of the fine armour offered him, that they have not proved it, and go on preferring the old sling and the pebbles from the brook. There is one section of this work for which all architects will be grateful to the authors, and that is the appendix, wherein are some excellent formulæ for calculating the draughts in hot air flues, and also a ready reckoner of velocities.

A Digest of the Statutes Relating to the Public Health; for the use of Members of Urban Sanitary Authorities. By George F. Chambers, F.R.A.S. London: Stevens and Sons.

This work is very well designed, and the legal contents appear to be all that could be desired as far as they go. They deal only with the *urban* side of the question; the rural sanitary authorities having yet to be taught their lesson in a promised digest of similar design.

The legal contents of the present work are so condensed that they give little more information—though enough for the purpose—than a well-arranged index itself would do, though, to make them available, an index is indispensable. In the present case, the index is very imperfect; for instance, the word "Sewage" does not appear in the index at all, nor does "Irrigation," although sewage farming means nothing else; and every urban sanitary authority is now considering this mode of utilization in some shape or other. With a carefully devised index, Mr. Chambers's 'Digest' will become a "handy" work; but it is essential that the rural portion should be dealt with at the same time, and that the promised instructions of the Local Government Board should be attached.

Mr. Chambers has done enough to give him precedence of other writers, who take the great subject of public health legislation in hand, to instruct members of Boards of Health and Boards of Guardians and the numberless officers who will take part in local administration.

BOOKS RECEIVED.

Posological Tables: being a classification of the Doses of all Officinal Substances, for the Use of Students and Practitioners. By W. Handsel Griffiths, Ph.D., L.R.C.P., etc. London: Ballière, Tindall and Cox.

A Course of Qualitative Chemical Analysis. With 19 Engravings on Wood. By Wm. Geo. Valentin, F.C.S., etc. London: Churchills. 1873.

The following journals have been received:—The 'British Medical Journal,' February 15; the 'Medical Times and Gazette,' February 15; the 'Lancet,' February 15; the 'Medical Press and Circular,' February 15; 'Nature,' February 15; the 'Chemical News,' February 15; 'English Mechanic,' February 15; 'Gardeners' Chronicle,' February 15; the 'Grocer,' February 18; the 'Journal of the Society of Arts, February 15; 'Grocery News,' February 15; 'Medical Record,' February 12; 'Scientific American' February 1; 'British Journal of Dental Surgery' for February; 'Journal de Pharmacie et de Chimie' for February; 'American Journal of Pharmacy' for February; the 'New York Druggists' Circular' for February; the 'Druggist,' No. 1; the 'Anti-Adulteration Review' for February; the 'Educational Times' for February; the 'Brewers' Guardian,' February 11; 'L'Union Pharmaceutique' for February; 'Répertoire de Pharmacie,' February 10.

Notes and Queries.

[329.]—LIQ. AMMONIAT. VALERIANÆ.—Probably the preparation intended in your correspondent's prescription was that made by Mr. Bastick. A prescription was brought to me some time since in which Sol. Ammon. Valerian. was ordered, and after an unsuccessful attempt to ascertain the proper dose, I used Mr. Bastick's preparation, which is an expensive one, and charged accordingly. Proprietors of such articels would save us a vast amount of trouble and anxiety by adding the usual dose on the labels of their specialities. —H. D. W.

[331.]—YELLOW FLUID FOR CARBOY.—W. R. F. would be glad to be favoured with a formula for preparing a good permanent golden-yellow coloured water for a window carboy.

[*** The following recipes are given in Cooley's Cyclopædia;—(1) $\frac{1}{2}$ lb. of sesquioxide of iron dissolved in a quart of hydrochloric acid, and diluted with water. (2) A solution of equal parts of nitre and chromate or bichromate of potash in water. Filter through glass.—Ed. Pharm. Journ.]

ADULTERATION OF DRUGS IN AMERICA.—Mr. Richard F. Mattison, of Philadelphia, states (Amer. Journ. of Pharm. [4] iii. 13) that having had some supposed heavy magnesia returned to him by customers who complained of its unusual taste, it was submitted to analysis by Professor Maisch and found to be mixed with Rochelle salt. A correspondent of the *American Chemist* also states that he recently found 77 per. cent. of alum in some supposed cream of tartar which he recently examined for a drug broker.

BISMUTH OINTMENT.—An ointment containing bismuth in the proportion of half a drachm of the subnitrate to the ounce of simple ointment, rubbed up with a little spirits of wine, is recommended by a correspondent of the *Medical Times and Gazette*, as giving great relief when applied freely to the skin to allay itching and irritation in chronic eczema and other forms of skin disease. Dr. McCall Anderson, to whom the suggestion was originally due, observes that the ointment must not be made with benzoated lard or the reverse of a soothing effect may be produced.

FLAVOURING OF INVALID DIET.—A correspondent of the *Medical Times and Gazette* refers to the importance of knowing how to flavour a sick person's food, so as to make him eat it with relish, which is often wanting where even well prepared beef-tea has been long taken. He says, "I have often found that the addition of some vegetable flavouring matter has enabled the patient to resume his food with relish. I do not mean that the vegetable food is to be swallowed; but after being strained off the broth retains its flavour. The use of burnt onions among all classes of cooks is well known; and though I am not prepared to advocate the use of such a robust vegetable, there are others equally accessible and more delicate. Chief among these is celery, which during a certain portion of the year may be used bodily, but during certain seasons it cannot. For this reason I am in the way of using from time to time small quantities of celery seed, which may be easily procured. A very small proportion of the seed added to the beef-tea gives to it a totally different flavour from the insipid mawkish taste it often possesses, and I have been rewarded by seeing patients turn to their food when so seasoned with a zest they had long ceased to exhibit.

Correspondence.

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

The School of Pharmacy.

Sir,—An article appeared in this month's issue of the 'Chemist and Druggist' which would seem to convey the impression that everything connected with the School of Pharmacy at 17, Bloomsbury Square, is in a disgraceful condition, and that the students themselves are grossly neglected. A reply addressed to the editor of the *Chemist and Druggist* could not appear without considerable delay, and, therefore, I should feel obliged by your allowing the following to appear in your columns. As I am *now* working in the laboratory, I think I may be allowed, as well as "one who *has been* there," to make a statement concerning the present state of affairs.

This morning I made a sort of canvass of the students at present working in the laboratory in order to obtain their opinions. I am glad to say that in no case did a student consider he was neglected, but each agreed that if he were in any difficulty, by applying either to the Director or his assistants during their visits, or when at their desks, he always received a most courteous reply and a full explanation.

From a number of twenty-five to whom I mentioned the subject, there were three who complained that they were not pushed on sufficiently, but this differs materially from neglect, for I contend that the student who, after proper direction, is left to work for himself, is much more likely to succeed than one who has knowledge continually thrust upon him.

Sydney Plowman.

17, *Bloomsbury Square, February* 20*th*, 1873.

The Admission of Outsiders.

Sir,—Though what is called an "outsider," yet as an old druggist, having been apprenticed 44 years ago, I have been often amused in reading what has been said on several occasions on the subject of admitting outsiders as members of the Pharmaceutical Society, and the fee to be charged. I notice that in discussing this question, invariably both speakers and writers assume that it is a very great privilege to be such a member—that by becoming such, a man is put into possession of some very great advantage. Hence at the last meeting of the Council, Mr. Shaw asked, whilst a member who had fallen into arrears had to pay five guineas in order to be reinstated, "what justice was there in admitting another man on payment of one guinea only?" And the President "did not think it would be just to those who had paid two guineas to reduce the entrance fee to new comers."

Will you allow me very civilly and most respectfully to ask, except the very shadowy privilege of voting once a year for a few gentlemen of whom you know little or nothing, what advantage accrues to an outsider on becoming a member of the Society? What is there to make a man ardently desire such a thing? In answer to this question I was once told that in return for a yearly subscription of a guinea I should receive the Journal; in answer to which I replied that as it was I received it for 17*s.* 4*d.* a year.

I seriously ask, is it not much more to the advantage of the Society to receive the outsiders, than to that of the outsiders to receive the Society?

An Old Druggist.

The Preliminary Examinations.

Sir,—The indignation so warmly expressed by Mr. Whitfield in his letter in the Journal may be perfectly justifiable so far as he personally is concerned, as also a great many others who honestly do their duty. But Mr. Whitfield may rest assured it is not universally so with all local secretaries. From what I have heard any amount of cribbing can be done. At the same time, I should deeply regret to see a bye-law passed that would necessitate all future candidates to go to London for this purpose, and I should consider it a point deserving the strongest opposition of the whole trade.

F. M. Rimmington.

Bradford, February 15*th*, 1873.

Sir,—Respecting Mr. Whitfield's letter in the Journal of the 15th, it is obvious that he cannot be held responsible for the failings of his colleagues in office; neither can his virtues be imputed to them. I should be sorry to bring a sweeping charge against local secretaries in general; but I should wish to put some personal questions to a youth, as to the manner in which his Preliminary examination had been conducted, before signing his indentures. Only a few days since, a friend was conversing with me about the unsatisfactory manner in which two examinations attended by his apprentices had been conducted. There had been no supervision, the candidates helped one another as they listed; nor was there any safeguard against the introduction of crutches for the lame in the shape of ready-made translations and sundry useful "keys." Local secretaries are sometimes appointed for their long standing and the general esteem in which they are held as townsmen rather than for any special qualification for the office, or for any zeal they have manifested in the cause of pharmacy. They have probably been consulted by the parents of the candidates, and are unwilling to be thought harsh or severe. They are too good-natured to place obstacles on the threshold of a calling to which youths aspire; and so by the manifestation of mistaken kindness in the form of leniency at the outset, apprentices enter the trade with false views of the stringency and importance of examinations; they get a false start, and after toiling halfway up the hill, they abandon the task in despair, having lost two or three of the most valuable years of their life.

In these days a journey to London is no great undertaking. But if it is considered impracticable, might not special examiners attend at half-a-dozen provincial centres, at stated periods, to conduct the "Preliminary"?

In such a connection it would be invidious to mention names or places, from which unjust inferences might be drawn against individual secretaries.

Henricus.

February 17*th*, 1873.

Sir,—As the Preliminary examination is now attracting attention, allow me to state an instance which has come under my notice:—A local secretary and pharmaceutical chemist conducted the examination of his apprentice and another young man; he, not keeping an assistant, was obliged to leave them by themselves, in order to attend to some customers; they expecting this, had some books at hand. Of course they both passed.

An Associate.

Pharmaceutical Women.

Sir,—Before the admission of ladies to the privileges and membership of our Society, I think it only fair and just that the rising generation of chemists should be permitted to give their views on this important subject; or that we should be represented in the Council by one of ourselves, in order that we may have some voice in a matter that will principally affect us in the future.

It appears to me that the present position of chemists' assistants is far from being an enviable one; and that our salaries are not so high, that we can afford to have ladies enter into opposition to us, especially as it is a well-known fact that women are paid at a smaller rate than men, and their establishment would certainly tend to lessen our own too small pay, and must ultimately lead to the absence of good men from the Society.

I think with others our field of competition is quite large enough, and the admission of women would damage the profession, and more than is at present understood or even thought of. The present aspect of the Pharmaceutical Society, that an assistant ought to look forward to as a means of ascending a little higher "the tree of knowledge," has commenced to give him a shadow of hope for the future, and this would I think be too great a concession.

I trust that this matter will be taken up by abler hands than mine, and gain the support it most certainly ought from the ones most concerned.

"Pharm. Brit."

London, February 18*th*, 1873.

A Valentine.

To the President, Vice-president, and Council of the Royal Pharmaceutical Society of Great Britain.

"O, woman! . . . . .
"When pain and anguish wring the brow
"A ministering angel thou!"

Ye gentlemen of England so loyal, free, and grand,
Who in the realms of "Pharmacy" have gained the foremost stand,
A "young man from the country," with reverence would draw near
And seek permission, if you please, to whisper in your ear.
'The Journal' hints that you have held a long and warm debate;
Yea, more—that what with "pros" and "cons" you kept it up till late;—
Your lovely wives and daughters, too, I'm sure would all feel sad,
When you got home at last and said what a "stormy day" you'd had.
And, O! methinks they'd almost weep when you with feverish brow
Began to say that *they* had been the cause of all the row!
And each one to her partner dear—or fond Papa—would say,
"Do tell me quickly! tell me, love, how *we* have caused this fray?"
"I'm glad at least that *you* were there—with true and noble heart—
"For like a freeborn Englishman *you'd* take the women's part;
"*You'd* ne'er consent that we should be the slave of any man—
"But seek to help us all to *gain* and *do* what good we can."

Well, gentlemen, if this be true, why should you still delay
To grant the privilege they seek, until the month of May?
If they desire to learn the art which soothes our pain and woe,
You surely will not close your door and coldly answer "*No.*"
If by the bedside of the sick they watch with sleepless care
And tenderly administer the medicines you prepare,
Methinks it cannot be a sin—if they desire to try—
To let them learn to *mix* the drugs, as well as you or I;
The only fear is lest they should surpass us by-and-by!
But now that they have once begun, I'm sure they won't be still;
What man on earth could ever turn a woman's steadfast will?
That they have good abilities was proved last month by *three*,
Especially by *one* who stood the highest on the tree!
A "Royal charter" you've obtained, and published certain rules,
But none of these, I think, excludes the *Women* from our schools.
If they obey the law laid down, we cannot keep them out,
And, O! they're wide enough awake to know what they're about.
Be gallant, just, and graceful, then—let prejudice give way—
Admit them freely to your ranks, nor wait another day.
Come, then, most noble "President," let them beside you stand;
The "Vice," I'm sure, will proudly join and help with generous hand.
Had but your final "casting vote" been given the *other* way,
Some dozen fragrant Valentines you might have had to-day!

W. B.

A.-u.-L., February 14*th*, 1873.

Passing the Examinations.

Sir,—I trouble you with the following, in the hope that it will diminish the number of trifling communications you receive upon the subject of preparing for the examinations.

I was recently much astonished on looking over the list of those who had passed the Minor examination, to see the name of a gentleman with whom I am acquainted. Only sixteen months ago we were behind the counter together, I having passed my apprenticeship with him as assistant. I, therefore, know something of his capabilities. At that time he was complaining (as many are now) of the hardship of passing that examination. He had had little or no education to assist him in his vocation, small pecuniary means, and was rather inclined to give up and despond; but by a good stern resolution and patient industry, he has in the few months mentioned, overcome those so-called hardships and become *victor*, even with "honours."

I really think if some of those who occupy their time so much in writing to the Journal were, after reading the above, to put their "shoulder to the wheel," they would soon find their difficulty to disappear.

Geo. F. H. Bartlett.

Cirencester, January 31*st*, 1873.

E. W. B.—It is unlawful for any person not registered under the Pharmacy Act, 1868, to sell poisons or to keep open shop for retailing, dispensing, or compounding poisons; and it is equally unlawful for such unregistered persons to carry on the business of a chemist and druggist if they employ a registered chemist to manage for them. See Pharmacy Act, Clause I., also Clause XV., for the penalties attaching to infringements of the law, and Clause XVI. for the exemptions.

R. Rawlinson.—Several assumptions in your letter are, to say the least, open to question, and therefore until you furnish something like tangible evidence in their support we must decline to give currency to the remarks based upon them. In the first place, the Registrar's report does not show a decrease in the number of members. It is true that there is a slight decrease in the number of pharmaceutical chemist members, but this is due rather to the small number of men who pass the Major, than to any disinclination to join the Society, for the increase in the chemist and druggist members is more than double the decrease in the other section, while there is also a very much larger increase in the number of associates in business, who are to be regarded as members as far as it is likely the great majority of those belonging to the Society could ever expect to enjoy all the fruits of membership. As to the examinations, we are at a loss to guess from whom you learned that your friend was plucked, although he had obtained one hundred marks more than were necessary. Was it from the supposed delinquent examiner? For our own part we hope your apparent fear that by the time you have passed the "Major" the Pharmaceutical Society will be on the point of disruption will not turn out to be true. At any rate, should the events prove to be synchronous, you will still preserve the knowledge to acquire which we presume is the primary object of your study.

"*Rogdon.*"—If you will read the report of the discussion upon the subject, printed on pp. 634–636, you will find that the third paragraph of the proposed alteration in section 10, clause 16 of the bye-laws, by which Preliminary examinations would have ceased in all places except London and Edinburgh, was rejected. Therefore as the presumed occasion for your strictures does not exist, we do not think it necessary to publish your letter.

W. Booth.—Perhaps you would find what you require in Maunder's 'Treasury of Botany,' edited by Lindley and Moore, and published by Messrs. Longmans, in two parts, 12s., cloth.

E. B.—*Mentha sativa*, or common mint.

"*Spes.*"—(1) You might obtain the information at Apothecaries' Hall. (2) Apply to the Secretary of the Pharmaceutical Society for a copy of a pamphlet entitled 'Hints to Students.'

S. A. Pring.—There is no restriction as to when, where, or how a candidate for examination shall acquire his knowledge.

W. G. B.—It does not come within the wording of the Act, but inasmuch as it is a very dangerous poison, it would be desirable in the interests both of the seller and the public to observe every possible precaution in the sale of it.

"*Two Inquirers.*"—Put the syrup into the bottle, add first the tincture of benzoin, then the oil of cubebs, and lastly the copaiba. Add the camphor mixture gradually.

M. P. S. writes in reference to requests which are sometimes made to chemists and druggists by their customers that they would translate and write prescriptions. He suggests that such a practice should be strenuously resisted as unjust to the person who wrote the original prescription, and suicidal on the part of the chemist and druggist.

Communications, Letters, etc., have been received from Messrs. J. F. Barrett, J. Roberts, H. Rogerson, E. J. Bishop, G. W., C. D., H. D. H., "An Assistant," and "Apprentice."

B. B. and "A Chemical Student" are referred to the rule respecting anonymous communications.

THE COLOUR OF THE WING CASES OF CANTHARIDES.

BY HENRY POCKLINGTON.

As every one knows who has read the B. P. description, *Cantharis vesicatoria* is furnished "with two wing-covers of a shining metallic green colour." This characteristic holds good only when dried insects are looked at in a certain way, for it happens, as perhaps many readers know, that by properly managing matters it is possible to see these wing-cases of almost any colour. For instance, if one be examined by lamplight, the colour varies very sensibly as the positions of the lamp or wing-case are varied with respect to each other. These variations are much intensified when a wing-case is immersed in alcohol or carbon bisulphide in a narrow test-tube, and the test-tube containing the case held so that the lamp is between, but in a line or nearly so, with the eye, the colour appears no longer green but a rich golden copper. Slightly varying the position of the tube, the colour changes to a more decided yellow, and quickly to green. Again changing the position, the colour appears to be a beautiful blue, and then a purple. A peculiarity of shade in these last colours induced me to test the light with a Nicol prism. In two positions of the prism the light was nearly wholly quenched. In two other positions it was transmitted. I quench the light and lower the slide, the green appears; I slightly turn the Nicol, the green is partially quenched and becomes more yellow. I interpose the Nicol between the light and the wing-case, and I find that in two positions of the prism I cannot obtain the blue colour, and that these positions of the prism are complementary to those in which the blue light was previously quenched. Whence it is quite clear that whatever causes the blue colour, it is something which alters the plane of vibration of the reflected light. So far for lamplight.

If I view the wing-case by daylight, I find the blue is much more intense, and using the magnesium light, that it is even more beautiful; whence it may be suspected that this blue colour is due either to fluorescence, or to dispersion by reflection. I think it is probably due to both. The purple and the major part of the blue are clearly due to reflection, otherwise the interposition of a Nicol between the light and the wing-case would not so nearly quench it as it does. That the Nicol so placed does not wholly quench the light goes a long way to show that part of the colour is due to reflection; and the fact that when the emergent blue light is examined by a Nicol, it is never wholly quenched, nor *wholly* transmitted, I think places the matter almost in the region of certainty. The blue is not a pure blue; it contains a little green; and this is pretty constant however the wing-case may be viewed by reflected light. So we may suspect that although most of the colours of the case, as variously viewed, are due to interference, or selective dispersion by reflection, or to lowering of refrangibility if fluorescence be also a factor, there is also what we generally denominate a colouring matter—a substance that is persistently selective and sends out, in this case, light with a continued balance on the green side of the account. With a view to ascertaining the nature of this colouring matter, a few wing-cases were immersed in ether, in alcohol and in water for several days, and these fluids were examined spectroscopically.

Ethereal Solution.—A small quantity placed in a specimen tube, or homœopathic pilule tube, and examined by a Sorby Browning spectroscope, or a student's stand spectroscope, kindly lent me by Mr. J. E. Winspear for the purpose. (A micro-spectroscope is the more convenient instrument for use in these researches, but it is advantageous to check the reading of one instrument by another.) I was much surprised to see a sharply defined band in the red, suggestive at once of a chlorophyll band I once saw, but unhappily could never trace the origin of, and a shaded band in the green with partial absorption of the blue, and general absorption beyond. In other words, there was a well-defined narrow absorption band at $1\frac{1}{2}$ of Sorby's scale, a shaded band extending each side of $5\frac{1}{2}$, and the partial and general absorption already spoken of. In many respects the spectrum resembles that of the privet, and exactly corresponds with that given by the chlorophyll of a portion of a leaf I examined some time since, but have not as yet succeeded in tracing. It differs from the privet spectrum as given to Herapath's diagram in the presence of the shaded band at $5\frac{1}{2}$, and also, if the diagram be correctly printed, very slightly also in the position of the band at $1\frac{1}{2}$.

Alcoholic Tincture.—The spectrum of this is essentially similar, excepting that the shaded band at $5\frac{1}{2}$ is absent.

The *Aqueous Solution* gives an entirely different spectrum. There is general absorption of the violet head of the spectrum and no well-defined bands (entire absorption from 8 to violet; shaded or partial absorption, 8 to 7). The wing-cases removed from the water, dried and digested in alcohol, give a well-defined band at $1\frac{1}{2}$, and general and partial absorption as in the alcoholic tincture, the $3\frac{1}{2}$ shaded band being absent. Ether added after alcohol has been removed gives the $3\frac{1}{2}$ shaded band by daylight, if care be paid to adjust the slit very exactly, and to focus sharply for that part of the spectrum.

There are thus, I think, grounds for concluding that the green colouring matter (the green oil of some analyses) is due to chlorophyll, and it is an interesting question whether the spectrum (the $1\frac{1}{2}$, $5\frac{1}{2}$ shaded and absorption beyond 8) characteristic of this will not be found to vary in ethereal tinctures prepared from cantharides collected from off different feeding grounds. And it is with a view of suggesting the inquiry to those who, perhaps, have more leisure and better opportunities of procuring the raw material than I have, that I send the foregoing rough and incomplete notes for publication.

The reagents that I have used, *e.g.*, sulphide of soda, ammonia, acids and iron salts, do not give results which permit at present of reduction into conformity with each other, and I reserve any account of them for a future paper which will include an account of the colouring matter of the contents of the stomach, of the thorax and other parts not now noticed; I will only remark that so far they confirm my opinion as to the chlorophyll nature of the green colouring matter.

In conclusion, I may just remind my readers that the reference spectrum spoken of is that devised by Mr. Sorby, and described by him in Dr. Beale's 'How to Work with the Microscope,' 4th ed., page 225, and is an interference spectrum produced by a plate of quartz interposed between two Nicol prisms. The spectrum is divided by 12 distinct bands of equal optical value, of which 3 and 4, counting from the red end of the spectrum, are respectively on each side of the well-known Fraunhofer's line D, or the sodium line (3½).

COMPARATIVE SOLUBILITY OF VARIOUS SALTS OF QUININE IN WATER AND GLYCERINE.*

BY M. SCHLAGDENHAUFFEN.

The inconveniences attending the ordinary modes of preparing a concentrated solution of a salt of quinine for the purpose of hypodermic injection, in cases where its administration in any other way is not so well tolerated by the patient, have caused M. Schlagdenhauffen, who is *pharmacien en chef* of the civil hospitals at Nancy, to undertake a thorough investigation of the subject, with the object of determining the salt and the solvent best suited for the purpose. Beginning with a series of experiments as to the solvent powers of pure water and acidulated water at varying temperatures upon the better-known salts as well as several more seldom met with, he next proceeded to test their solubility in glycerine. The general results of these experiments may be summed up as follows :—

Sulphate of Quinine.—The relative insolubility of this salt in cold water renders it unsuitable for use in subcutaneous injections. The author found that to dissolve 1 gram of the sulphate it required

25 c.c.	of water at	100°C	120 c.c.	of water at	50° C
40 c.c.	„	88°	200 c.c.	„	30°
55 c.c.	„	80°	255 c.c.	„	20°
85 c.c.	„	65°	265 c.c.	„	15°
100 c.c.	„	58°	300 c.c.	„	0°

When sulphuric acid was added in the proportion of 5, 10, or 15 drops to 100 c.c. of water, it required to dissolve 1 gram of sulphate of quinine—

	5 drops.	10 drops.	15 drops.
At 100° C.	24 c.c.	17 c.c.	9 c.c.
80°	—	—	12 „
70°	—	20 „	—
62°	40 „	—	—
55°	—	—	15 „
35°	54 „	27 „	—
30°	—	—	16 „
18°	—	30 „	—
0°	70 „	35 „	17 „

When water acidulated with hydrochloric acid was used to obtain similar results, 7, 13, and 18 drops of the acid were required, and of lactic acid 10, 15, and 20 drops. In a mixture of lactic acid, chlorides and phosphates, corresponding to the composition of the gastric juice, the sulphate dissolves with facility,—1 gram requiring 40 c.c. at from 30° to 40°. From this the author concludes that the quantities usually administered in powders by medical men may be completely dissolved in the stomach.

M. Schlagdenhauffen considers that these aqueous solutions of sulphate of quinine are at once too feeble and too acid for hypodermic injection; since the addition of so much acid would of necessity cause irritation, while the quantity of sulphate contained in each syringeful—not more than from 0·015 gram to 0·060 gram—would be insufficient probably for any practical good.

But in *glycerine* the sulphate is much more soluble, one gram of that salt dissolving—

At 100° C.	in 4	grams of glycerine.
65°	„ 10	„ „
40°	„ 20	„ „
0°	„ 40	„ „

Hydrochlorate of Quinine.—The hydrochlorate, as is well known, is more freely soluble than the sulphate, one gram dissolving in—

24 c.c.	of water at	0° C.	5 c.c.	of water at	40° C.
18 „	„	15°	4 „	„	55° to 100°
12 „	„	22°			

The addition of hydrochloric acid augments the solubility, the following being the quantity of water required to dissolve one gram, when 1, 2, or 8 drops of acid are added to each 100 c.c. :—

1 drop.		2 drops.		8 drops.	
0·5 c.c.	at 52° C.	0·5 c.c.	at 45° C.	0·5 c.c.	at 42° C.
1 c.c.	„ 45°	1 c.c.	„ 40°	1 c.c.	„ 34°
4 c.c.	„ 37°	2 c.c.	„ 35°	3 c.c.	„ 25°
6 c.c.	„ 30°	5 c.c.	„ 25°	10 c.c.	„ 12°
17 c.c.	„ 0°	16 c.c.	„ 0°	14 c.c.	„ 0°

It will thus be seen that by using an aqueous solution of the hydrochlorate—especially if two drops of acid be added, in which state its acidity is not discernible by litmus paper—a syringe containing one cubic centimetre would introduce a much larger proportion of quinine than when the sulphate is used.

In *glycerine* the hydrochlorate is very soluble, requiring only two or three times its weight to dissolve completely and to remain dissolved at 0° C.

A comparison of the solubility of these two salts in glycerine and in water, shows that at the temperature of melting ice they are both about eight times more soluble in the former vehicle than in the latter, and that this difference diminishes in proportion as the temperature is raised. The same remark applies to the butyrate of quinine described further on. The acetate, formate, lactate and sulphovinate are also more soluble in glycerine than in water, but the difference is not so great as in the preceding.

Hypophosphite of Quinine.—If one equivalent of sulphate of quinine be heated to boiling in a sufficiency of water to completely dissolve it, and added to two equivalents of hypophosphite of baryta, also dissolved in boiling water, the sulphate of baryta removed by filtration, and the solution carefully evaporated, a neutral hypophosphite of quinine is obtained, one gram of which after drying in a water bath, dissolves in the following proportions of water :—

At 87° C. to 100°	1 c.c.	At 37° C.	6 c.c.
70° „	2 „	24° „	8 „
50° „	4 „	0° „	12 „

At a temperature of 12° C. 1 c.c. of water dissolves 1 decigram of this salt, and a neutral solution is thus formed, containing enough salt of quinine to allow of febrile attacks being treated with one or two syringefuls. This solution has already been successfully employed in the Strasbourg Civil Hospital. The superior solubility of the hypophosphite is shown by the fact that if an alkaline sulphate or very dilute sulphuric acid be added to such a solution as that mentioned, the precipitate formed is so abundant that the vessel containing it might be

* Abstracted from papers in 'L'Union Pharmaceutique,' vol. xiii. pp. 101, 132, and 352.

reversed without its contents running out. The hypophosphite is also precipitated by chloride of sodium, acetate of potash and acetate of soda.

Formate of Quinine.—If the sulphate of quinine be decomposed by formate of baryta, neutral formate of quinine is obtained, which is still more soluble than the hypophosphite, one gram being soluble in 1 c.c. of water at 100° C. If the solution be cooled slowly, it does not deposit above 37° C.; so that between those temperatures the formate is soluble in its own weight of water.

Between 25° and 37° 1 gram requires 2 c.c. of water.
" 10° " 25° " " 3 " "
" 0° " 10° " " 4 " "

If, however, an excess of water be added a precipitate is thrown down, soluble by heat, but reforming in the cold, which is probably a basic salt.

Acetate of Quinine.—Obtained in shining acicular crystals by double decomposition of acetate of baryta and sulphate of quinine. At high temperatures its solubility is near to that of the hydrochlorate, but at lower temperatures it is much less soluble. Thus 1 gram requires—

1 c.c. of water at 100° C.	25 c.c. of water at 13° C.
10 c.c. " 30°	35 c.c. " 0°

Butyrate of Quinine.—When 1 equivalent of sulphate of quinine is treated with 2 equivalents of butyrate of baryta, the baryta is precipitated, and a limpid solution of neutral butyrate of quinine is obtained, which, if concentrated in a water-bath until it contains about ten per cent. of the salt, throws off some oily drops, and, upon further concentration, forms a syrupy transparent mass that crystallizes in shining needles after four or five days. If the solution be left to evaporate spontaneously, the syrupy mass is not formed, and the salt crystallizes in long needles. The salt is not very soluble, 1 gram requiring—

13 c.c. of water at 100° C.	105 c.c. of water at 15° C.
70 c.c. " 32°	130 c.c. " 0° C.

These solutions if left to evaporate spontaneously yield a magnificent crystallization in silky tufts, consisting probably of anhydrous salt, since it does not comport itself in the same manner as the original crystals when redissolved.

Lactate of Quinine.—Obtained when sulphate of quinine is precipitated by lactate of baryta. The lactate is freely soluble in water in proportions similar to the formate, over which it has the advantage, however, that it is not precipitated when an excess of water is added. 1 gram requires—

0·5 c.c. of water between 70°–100° C.
1·0 " " at 45°
1·5 " " " 38°
2·5 " " " 30°
3·0 " " " 10°
3·5 " " " 0°

As this salt allows of the preparation of such concentrated solutions, which are always slightly alkaline, the author thinks it would probably be found particularly suitable for subcutaneous injection.

Sulphovinate of Quinine—This new salt is much more soluble than any of the foregoing. It was obtained by the precipitation of 5·48 grams of sulphate of quinine with 3·06 sulphovinate of baryta,* evaporating the solution at a temperature below 40° C. to crystallization. The crystals may be heated in a water-bath to 100° without undergoing alteration. When dry and powdered, it dissolves in water in the following proportions:—

1 gram dissolves in 0·3 c.c. of water at 100° C.
" " 0·5 c.c. " 50°
" " 0·9 c.c. " 0°

Its solution is abundantly precipitated by alkaline sulphates, chlorides and acetates, and sulphuric acid; but not by free hydrochloric or acetic acid. This salt the author thinks to be especially well suited for subcutaneous injection, since at 10° C. at least 1 gram is soluble in 1 c.c. of water.

Sulphomethylate of Quinine is prepared in a similar manner to the sulphovinate, and has about the same degree of solubility.

Sulphoamylate of Quinine, also prepared in a similar manner, requires at from 15° to 35° C. about 100 parts of water to dissolve one of the salt, but it is very soluble in alcohol.

From the foregoing it would appear that the proportion of the various salts of quinine present in 1 c.c. of aqueous solution, or the quantity contained in a Pravas syringe,* is—

	30° C. gram.	20° C. gram.	10° C. gram.
Acetate	0·091	0·037	0·027
Hydrochlorate	0·092	0·049	0·031
Hypophosphite	0·12	0·097	0·065
Formate	0·33	0·296	0·272
Lactate	0·35	0·31	0·29
Sulphomethylate	0·80	0·71	0·60
Sulphovinate	0·80	0·72	0·60

Solutions in Glycerine.—The glycerine solutions of the salts of quinine present a peculiarity worthy of remark, in a species of supersaturation in which they remain after being cooled suddenly, a phenomenon that does not occur when they are allowed to cool slowly. Thus a solution of 1 part of hydrochlorate in one part of glycerine cooled suddenly to 0° C. remains about three hours without crystallization, whilst if cooled slowly to 15° C. the crystals commence to deposit at the end of a quarter of an hour. The addition of a larger proportion of glycerine allows of the preparation of solutions which remain transparent for a longer time. Thus a solution, consisting of one part of hydrochlorate and three parts of glycerine, cooled slowly to 15°, remains limpid during eight hours, and only after sixteen hours commences to deposit a few acicular crystals. With four parts of glycerine the solution remains perfectly transparent for a week. The lactate dissolved in its weight of glycerine remains soluble for about two hours.

The following table shows the characteristic behaviour of solutions of some of the salts of quinine

* M. Limousin proposes to use sulphovinate of soda, and avoid the possible danger attending the use of a barium salt.—*Ante,* pp. 651.—Ed. Pharm. Journ.

* One point, however, should not be lost sight of in estimating the efficacy of these various solutions, and that is the proportion of the normal alkaloid present in a given quantity of any of these salts, a proportion that would vary considerably, for instance, in the hydrochlorate and the sulphovinate. This subject has been already dealt with by M. Adrian, in a paper of which an abstract appeared at p. 2 of the present volume. The possible modification in the physiological properties of the alkaloid which might result from the different states of combination would also appear to require further investigation.—Ed. Pharm. Journ.

in glycerine under various conditions; one gram of the quinine salt being used in each case:—

Nature of Salt. 1 grain.	Quantity of Glycerine.	Temperature.		Cooled suddenly to 0° C.	Cooled slowly to 15° C.	
		Boiling.	30° C.		Time employed.	Effect on Solution.
Sulphate	2 gr.	sol.	ins.	ins.	10 min.	Deposited in a mass.
	12 gr.	sol.	sol.	ins.	1 day	A few crystals.
	24 gr.	sol.	sol.	sol.	8 days	Remained clear.
Hydrochlorate	1 gr.	sol.	sol.	sol.	8 hours	Crystals in mass.
	3 gr.	sol.	sol.	sol.	15 hours	Remained clear.
	5 gr.	sol.	sol.	sol.	8 days	Remained clear.
Lactate	1 gr.	sol.	sol.	sol.	4 hours	Remained clear.
	2 gr.	sol.	sol.	sol.	24 hours	Remained clear.
	4 gr.	sol.	sol.	sol.	4 days	Remained clear.
Acetate	4 gr.	sol.	sol.	sol.	10 hours	Remained clear.
	4 gr.	sol.	sol.	sol.	3 days	Deposited in a mass.
	12 gr.	sol.	sol.	sol.	8 days	Remained clear.
Sulphovinate	2 gr.	sol.	sol.	sol.	4 hours	Remained clear.
	4 gr.	sol.	sol.	sol.	1 day	Remained clear.
Formate	2 gr.	sol.	sol.	sol.	8 hours	Remained clear.
	4 gr.	sol.	sol.	sol.	3 days	Remained clear.
Hypophosphite	4 gr.	sol.	sol.	sol.	4 days	No crystals.
Tannate	3 gr.	sol.	sol.	sol.	3 days	Cloudy without crystals.
	5 gr.	sol.	sol.	sol.	1 month	Remained clear.

M. Schlagdenhauffen has found the tannate of quinine to be more soluble than has been previously stated,* he having obtained both warm and cold solutions containing 0·33 gram in each cubic centimetre of glycerine. It is necessary, in preparing these solutions, to heat the glycerine to boiling point, but once dissolved, the tannate is retained in solution during upwards of two months if kept in stoppered bottles. Exposed to the air the syrupy liquor commences to form a whitish crust, which augments rapidly after a few days, and consists of amorphous tannate. So concentrated an infusion would be too thick for injections, but one containing 0·22 gram to the cubic centimetre might be used.

The conclusion drawn by the author from his experiments is that a glycerine solution of a salt of quinine may be used for hypodermic injection some time after its preparation, since a sufficiently concentrated solution remains perfectly clear without deposit of crystals. The following table shows the length of time during which glycerine solutions of the different solutions remain serviceable:—

Sulphate	containing 0·04	gram per c.c.	1 day.
Hypophosphite	,, 0·25	,, ,,	4 days.
Hydrochlorate	,, 0·33	,, ,,	16 hours.
Formate	,, 0·50	,, ,,	8 hours.
Acetate	,, 0·25	,, ,,	10 hours.
Sulphovinate	,, 0·50	,, ,,	19 hours.
Lactate	,, 0·50	,, ,,	1 day.
Tannate	,, 0·33	,, ,,	3 days.

The necessity for using these solutions shortly after their preparation, because of their tendency to crystallize,* is undoubtedly an inconvenience, but if they be kept at a temperature of 30° C. (86° F.) they will remain perfectly clear and fit for use during a week or a fortnight.

The glycerine solutions of quinine are precipitated by water, and also in the presence of albuminous liquids, for which reason they would appear to be unsuited for use hypodermically, lest nodosities should be formed. But careful experiments in the civil hospitals of Strasbourg appear to have shown that in using the hypophosphite, hydrochlorate, sulphovinate and lactate no such inconvenience has resulted. Experiments with the tannate, however, have not at present been made.

* See Journ. Pharm. et de Chim. vol. xii. p. 211.

FENNEL FLOWER SEED, OR BLACK CUMIN SEED.

BY P. L. SIMMONDS.

In the very interesting paper "On Some Drugs from Morocco," read by Dr. Leared and published in the Journal of the 8th ult., under the name of Sanous, an unidentified seed is mentioned. From a sample of it shown me by Mr. T. Greenish, there appears to be no doubt that it is that of *Nigella sativa*, a pungent seed much used in Northern Africa, India, and Turkey. Commander F. Jones, whilst surveyor for the Hon. East India Company in 1857, included it in his catalogue of the articles of the materia medica sold in the bazaars of Baghdad, under the Arabic name of Hubbeh es Sauda. Mr. M. C. Cooke, in a descriptive article on these drugs in my 'Technologist' (vol. iv. p. 537), says that the Hub-sindie of Egypt is identical with the Siah-daneh of Persia and the Mugrela of Bengal. The Singalese name is Kallodooro, and it is used as a condiment in Ceylon. I stated in my work on 'The Commercial Products of the Vegetable Kingdom' (1853), that the aromatic seeds of some of the species of fennel-flower were formerly used instead of pepper, and are said to be still employed in Europe in adulterating it. A dark and fragrant oil is extracted from the seeds in India,

* Another possible source of inconvenience might exist in the rise of temperature which takes place when concentrated glycerine comes in contact with water. In a paper read before the American Pharmaceutical Association, Mr. J. P. Remington stated that under certain circumstances this amounted to 10° F., and the late Professor Parrish said that he had met with cases when the use of concentrated glycerine in preparations for the eye had caused such pain as to give rise to a charge against the druggist of having used sulphuric acid for the purpose of dissolving the alkaloid (see Pharm. Journ. [3] vol. ii. p. 908).—Ed. Pharm. Journ.

and appears to be principally used in medicine. It is called jungle-geerah oil in Mysore. The oil obtained from the same source in Egypt is limpid and colourless, and with but little odour. A specimen from Egypt, with the seeds, was shown at the first London Exhibition in 1851.

The seed is called gitta by the Arabs. Lady Calcott, in her 'Scripture Herbal,' states that the seed is much esteemed in the East, where it is common to strew it over the floor of the oven before the bread is put in, and to sprinkle it over the loaves, and even to knead it into the dough, as is done with poppy seeds in Bohemia and some parts of Germany. The seed of the Nigella is used in this manner and also by way of pepper in Egypt, Persia and India, as well as in Syria and Palestine, and very powerful as well as healthful qualities are ascribed to it. Under the strange name of fennel-flower, this plant was formerly cultivated in our gardens as a pot-herb, but like many others it has been displaced by the more common and pungent Eastern spices.

CONTRIBUTIONS TO THE PHYSIOLOGICAL CHEMISTRY OF MILK.*

BY F. SOXHLET.

Soxhlet investigates the question as to the identity of casein and alkali-albuminate, concerning which there exist considerable differences of opinion.

He first discusses the relation of alkaline phosphates to alkali-albuminate.

Hoppe-Seyler opposes the identity of casein and alkali-albuminate on the ground that in the milk no alkali-albuminate can be present, inasmuch as the fluid generally has an acid reaction, whereas solutions of the latter substance are precipitated even on neutralisation. Rollett, however, has proved that solutions of alkali-albuminate are not precipitated by acids in presence of neutral sodium phosphate, and it is owing to the presence of such phosphates in the milk that casein, which behaves exactly like alkali-albuminate, is not precipitated, even though the milk exhibits an acid reaction. Following out Rollett's researches, Soxhlet seeks to determine the quantitative relation of the acids and salts in the liquids in which, notwithstanding an acid reaction, no precipitation of albuminate occurs. By experiments with volumetric solutions of neutral sodium phosphate, acid potassium phosphate, neutral sodium sulphate, sulphuric, acetic and phosphoric acids, he arrives at the result, that on the addition of an acid to a solution of alkali-albuminate in presence of neutral sodium phosphate, the albuminate begins to be precipitated at the moment when all the neutral phosphate has been converted into the acid salt. The quantity of acid required for precipitation stands in intimate relation to the quantity of alkaline phosphate present, and the precipitation depends, not on the absolute amount of acid phosphate formed, but on its relative proportion to the neutral phosphate still remaining. The sodium sulphate which is formed when sulphuric acid is added to the albuminate solutions in neutral sodium phosphate, is without influence on the precipitation of the albuminate.

A relatively small amount of acid phosphate causes precipitation in pure alkali-albuminate solutions. In order to cause precipitation when neutral phosphate is present, a much larger proportion of the acid salt is required, because if the former is in excess, the albuminate remains in solution. In order to cause precipitation, it was found that acid phosphate of alkali-metal must be added until the quantity of neutral phosphate, which is formed from the base of the alkali-albuminate and from a part of the acid phosphate, stands in the relation of one molecule to thirty-two molecules of the acid phosphate. If more neutral phosphate is present than is expressed by this proportion, no precipitation occurs.

Reaction of the Milk and other Animal Fluids.—The solution of casein in milk with an acid reaction must, as shown by the foregoing experiments, depend on the simultaneous presence of a certain proportion of neutral phosphate together with the acid phosphate which gives the acid reaction. Such solutions, however exhibit not merely an acid but also an alkaline reaction at the same time. And this is really the case with the milk, for it at the same time reddens blue litmus and turns red litmus-paper blue. This *amphoteric* reaction of milk can be demonstrated best on gypsum plates coated with litmus, after the manner suggested by Liebreich. To this amphoteric reaction of the milk, the author ascribes the different statements made in regard to the normal reaction of the fluid. The alkaline reaction becomes more evident when the milk is heated. The same is shown by very dilute solutions of so-called neutral sodium phosphate and caustic soda. Violet solutions of litmus also become more blue on heating. The change is not due to concentration by evaporation, as the original colour reaction returns on cooling. Fluids which contain vegetable albumen become more alkaline when heated, and it has been supposed that this is due to the liberation of an alkali when the albumen is coagulated. That it is not due to this cause is proved by the fact that solutions free from albumen, but containing the same salts as the albuminous liquids, likewise exhibit the same intensification of the alkaline reaction when heated. A similar explanation is given of the fact observed by Du Bois Reymond, that a muscle dipped in boiling water becomes more alkaline than before.

In connection with the amphoteric reaction of animal fluids, difficulties are pointed out in the estimation of the so-called free acid of the urine. The presence of acid sodium phosphate in the urine renders it difficult to say exactly when all the acid is neutralised by the addition of alkali, because it is impossible to hit a point when the liquid will react exactly neutral, as there is no solution of a phosphate which reacts precisely neutral.

A third objection to the identity of casein and alkali-albuminate is supposed to exist in the different behaviour of these two substances towards rennet. Milk is coagulated, while alkali-albuminate is not. It has been shown, however, that alkali-albuminate is coagulated by rennet when milk sugar has been added to the solution. Soxhlet agrees with Simon in referring the coagulation to the lactic acid developed by the action of rennet on milk-sugar. Heintz, however, and subsequently Völcker found that casein might be coagulated by rennet, and yet the fluid remain alkaline, and hence considered that rennet may coagulate casein, not only by the formation of lactic acid, but also by some specific action. For this specific action a higher temperature is necessary. Soxhlet explains the differences by the amphoteric reaction. Rennet develops lactic acid from the milk-sugar; by which the neutral alkaline phosphate of the milk is converted into acid phosphate. When in consequence of this acidification, that relation between the neutral and acid phosphate is established in which the albuminate remains just dissolved and no more, then when the temperature is raised albumen is precipitated while the fluid is still alkaline. Along with the alkaline reaction, however, an acid reaction is also to be observed. This, however, had not been noticed by former observers.

The statement that the casein precipitated by acid is easily soluble in sodium carbonate, while that precipitated by rennet is not so, depends merely on the physical, and not on any chemical differences of the precipitate.

Rennet belongs most probably to the non-organised ferments. Zahn states that alkali-albuminate may be filtered through porous earthenware, but casein not; and

* Journ. f. pract. Chemie. [2], vi., 1—52; and from the 'Journal of the Chemical Society.'

considers this to be a proof against the identity of the two substances. Soxhlet shows that this depends on the presence of fat-globules in the milk, and finds that alkali-albuminate, when emulsionised by fat, is likewise incapable of filtration (or with difficulty) through such earthenware cells.

Zahn also states that the casein of the milk can be precipitated by sodium carbonate, but that solutions of alkali-albuminate cannot. This, however, does not depend on any chemical difference between the two substances, but on the fact that in the milk other substances are present. The precipitation of casein from milk may likewise be effected by caustic alkalis and sodium phosphate, as well as by sodium carbonate. The cause of the precipitation is the formation of calcium phosphate, which carries down the albuminate mechanically in the form of a finely granular precipitate. If alkali-albuminate is treated with calcium chloride and emulsified with fat, a like precipitate is caused on the addition of sodium phosphate. The statement made by Hoppe-Seyler that alkali-albuminate does not, like casein, yield potassium sulphide when treated with caustic potash, Soxhlet finds to be incorrect. He obtained a distinct evolution of hydrogen sulphide on the addition of acetic acid to the mass resulting from the treatment of alkali-albuminate with concentrated caustic potash.

Still, another difference is stated by Hoppe-Seyler to exist between casein and alkali-albuminate, namely, the specific rotation exerted by these two substances on a ray of polarised light. Soxhlet thinks that this is no sufficient ground for establishing a chemical difference between the two, because the specific rotation is liable to be greatly influenced by the presence of salts and by other conditions of the solutions.

From these various considerations the author comes to the conclusion that casein and alkali-albuminate are identical in every respect.

PROFESSOR TYNDALL ON LIGHT.*

The series of lectures from which the following notes are taken was delivered by Professor Tyndall at the Cooper Institute, New York. At the commencement of the first lecture, he said that the favour with which his writings have been received in America had led to his being invited to lecture in that country. Having been given to understand that experimental lectures would probably be preferred, he decided to meet the wish, so far as he could, by selecting and transporting such apparatus as was suitable for such lectures, and to take some single department of natural philosophy, and illustrate the growth of scientific knowledge under the guidance of experiment. In his first lecture, he would describe certain elementary phenomena; then point out how the theoretic principles by which such phenomena are explained take root and flourish in the human mind, and afterward apply these principles to the whole body of knowledge covered by the lectures. The science of optics lends itself to this mode of treatment, and on it, therefore, he purposed to draw for materials. He thought it best to begin with the few simple facts regarding light which were known to the ancients, and to pass on from them in historic gradation to the more abstruse discoveries of modern science.

All men's notions of nature have some foundation in human experience. This is the broad foundation on which intellectual structures ultimately rest. The notion of personal volition in nature had this basis. In the fury and the serenity of natural phenomena the savage saw the transcript of his own varying moods, and he accordingly ascribed these phenomena to beings of like passions with himself, but vastly transcending him in power. Thus the notion of causality—the assumption that natural things did not come of themselves, but had unseen antecedents—lay at the root of even the savage's interpretation of nature. Out of this bias of the human mind to seek for the antecedents of phenomena all science has sprung.

The first sciences were those of observation, when the matter of thought was provided by man's environment, and he had no notion of creating it himself. The apparent motion of sun and stars first drew toward them the questionings of the intellect, and accordingly astronomy was the first science developed. Slowly, and with difficulty, the notion of natural forces took root in the mind, its seedling being the actual observation of electric and magnetic attractions. Slowly, and with difficulty, the science of mechanics had to grow out of this notion; and slowly at last came the full application of mechanical principles to the motions of the heavenly bodies. We trace the progress of astronomy through Hipparchus and Ptolemy; and after a long halt, through Copernicus, Galileo, Tycho Brahe, and Kepler; while from the high table-land of thought raised by these mighty men, Newton shoots upward like a dominant peak overlooking all others from his stupendous elevation.

But other objects than the motions of the stars attracted the attention of the ancient world. Light was a familiar phenomenon, and from the earliest times we find men's minds busy with the attempt to render some account of it. But without experiment, which belongs to a later stage of scientific development, no progress could be made in this subject. The ancients accordingly were far less successful in dealing with light than in dealing with solar and stellar motions. Still they did make a little progress. They satisfied themselves that light moved in straight lines; they knew also that these lines or rays of light were reflected from polished surfaces and that the angle of incidence was equal to the angle of reflection. These two results of ancient scientific curiosity would constitute the starting point of the present course of lectures.

Professor Tyndall continued—Both of these are capable of the easiest experimental illustration, but in the first place it may be useful to say a few words regarding the source of light to be employed in our experiments. The rusting of iron is, to all intents and purposes, the slow burning of iron. It develops heat, and if the heat be preserved a high temperature may be thus attained. The destruction of the first Atlantic cable was probably due to heat developed in this way. Other metals are still more combustible than iron. You may light strips of zinc in a candle flame, and cause them to burn almost like strips of paper. But beside combustion in the air we may also have combustion in a liquid. Water, for example, contains stores of oxygen, which may unite with, and thus consume a metal immersed in it. It is from this kind of combustion that we are to derive the heat and light employed in the present course.

Their generation merits a moment's attention. Before you is an instrument—a small voltaic battery—in which zinc is immersed in a suitable liquid. Matters are so arranged that a strain is set up between the metal and the oxygen; actual union, however, being avoided. Uniting the two ends of the battery by a thick wire, the attraction is satisfied, the oxygen unites with the metal, the zinc is consumed, and heat, as usual, is the result of the combustion. A power, which for want of a better name, we call an electric current, passes at the same time through the wire.

Cutting the thick wire in two, I unite the severed ends by a thin one. It glows with a white heat. Whence comes that heat? The question is well worthy of an answer. Suppose in the first instance, when the thick wire was employed, that we had permitted the action to continue until 100 grains of zinc were consumed, the amount of heat generated in the battery would be capable of accurate numerical expression. Let the action now continue with this thin wire glowing until 100 grains of

* Abstracted from a report in the *New York Tribune*.

zinc are consumed. Would the amount of heat generated in the battery be the same as before? No, it would be less by the precise amount generated in the thin wire outside the battery. In fact, by adding the internal heat to the external we obtain for the combustion of 100 grains of zinc a total which never varies. By this arrangement then we are able to burn our zinc at one place, and to exhibit the heat and light of its combustion at a distant place. In New York, for example, we have our grate and fuel; but the heat and light of our fire may be made to appear at San Francisco. We have here an illustration of the constant law that in physical nature we have incessant substitution but never creation.

I now remove the thin wire and attach to the severed ends of the thick one two thin rods of coke. On bringing the rods together we obtain a small star of light. Now the light to be employed in our lectures is a simple exaggeration of this star. Instead of being produced by 10 cells it is produced by 50. Placed in a suitable camera, provided with a suitable lens, this light will give us all the beams necessary for our experiments.

And here, in passing, let me refer to the common delusion that the works of nature, the human eye included, are theoretically perfect. The degree of perfection of any organ is determined by what it has to do. Looking at the dazzling light from our large battery you see a globe of light, but entirely fail to see the shape of the coke-points whence the light issues. The cause may be thus illustrated: On the screen before you is now projected an image of the carbon points, the whole of the lens in front of the camera being employed to form the image. It is not sharp, but surrounded by a halo which nearly obliterates it. This arises from an imperfection of the lens, called spherical aberration, due to the fact that the circumferential and central rays have not the same focus. The human eye labours under a similar defect, and when you looked at the naked light from fifty cells the blur of light upon the retina was sufficient to destroy the definition of the retinal image of the carbons. A long list of indictments might indeed be brought against the eye—its opacity, its want of symmetry, its lack of achromatism, its absolute blindness in fact. All these taken together caused an eminent German philosopher to say that if any optician sent him an instrument so full of defects he would send it back to him with the severest censure. But the eye is not to be judged from the standpoint of theory. As a practical instrument, and taking the adjustment by which its defects are neutralized into account, it must ever remain a marvel to the reflecting mind.

[He now employed the larger battery, using the electric light as occasion required in any one of three or four lanterns in which the carbon points were moved by clockwork. The first image obtained on the screen of the carbon points looked like a faint drawing in brown pastel on a pure white circular ground. The circular ground represented the globular light as seen by the eye. A transparent screen was then interposed, which cut off the halo, and the carbon points seemed like two burning volcanoes, one upside down and its crater overhanging the other, which was conical. Between them there was a space that looked like the burning gas of a blast furnace, where the elements would melt with fervent heat.]

And now we are ready for work. The rectilineal propagation of light may be beautifully illustrated by making a small hole in a window-shutter, before which stands a house, or tree, or animal, and placing within the darkened room a white screen at some distance from the orifice. Every straight ray proceeding from the object stamps its colour upon the screen, and the sum of all the rays forms an image of the object. But as the rays cross each other at the orifice the image is inverted. An image of the carbon points produced by a pinhole in tinfoil will be employed to illustrate this point of rectilineal propagation.

[In each of these images the carbon points were apparent; they gradually overlapped each other as their number and proximity was increased, until the audience were ready to accept the statement of the lecturer that the total circle of light from the lens was merely the intricate and complete overlapping of images of the carbon.]

The law that the angle of incidence is equal to the angle of reflection is illustrated in this simple way: A straight lath is placed as an index perpendicular to a small looking-glass capable of rotation. A beam of light is received upon the glass and reflected back along the line of its incidence. Though the incident and the reflected beams pass in opposite directions, they do not jostle or displace each other. The index is now turned, the mirror turns along with it, and at each side of the index the incident and the reflected beams are seen tracking themselves through the dust of the room. The mere inspection of the two angles inclosed between the index and the two beams shows their equality. The same simple apparatus enables us to illustrate a law of great practical importance, namely, that when a mirror rotates the angular velocity of a beam reflected from it is twice that of the reflecting mirror.

For more than 1000 years no step was taken in optics beyond this law of reflection. The men of the middle ages, in fact, occupied themselves on the one hand in trying to develop the laws of the universe out of their own consciousness, while on the other hand they were so occupied with the concerns of a future world that they looked with a lofty scorn on all things pertaining to this only. As regards the refraction of light, the course of real inquiry was resumed in 1100 by an Arabian philosopher named Alhazen. Then it was taken up in succession by Roger Bacon, Vitellio and Kepler. One of the most important occupations of science is the determination by precise measurements of the quantitative relations of phenomena. The value of such measurements depends upon the skill and absolute conscientiousness of the man who makes them. Vitellio was such a man, while Kepler's habit was to rummage through the observations of his predecessors, look at them in all lights, and thus distil from them the principle which united them. He had done this with the astronomical measurements of Tycho Brahe, and had extracted from them the celebrated "laws of Kepler." But in the case of refraction he was not successful. The principle, though a simple one, escaped him. It was first discovered by Willebord Snell, about the year 1621.

Less with the view of dwelling upon the phenomenon itself than of introducing it to you in a form which will render intelligible the play of theoretic thought in Newton's mind I will show you the fact of refraction. The dust of the air and the turbidity of a liquid may here be turned to account. A shallow circular vessel with a glass face, half filled with water, rendered barely turbid by the precipitation of a little mastic, is placed upon its edge with its glass face vertical. Through a slit in the hoop surrounding the vessel a beam of light is admitted. It impinges upon the water, enters it, and tracks itself through the liquid in a sharp, bright band. Meanwhile the beam passes unseen through the air above the water. A puff of tobacco smoke into this space at once reveals the track of the incident beam. If the incidence be vertical, the beam is unrefracted. If oblique its refraction at the common surface of air and water is rendered clearly visible. It is also seen that reflection accompanies refraction, the beam dividing itself at the point of incidence into a refracted and a reflected portion.

[This experiment was performed with a small drum containing liquid. The lecturer remarked that milk having a slight bluishness answered the purpose. London milk was particularly well suited. There was also visible in the smoke above the water a faint reflected beam, probably reflected from the surface of the water.

Snell connected the angle of incidence with the angle of refraction, by proving that the sine of the one divided by the sine of the other is absolutely constant for the same medium, whatever the obliquity of the incident ray may be. The lines answering to these "sines" will be pointed out in the lecture. The constant quotient here referred to is called the index of refraction. The discovery is one of the corner-stones of optical science.

Quickly following Snell's discovery, is the application of it by Descartes to the explanation of the rainbow. The bow is seen when the back is turned toward the sun. Draw a straight line through the spectator's eye and the sun, the bow is always seen at the same angular distance from this line. This was the great difficulty. Why should the bow be always, and at all parts, 41 degrees distant from this line? Taking a pen and calculating the track of every ray through a rain-drop, Descartes found that at one particular angle the rays emerged from the drop almost parallel to each other; being thus enabled to preserve their intensity through long atmospheric distance; at all other angles the rays quitted the drop divergent, and through this divergence became practically lost to the eye. The particular angle here referred to was the foregoing angle of 41 degrees, which observation had proved to be invariably that of the rainbow.

But in the rainbow a new phenomenon was introduced —the phenomenon of colour. And here we arrive at one of those points in the history of science when men's thoughts and labours so intermingle that it is difficult to assign to each worker his precise meed of honour. Descartes was at the threshold of the discovery of the composition of solar light. But he failed to attain perfect clearness, and it is certain that he did not enunciate the true law. This was reserved for Newton, who went to work in this way.

Through the closed window-shutter of a room he pierced an orifice, and allowed a thin sunbeam to pass through it. The beam stamped a round image of the sun on the opposite white wall of the room. In the path of this beam Newton placed a prism, expecting to see the beam reflected, but also expecting to see the image of the sun after refraction, round. To his astonishment it was drawn out to an image whose length was five times its breadth; and this image was divided into bands of different colours. Newton saw immediately that this image was due to the fact that some constituents of the solar light were more deflected by the prism than others, and he concluded, therefore, that white solar light was a mixture of lights of different colours and of different degrees of refrangibility.

The elongated image here referred to is called the spectrum. Newton divided the spectrum into seven parts, red, orange, yellow, green, blue, indigo, violet; which are commonly called the seven primary or prismatic colours.

This was the first analysis of solar light by Newton; but the scientific mind is fond of verification, and never neglects it where it is possible. It is this stern conscientiousness on the part of those who pursue it that gives adamantine strength to science, and renders all assaults on it unavailing. Newton completed his proof by synthesis. For instance, he refracted the colours back, reblended them, and thus reproduced the white light out of which they came.

In the lecture, Newton's experiment in Newton's own form is made; it is afterwards made with instruments which yield larger and richer effects than those seen by Newton. The synthesis of white light is effected in three different ways. Firstly, the colours of the spectrum are squeezed together and blended by a cylindrical lens, white light being the result of their mixture; secondly, an image of the carbon points, whence the light issues, is built up from the colours of the spectrum; thirdly, in virtue of the persistance of luminous impressions upon the retina, the prismatic colours may be mixed together in the eye itself, the impression of whiteness being the result. The drawing out of the white light into a spectrum is called dispersion. And here historic completeness renders necessary a brief reference to an error of Newton's. He supposed that refraction and dispersion went hand in hand, and that if you abolished the one you at the same time abolished the other. He maintained this opinion to the end of his life, and thus retarded the progress of discovery. Dolland, however, proved that by combining two different kinds of glass the colours could be extinguished, still leaving a residue of refraction, and he employed this residue in the construction of achromatic lenses—lenses which yield no colour—which Newton thought an impossibility. This point is illustrated in the lecture by combining a prism of water and one of glass; the colour is destroyed but not the refraction.

The refraction and dispersion of bisulphide of carbon are compared with those of water, in order to explain why the first mentioned liquid is used when our object is to obtain spectra of great extent and richness of colour.

[The spectra exhibited in this part of the lecture, and from then till its close, were of great beauty. The one upon which the final experiments were made, by which the actual character of colour was explained, must have been at least two and a half feet wide, and its length, when dispersed by two prisms, covered the whole screen.]

Having unravelled the interwoven constituents of white light, we have next to inquire what part the constitution so revealed enables this agent to play in nature? To it we owe all the phenomena of colour; and yet not to it alone, for there must be a certain relationship between the ultimate particles of natural bodies and light to enable them to extract from it the luxuries of colour. But the function of natural bodies is here selective, not creative. There is no colour generated by any natural body in any kind of form. Natural bodies have showered upon them, in the white light of the sun, the sum total of all possible colours, and their action is limited to the sifting and appropriating from the total the colours which really belong to them, and rejecting those which do not. It will fix this subject in your minds if I say that it is the portion of light which they reject, and not that which belongs to them, that gives bodies their colours.

Let us begin our experimental inquiries here by asking what is the meaning of blackness? Pass a black ribbon in succession through the colours of the spectrum; it quenches all. This is the meaning of blackness—it is the result of the absorption of all the constituents of solar light. Pass a red ribbon through the spectrum. In the red light the ribbon is a vivid red. Why? Because the light that enters the ribbon is not quenched or absorbed, but sent back to the eye. Place the same ribbon in the green or blue of the spectrum; it is black as jet. It absorbs the green and blue light, and leaves the space on which they fall a space of intense darkness. Place a green ribbon in the green of the spectrum. It shines vividly with its proper colour; transfer it to the red, it is black as jet. Here it absorbs all the light that falls upon it, and offers mere darkness to the eye. When white light is employed, the red sifts it by quenching the green, and the green sifts it by quenching the red, both exhibiting the residual colour. Thus the process through which natural bodies acquire their colours is a negative one. These colours are caused by subtraction, not by addition. The action of various liquids and solids upon the spectrum is also illustrated; some cutting off the one end, others cutting off the other end, and some selecting for absorption the middle of the spectrum.

These experiments prepare us for the consideration of a point regarding which error has found currency for ages. You will find it stated in books that blue and yellow lights mixed together produce green. They do not. Blue and yellow are complementary colours and produce white by their mixture. The mixture of blue and yellow pigments undoubtedly produces green, but the mixture of pigments is totally different from the mixture of lights. Helmholtz has revealed the cause of the green in the case of the pigments. No natural colour is pure. A blue liquid, or a blue powder permits not only the blue to pass through it but a portion of the adjacent green. A yellow powder is transparent not only to the yellow light but also in part transparent to the adjacent green. Now when blue and yellow are mixed together the blue cuts off the yellow, the orange, and the red; the yellow, on the other hand, cuts off the violet, the indigo, and the blue. Green is the only colour to which both are transparent, and the consequence is that when light falls upon a mixture of yellow and blue powders, the green alone is sent back to the eye. The explanation of the mixture of pigments will be subjected to the test of experiment; and in a subsequent lecture the mixture of coloured lights will be employed to prove that blue and yellow, by their blending, produce white. This question of absorption is one of the most subtle and difficult in molecular physics. We are not yet in a condition to grapple with it, but we shall be by-and-by.

Meanwhile we may probably glance back on the web of relations which these experiments reveal to us. We have in the first place in solar light an agent of exceeding complexity, composed of innumerable constituents refrangible in different degrees. We find, secondly, the atoms and molecules of bodies gifted with the power of sifting solar light in the most various ways, and producing by this sifting the colours observed in nature and art. To do this they must possess a molecular struction commensurate in complexity with that of light itself. Thirdly, we have the human eye and brain so organized as to be able to take in and distinguish the multitude of impressions thus generated. Thus the light at starting is complex, to sift and select it as they do natural bodies must be complex. Finally, to take in the impressions thus generated the human eye and brain must be highly complex. If we were permitted to inquire into the intention of Nature we might well ask whence this triple complexity? If what are called material purposes were the sole end of nature, a much simpler mechanism would be sufficient. But instead of simplicity—instead of the principle of parsimony—we have prodigality of relation and adaptation, and this apparently for the sole purpose of enabling us to see things robed in the splendours of colour. Would it not seem that Nature harboured the intention of educating us for other enjoyments than those derivable from meat and drink? At all events whatever Nature meant, and it would be mere presumption to dogmatize as to what she meant, we find ourselves here as the issue and upshot of her operations, endowed not only with capacities to enjoy the materially useful, but also with others of indefinite scope and application, dealing alone with the beautiful and the true.

PREMIUM LIST OF THE SOCIETY OF ARTS.

The Council of the Society for the Encouragement of Arts, Manufactures and Commerce have just issued the "Premium List for the Sessions 1873-4-5." In their address they say that they are aware that some of the suggestions put forth may, at first sight, appear difficult of realization. "In some instances the thing sought involves the use of known substances in the industrial arts in a manner in which they are not at present employed, but in which there is reason to believe they are capable of being used with economy. In other cases the aid of the chemist is sought to develope such a form of action upon the material used as will induce the creation of new industries, or aid the extension of old ones by economizing processes, render them less detrimental to health, or lessen the risk of accident to those employed. Steam is the motive power now generally employed, but its use on common roads seems at present, for various reasons, inadmissible. Other agents, such as mercury, gunpowder and petroleum have been tried, but hitherto without success. There are, however, many other materials in nature to which scientific men and others may well turn their attention for the development of power, and put them in a form which shall render them available to the engineer and mechanist."

First on the list of the subjects for which prizes are offered we find some relating to economy in the use of coals for domestic purposes. They are—

1. For a new and improved system of grate, suitable to existing chimneys as generally constructed, which shall, with the least amount of coal, best answer for warming and ventilating a room.—*The Society's Gold Medal and Fifty Pounds.*

2. For a new and improved system of grate, suitable to existing chimneys as generally constructed, which shall with the least amount of coal, best answer for cooking food, combined with warming and ventilating the room.—*The Society's Gold Medal and Fifty Pounds.*

3. For the best new and improved system of apparatus which shall, by means of gas, most efficiently and economically warm and ventilate a room.—*The Society's Gold Medal and Fifty Pounds.*

4. For the best new and improved system of apparatus which shall, by means of gas, be best adapted for cooking, combined with warming and ventilating the room.—*The Society's Gold Medal and Fifty Pounds.*

5. For any new and improved system or arrangement not included in the foregoing, which shall efficiently and economically meet domestic requirements.—*The Society's Gold Medal and Fifty Pounds.*

The Council reserve to themselves the right of withholding all or any of the above prizes, as the judges appointed by them may determine.

Preserved Fresh Meat.—The sum of £100, placed at the disposal of the Council by Sir W. C. Trevelyan, Bart., with the Society's medal, is offered for the discovery of a process for preserving fresh meat in an uncooked or raw state better than by any method hitherto employed, applicable to the preservation of meat in countries where it is now almost valueless, so as to render it an article of commerce.

Uninflammable Wood.—The Society's Gold Medal is offered for the economic production of an uninflammable wood, so as to render buildings in which it is employed less destructible by fire.

A Gold Medal is offered for the discovery or manufacture of a means for safely and economically generating power suitable for use in place of steam. It should be free from refuse, noxious fumes, and injurious effects on the metals with which it may be brought into contact, or on the workmen employed.

Among the general prizes of gold and silver medals are—

Coating Vessels.—For an economical method of coating large vessels of zinc, such as baths, so as to present a bright and clean surface not readily oxidizable, and as durable as a tinned or japanned surface.

Vacuum.—For the introduction and use of a vacuum, for the drying and preservation of fruits and vegetables, either with or without heat of low temperature.

Vacuum.—For any new and economic application of a vacuum in the preparation or finish of manufactured goods.

Elastic Tubing.—For an elastic material for tubing suited to the conveyance of gas, and not liable to be affected by moisture, alterations in temperature, or to be acted upon by the gas itself.

Improved Chemical Balance.—For the best chemical and assay balance, suitable for the use of students and experimentalists, which (loaded with 600 grains in each pan) will show a difference of ·005 or less. To be sold at a moderate price.

Incombustible Wick.—For the production of an incombustible wick, suitable for use in lamps.

Waste Coal.—For a more economical and efficient method than any at present in use of preparing waste coal, so as to render it available as fuel for engineering or domestic purposes.

Lighting Coal Mines.—For a means of lighting coal mines, so as to increase the light in the workings, and at the same time reduce the risks arising in the use of the ordinary miner's lamp.

Freezing Machine.—For a machine or process, either chemical or mechanical, for lowering the temperature of substances by the abstraction of heat more effectually, and at less cost than is done by machines at present in use. The machine must be capable of working efficiently in the tropics.

For the Application of Lithography or Block Printing to stopping grounds, for etching upon glass or metals by means of chemical agents.

A Varnish or coating which can be applied to iron wires so as to protect them against rust, and which shall not be liable to chip off when the wire is bent or rubbed.

A Galvanic Element which shall combine the constancy of the Daniells's cell with the low resistance and high electromotive force of a Grove's cell.

An Electric Condenser which shall combine high capacity with small bulk, and small residual charge.

A Sensitive Pocket Galvanometer.—The size should not exceed that of a watch.

New Edible Roots.—For the discovery and successful introduction into this country of any new edible root or tuber useful as food for men or cattle, capable of resisting frost, and suitable for extensive and improved cultivation.

Electric Weaving.—To the manufacturer who first practically applies electricity to the production commercially of figured fabrics in the loom.

New Gums or Oils.—For any new resin, gum, or oils, the produce of India or Africa, calculated to be useful in the arts and manufactures, and obtainable in quantity at a moderate price. Samples of not less than 25 lb. of gum, and 50 lb. of oil, to be transmitted to the Society.

Telegraphs.—For an economic and permanent means of telegraphing through uninsulated wires, between places not less than 1000 miles apart.

Gunpowder.—For a method of constructing magazines for the storing of gunpowder, gun-cotton, nitro-glycerine, and other highly explosive compounds, so as to give increased security against explosions, and more effectually to provide against the possibility of large masses of material exploding, or, in case of explosion, communicating with other and adjacent quantities of explosive material.

Petroleum and other Light Oils and Spirits.—For a cheap and efficient method of constructing storehouses for the stowage of petroleum and other light oils, in towns and cities, so as to give greater security to the adjacent properties.

Peat.—For the introduction into commerce, as a substitute for coal, of fuel manufactured from peat, and suitable for combustion in domestic fireplaces, the furnaces of steam-engines, and for industrial purposes generally.

ANNUAL DINNER OF THE SHEFFIELD PHARMACEUTICAL AND CHEMICAL ASSOCIATION.

The annual dinner in connection with the above association was held in the rooms of the Society on Wednesday evening, February 12th; Mr. W. Ward, F.C.S., President, in the chair. There was a fair attendance of members, and amongst the guests were Dr. Hime, Wm. Baker, Esq., F.C.S., A. H. Allen, Esq., F.C.S., E. Birks, Esq., J. W. Harrison, Esq., M.R.C.S., etc.

The tables were very tastefully arranged, a large quantity of silver having been kindly lent for the occasion by a firm in the town. This is the first time the dinner has been held in the Society's own rooms; and it being somewhat of an experiment, it is gratifying to find that the arrangements gave universal satisfaction.

After the usual expressions of loyalty, "The Sheffield Pharmaceutical and Chemical Association" was proposed in an able speech by Mr. Allen, and was acknowledged by Mr. G. A. Cubley. Mr. J. T. Dobb proposed "The Medical Profession," Dr. Hime responding in an eloquent manner. "The Pharmaceutical Society," proposed by Mr. E. Birks; "The President," proposed by Mr. W. V. Radley; the Vice-President, Treasurer, Council, Secretary, and other officers being among the remaining toasts which were duly honoured. These proceedings, which were enlivened from time to time by music and singing, were of a thoroughly enjoyable nature, and were evidently appreciated by those present.

Perhaps one of the most interesting events of the evening was the presentation of a timepiece to Mr. W. V. Radley, Pharmaceutical Chemist (member of the Pharmaceutical Council), as a slight mark of esteem from a few of those who, as fellow-townsmen, have been acquainted with him in business, and who, holding him in high regard, have chosen this method of giving it expression. The clock, which is encased in a handsome black marble pedestal, inlaid with malachite, bears on a gilt plate this inscription:—"Presented to W. V. Radley, Esq. by a few friends, as a token of the respect in which he is held by the Pharmaceutical Chemists and Chemists and Druggists of Sheffield, February 12th, 1873."

Mr. Ward, President, in introducing the subject, alluded most feelingly and gracefully to the services rendered by Mr. Radley for years past to the Society at large, and particularly to the active regard he has ever evinced for the welfare and prosperity of the trade in this town.

Mr. Dobb followed in an eloquent speech, fully endorsing the remarks of the President, who, on again rising, amidst great applause, formally made the presentation.

Mr. W. V. Radley thanked sincerely and heartily those who had so kindly united to do him honour, and at the same time expressed the pleasure it had ever been to him to meet and work with those with whom it was his pride and happiness during many years to have been associated.

ANNUAL DINNER OF THE MANCHESTER CHEMISTS' ASSISTANTS' ASSOCIATION.

The third annual dinner of the above association was held at the Blackfriars Hotel on Wednesday evening, February 19; covers were laid for thirty-three. The after-dinner proceedings commenced by the President (Mr. W. Lane) calling upon the Secretary (Mr. Pidd) to read a short report of the proceedings since the commencement of the present session, which showed that eight fortnightly meetings had been held, at each of which a paper on some subject connected with pharmacy had been read and discussed. In regard to the number of members now on the roll, it was very gratifying to the Committee to see that the number this session is ten in excess of last,—last year being thirty-six and this forty-six. The usual loyal toasts were proposed, followed by that of the "Pharmaceutical Society," the "Manchester Chemists and Druggists' Association," and the "Manchester Chemists' Assistants' Association." The President, in responding to the latter toast, urged upon all those present not already members of the association the necessity of becoming so, assuring them that great benefit may be derived from the existence of such an association. With song and friendly discourse a most enjoyable evening was brought to a close.

The Pharmaceutical Journal.

SATURDAY, MARCH 1, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE REGISTER OF CHEMISTS AND DRUGGISTS AND THE CALENDAR OF THE PHARMACEUTICAL SOCIETY.

THE publication of the Register of Pharmaceutical Chemists and of Chemists and Druggists for 1873,—which, as will be seen by the Registrar's notice in our advertising columns, is now ready,—taken in conjunction with the recent issue of the Calendar of the Pharmaceutical Society, furnishes a favourable opportunity for laying before our readers some statistics partly drawn from them, and tending to throw light upon the effect the Pharmacy Act may possibly have in limiting or otherwise the number of persons entitled to carry on business as chemists and druggists. Another point, certainly of at least as much importance, which they will serve to illustrate, is the growing proportion of examined men that each year's Register contains, as well as the nature of the examinations they pass; and also, incidentally, the numerical relations of the Pharmaceutical Society to the whole body of chemists and druggists.

The Register of Chemists and Druggists for 1873 shows a gross total of 12,750 names; the first Register of the kind, published in 1869, a few months after the passing of the Pharmacy Act, 1868, contained 11,650. On the surface, therefore, it would appear that in four years there had been an increase of 1100 names. But among the rights reserved by the Pharmacy Act were those of the unexamined men, who were already engaged in the business as assistants, but who, not having kept open shop on their own account, were not entitled by the terms of the 5th section of the Act to be placed on the Register; for them it was provided that there should be a "modified" examination, the passing of which should entitle them to registration. About 2900 persons of this class, by sending in proper notices, took the necessary steps to secure this right, and of that number 1298 now appear upon the Register as "Chemists and Druggists: Modified Examination." Of these only 201 appeared upon the Register of 1869, showing an increase in 1873 of 1097. If this number 1097 be added to the 11,650 of the first Register,—as representing persons who were then virtually as much in the business as they are now,—it gives a total of 12,747, or very nearly the number on the Register for 1873. At any rate it will be better to adopt this number in estimating the proportion the examined men bear to the whole.

In 1869 there were 2443 Pharmaceutical Chemists on the Register, being 19·16 per cent. of the whole body of Registered Chemists and Druggists; in 1873 there are 2367 Pharmaceutical Chemists, or 18·56 per cent. Of these 1036, or 8·13 per cent. of the whole number on the 1869 Register, were Pharmaceutical Chemists, by virtue of having passed the "Major" examination, and 1138, or 8·93 per cent. on that for 1873. Of men who had passed the "Minor" examination,—the examination which is now required before registration—there were 462 in 1869, or 3·62 per cent.; in 1873 this number has increased to 1003, or 7·87 per cent. The result may be thus tabulated:—

	1869.				1873.			
	Number		Per cent.		Number		Per cent.	
Pharmaceutical Chemists:—								
Non-examined	1407	2443	11·03	19·16	1229	2367	9 63	18·56
Examined . .	1036		8·13		1138		8·93	
Passed the Minor		462		3·62		1003		7·87
Remainder, including 1097 "Modified" not on the Register in 1869.		9845		77·12		9,363		73·57
Total		12,750		100·00		12,733		100·00

In thus distinguishing between examined and non-examined men there is no intention to draw invidious inferences, but simply to place on record the facts by which in future years it will be most easy to ascertain the relative position of the trade.

If we take the list of Members and Associates of the Pharmaceutical Society, issued in 1859, ten years before the issue of the first Register and seven years after the passing of the first Pharmacy Act, the number of members (Pharmaceutical Chemists) contained in it was 2079, of whom only 47 were examined men. The Associates numbered 316. In 1868 the number of Members was 2022, of whom 600 had passed the examination. If to these be added the Associates, numbering 413, a gross total is arrived at of 2435, and upon comparing this with the total number contained in the first Register, it will be seen that about 20 per cent. of the whole trade were connected with the Society at the passing of the Pharmacy Act 1868. In 1872 the number of Pharmaceutical Chemist members was 2062, of whom 785 were examined, and of Chemist and Druggist members (a new class created by the Act of 1868) 669; giving a total of 2731. Add to these 940 Associates, and the total of registered Chemists and Druggists connected with the Society in that year amounts to 3671. In 1873, the Pharmaceutical Chemist members are 2027, of whom 790 have passed the "Major;" Chemist and Druggist members, 754; Associates, 941; giving a total of 3722, or upwards of 29 per cent. of the entire number on the Register, or an increase of nine per cent. in four years.

But, as might be expected, the largest relative proportions of persons connected with the Pharmaceutical Society, is to be found in the Register of Pharmaceutical Chemists. Thus in 1869 there were 2443 Pharmaceutical Chemists on the Register, of whom 2022 were members and 170 Associates of the Society: total, 2192 or nearly 90 per cent. This year, of 2367 Pharmaceutical Chemists on the Register, 2027 are members of the Society, or nearly 86 per cent. This apparent decrease is attributable to the putting in force of a bye-law which had been left in abeyance, as recently described in these columns, by which 163 names of persons who have passed the Major examination were erased from the Calendar. It is satisfactory to know that at least one half of these gentlemen have already applied for election as Members, a number quite sufficient to raise the per centage to as high a point as in 1869.

Lastly, of Registered Students or Apprentices of the Society, there were in 1859, 416; in 1868, 567; in 1872, 526; and this year there are 764.

The following table represents the foregoing figures:—

	1859.	1868-9.	1872.	1873.
Members:—				
Pharmaceutical Chemists	2079	2022	2062	2027
Of whom were examined	47	600	785	790
Chemists and Druggists .	—	—	669	754
Associates	316	413	940	941
Total number of Registered Chemists and Druggists connected with the Society	—	2435	3671	3722
Per centage of persons on the Register connected with the Society . . .	—	20	—	29
Per centage of Pharmaceutical Chemists connected with the Society . . .	—	90	—	86
Apprentices	416	567	526	764

DR. LYON PLAYFAIR ON PROFESSIONAL EDUCATION.

One of our chief authorities on education, whether in its preliminary or professional aspects, is Dr. Lyon Playfair. He has had experience of the subject both practically and theoretically—practically as an *alumnus* of Scotch and German Universities and as the holder of the chemical chair in his Edinburgh *alma mater*; theoretically, as one of the chief promoters of science as an element in school instruction, and particularly of technology. As the representative in Parliament of the combined constituencies of St. Andrew's and Edinburgh Universities, he has commanded the attention of the House on every occasion when primary and middle-class instruction has been the topic of debate; and now that Irish University Reform has been announced as one of the main features of the session, he may be expected to take a prominent part in its discussion.

In an address delivered the other day before the St. Andrew's Medical Graduates' Association he has given some anticipation of the line he means to adopt in university education in general, and professional education in particular. The great difficulty, he maintains, in the culture of professional men is to secure an efficient preliminary course, which shall complete itself before the commencement of strictly professional studies. The day is done when Latin, Greek, and Mathematics can pretend to engross all the student's time up to his twentieth year. These subjects will never lose their value as parts of a liberal education; but it is idle to claim for them the exclusive or even the principal place in the future professional man's curriculum. Why, he asks, cannot the professional aspirant gain from the modern languages, from elementary physics and chemistry, and from natural history all the training that the classics and geometry have hitherto been held to give? Dante, Corneille, Goethe, to say nothing of our own Shakspeare and Milton, form as refining agents in mental culture as Homer or Horace; while observation and induction—the best of all logical disciplines—can be better acquired from the study of physics and natural history than from algebra or the formal syllogism. Such being so, why should not the University make these newer and not less valuable subjects qualify for the B.A. degree; while still retaining the older ones for students who care as possibly the future barrister and divine may care, to take them up for the same degree? In this way the student whose destination is medicine may, in his preliminary course, be pursuing a discipline which, while accelerating his subsequent progress in his professional studies, entitles him to the University's imprimatur as a graduate in arts; in other words, to the B.A. degree.

This suggestion will, doubtless, engage much attention from University Reformers, as opening up the sphere of academic education in general and placing our seats of learning more *en rapport* with the spirit of the age. The B.A. degree—the stamp of University recognition—will be thrown open by Dr. Lyon Playfair's policy to the future pharmacist, agricultural chemist, or engineer; and the Universities themselves, by thus widening their curriculum, will not put themselves in competition with institutes which are now usurping so much of the education of the national youth. His plan, indeed, is essentially a conservative one, so far as the influence of the Universities is concerned; and its principle is already being admitted in practice by the usage of even Oxford and Cambridge. These seats of learning are now giving courses of chemistry and physics which, while counting for much in the arts curriculum, at the same time enable the future medical student to prosecute his professional studies from a coign of vantage denied to him before; and at Edinburgh and Glasgow, the day is not far distant when the B.A. degree will be open to candidates whose "little Latin and less Greek" will be condoned in consideration of their proved proficiency in chemistry, physics, and natural history.

The next Evening Meeting of the Pharmaceutical Society will be held on Wednesday next, March 5th. The following papers are announced to be read:—"Legal Pharmaceutical Preparations," by Charles Symes, Ph.D.; "On the Proposed Appendix to the British Pharmacopœia," by Professor Redwood; "Tincture of Quinine," by Mr. T. H. Hustwick, "Emulsions," by Mr. Herbert G. Rogerson.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

February 19*th*, 20*th and* 21*st*, 1873.

Examiners Present—

19th and 20th—Messrs. Allchin, Barnes, Carteighe, Cracknell, Davenport, Edwards, Gale, Haselden, Ince, Linford, Martindale, and Southall.

21st—Messrs. Allchin, Barnes, Carteighe, Cracknell, Davenport, Edwards, Gale, Haselden, Ince, Linford, and Martindale.

Major Examination.

Five candidates presented themselves, of whom *two* failed. The following *three* passed, and were declared to be duly qualified to be registered as Pharmaceutical Chemists:—

	*Evans, Gwilym	Swansea.
	Little, Arthur Nicholas	Bristol.
	Rossiter, John	London.

Minor Examination.

Fifty-six candidates presented themselves, of whom *twenty-two* failed. The following *thirty-four* passed, and were declared to be duly qualified to be registered as Chemists and Druggists:—

	*Howell, John	Carmarthen.
	*Cann, Charles John	Greenwich.
	*Heyland, Charles Philip	Hammersmith.
	*Cumming, James	Camberwell Road.
	*Baxter, William, jun.	Wisbeach.
	Stoddart, Joseph	Alresford.
	Radford, John Storer	Nottingham.
	Symons, William Henry	Barnstaple.
Equal.	Bradshaw, John	Runcorn.
	Rees, Llewellyn Vosper	Mumbles.
	Dyson, Alfred	Brighouse.
Equal.	Gerring, Charles	Worthing.
	Marin, Ferdinand Baptist	London.
	Rhodes, Samuel	Oldham.
Equal.	Barnes, Edward	Cosham.
	Davies, John	London.
	Weddell, Arthur	Stamford.
	Dangerfield, Edward	High Wycombe.
	McLean, Kenneth	London.
Equal.	Prust, Thomas William	Leeds.
	Stables, Walter Banks	Bradford.
	Thomas, James Phillip	Hay.
	Little, Henry	Surbiton.
Equal.	Betts, Alick Stephen	Woodbridge.
	Short, William	March.
	Bake, Alfred Benjamin	Guildford.
	Steele, Samuel	Plymouth.
	Miller, Edward	Oakham.
	Thompson, Harry	Norwich.
	Breadner, Charles Gibson	Manchester.
	Davies, Henry Morgan	Cardigan.
	Harris, Francis George	Leamington.
	Stevens, Stephen Nobbs	Swaffham.
	Hinds, Howell David	Pontardulais.

The above names are arranged in order of merit.

Preliminary Examination.

A Certificate of Examination by the University of Oxford was received from the undermentioned in lieu of the Society's Examination:—

Brookfield, Samuel .... Hanley.

* Passed with Honours.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The eighth general meeting was held at the Royal Institution on Thursday evening, the 13th inst.; the President, E. Davies, Esq., F.C.S., in the chair.

The following donations were announced:—'Proceedings of the Architectural and Archæological Society;' 'Calendar of the Pharmaceutical Society;' 'The Year Book of Pharmacy.'

Mr. T. Williams, F.C.S., exhibited a specimen of artificial galena which he had made, and described the process.

A discussion on the solubility of pure lead in sulphuric acid followed in which the President, Messrs. Armstrong, Williams and Mason took part.

A discussion also took place in reference to a recent case of death following the inhalation of nitrous oxide gas, and as to whether the accident was due to impurities contained in the gas, or to the state of the patient when inhaling it, in which the President, Messrs. Abraham, Mason, Williams and Redford took part.

The Hon. Secretary then read a paper on "Guaraná," and exhibited specimens of the seeds from which this substance is prepared, also samples of guaraná, including very pure, average, and inferior qualities, which he had procured from Messrs. Rigaud and Leconte, of Paris. Specimens of some other pharmaceutical products manufactured by the same firm, were shown, including chloral hydrate, medicinal "perles," etc.

The meeting terminated with a vote of thanks to the reader of the paper.

BRISTOL PHARMACEUTICAL ASSOCIATION.

The fifth general meeting of the session was held at the Museum and Library, Bristol, on Friday, the 14th of February.

The President, Mr. Townsend, occupied the chair, and briefly introduced Dr. Tilden, who delivered a lecture upon "The discoveries of Scheele," of which the following is an abstract:—

Carl Wilhelm Scheele was the son of a small tradesman at Stralsund, in Swedish Pomerania (now a Prussian province). He was born on 9th December, 1742, and at an early age was placed in apprenticeship with an apothecary at Gottenburg, where he remained about six years. After some years spent as assistant in different pharmacies Scheele went to Upsal, where he made the acquaintance of Bergmann, who was at that time a celebrated chemist and held a Government appointment. Scheele's reputation as a chemist was so soon established that at the instance of Bergmann he was invited to accept a chair in the University of Upsal. He also received then and afterwards various other flattering offers, not only from the Swedish Government, but from those of other countries. His sole anxiety, however, being to secure leisure for the pursuit of his favourite studies, he rejected all these opportunities of advancement, and retired to a small pharmacy which was then vacant in the town of Kœping. Here he made all the great discoveries with which his name is associated.

It is a fact which must be interesting to all who have at heart the advancement of scientific culture among the members of the pharmaceutical calling that these great discoveries, though they necessarily demanded the expenditure of much thought, time and labour, were accomplished in the very short period of about fourteen years, at a time too when the attention of the author must have been considerably distracted by the cares of business. It is further worthy of remark that that business was by no means neglected, and at the death of the proprietor, in 1786, was left in a prosperous condition.

The Essays of Scheele were translated into English, and published in the year 1786, by Dr. Beddoes, whose name is connected with the establishment of the Medical Pneumatic Institution, in Bristol, where, with the assistance of the young Humphry Davy, experiments were made on the cure of diseases by the aid of "factitious airs" or gases, nitrous oxide amongst the number.

Dr. Beddoes relates in his preface the origin of the compliment, a paraphrase of which was afterwards spoken of Davy, which in its first application was so deservedly paid to Scheele. It was observed to him, he says, "by a near relation of Bergmann, *that the greatest of Bergmann's discoveries was the discovery of Scheele.*"

It was then pointed out by the lecturer that great as the memory of Scheele actually is, and lasting as it must be, he receives credit for only a part of his work. A man of extremely retiring disposition, he sometimes omitted to publish his work till some time had elapsed, and other experimenters had gone over the same ground. This was the case with his treatise on 'Air and Fire,' in which is announced the independent discovery of both oxygen and nitrogen.

The lecturer then proceeded to give a rapid sketch of the theories which had been maintained up to Scheele's time, with reference to the phenomena of combustion and the nature of fire.

The ancients and even the alchemists regarded fire as an element or simple substance. In the act of burning, a thing was supposed to lose something, the escape of which was assumed to give rise to the appearances ordinarily attendant upon combustion.

Many of the metals were known to become converted, by exposure to heat in the air, into calxes. According to the views current at that time the metals were supposed to be compounds of these calxes, with a hypothetical element called sulphur, or inflammable earth, which, during the calcination, was believed to escape from them.

This idea is stated clearly in the following passage from Scheele's essay on 'Air and Fire.' "Iron consists of an earth *sui generis*, united with a certain quantity of phlogiston. and a certain quantity of heat: all metals agree in that point: the difference is in their earths, which, according to their nature, have absorbed either more or less phlogiston."

Every different kind of combustible substance was supposed to contain an inflammable constituent peculiar to itself.

At the beginning of the last century this idea was modified in an important respect by the celebrated Stahl, whose theory of *phlogiston*, though necessarily abandoned at the foundation of modern chemistry by Lavoisier, will always be remembered with respect. The leading idea of the theory was the existence of a universal element of combustibility, the presence of which in a substance rendered it capable of burning.

It is remarkable that throughout the progress of these ideas, developed so slowly, two circumstances inseparable from all ordinary cases of combustion whether slow or rapid had been systematically ignored.

These were the facts that, on the one hand, the presence of air is necessary for combustion, and on the other that metals when calcined in the air increase in weight.

The results of these experiments had been confirmed by men so able and eminent as Robert Boyle and others, but the facts had remained unnoticed or were disposed of by superficial explanations.

This was the state of matters when Scheele commenced his experiments on "Air and Fire," about 1774. In his essay on this subject, a translation of which, by J. R. Forster, LL.D., is bound up in the volume belonging to the library of the Pharmaceutical Society together with the rest of his essays, Scheele demonstrated the existence in air of two kinds of elastic fluids, of which one was completely absorbed by burning phosphorus, by solution of liver of sulphur, by alkaline sulphites, by turpentine, and all such oils as will dry in the air and may be changed into a resinous substance; also by moistened iron filings, and by many other substances. In all these cases a kind of air is left in which "neither a candle will burn nor any spark be visible." And "this air which is unserviceable for the fiery phenomenon, and which makes (as he stated erroneously) about two-thirds of common air, he called "corrupted or foul air" (nitrogen)." The other constituent of air which in the experiment with the phosphorus is absorbed by it, Scheele called "empyreal air," and obtained in a state of purity by several processes.

In the course of his experiments with this kind of air he observed and described correctly not only all the ordinary properties of oxygen gas, but was careful to note that it was entirely absorbed by phosphorus and those other substances which he had employed in the analysis of atmospheric air.

"Therefore these experiments prove that *empyreal air* is that kind of air by means of which fire burns in common air, and it is in common air mixed with a kind of air which has not the least attraction of the inflammable; and it is owing to this that some hindrance is made to rapid and violent conflagration; and most certainly if all the air consisted of empyreal air, the water would be of little service for extinguishing of fires."

One of the earliest of Scheele's essays was on 'Fluor Mineral and its Acid.' His attention had doubtless been attracted to this subject, "on account of the beautiful phosphoric light which this stone yields in a dark place when it has been heated. But its constituent parts are as yet little known." An observation which, notwithstanding the numerous experiments since made in the hope of isolating fluorine, is scarcely less true at the present day than it was in 1771. Scheele's first experiments upon the action of acids on fluor were made in glass retorts, and the consequent formation of white silicious earth in the water which he had placed in the receiver, together with the corrosion of the glass, caused him much perplexity, and led him not unnaturally into some serious errors.

Another very early essay was that on Manganese, or, 'Magnesia Vitrariorum,' published in 1774.

It has already been pointed out how, in the course of trying the effect of vitriolic acid upon this mineral, Scheele discovered pure empyreal air or oxygen. When he came to use muriatic acid, he made the discovery of another gaseous element scarcely less important in the eyes of the chemist. This substance was called, by Scheele, "dephlogisticated muriatic acid," in accordance with the views current in his day; and did not receive the name chlorine till many years afterwards, when its character as an element was established by Sir H. Davy.

The leading properties of chlorine are described quite correctly in Scheele's memoir, and were experimentally illustrated by the lecturer. One of its most striking peculiarities, which was of course unknown to Scheele, is its power of uniting with hydrogen gas, regenerating the muriatic acid from which it was obtained. Under the influence of light of sufficient intensity and especially of the more refrangible violet rays of the spectrum, this combination is effected so rapidly that explosion ensues. It is interesting to note that although Scheele was not acquainted with this particular instance of chemical action promoted by the agency of light, he was the first to observe and explain the photographic action of sunlight. For having exposed *luna cornua* to the sun, he found that a black powder was formed and muriatic acid generated. "Hence it follows that the blackness which the *luna cornua* acquires from the sun's light is silver by reduction."

One discovery of Scheele's will always be associated, at any rate, in the minds of pharmacists, with the memory of the illustrious Swede. The discovery of prussic or hydrocyanic acid was the result of some excellent and well-directed experiments upon Prussian blue, the origin of which is described (1782) by the author in the following terms: "Towards the beginning of the present century Mr. Diesbach, a manufacturer of colours at Berlin, with the assistance of Dr. Dippel, accidentally discovered the blue colour, since called Berlin or Prussian blue. They kept this preparation with great secrecy, till Woodward published the whole process in 1724."

The source of the colouring matter was, in the first instance, and long after, a solution of the ashes of blood, or, as it was called, *lixivium sanguinis*.

Scheele, in the course of his inquiries, soon found that, although the lixivium underwent rapid change when kept, the addition of vitriolated iron in some manner fixed the colouring matter in the lixivium so that it retained the power of furnishing, with a solution of iron, prussian blue.

He also found out that the colouring matter, for this was the name he applied to the prussic acid, was volatile and inflammable. The wonder is that he did not experience its poisonous action. He made a great many experiments with the view to discover the constituent parts of his colouring matter, and not altogether without success. At one time he was disposed to believe that it was a compound of volatile alkali and an oily substance. This view, however, he afterwards modified, as he could obtain no oil from it, neither could he produce the colour from fatty substances. But he retained the belief that volatile alkali had something to do with it, and here he was quite right, modern chemistry having taught us not only the relationship which connects the two, but also how ammonia may be transformed direct into hydrocyanic acid.

No account, however meagre, of Scheele's labours could be fairly undertaken without, at least, passing allusion to two discoveries which, from a practical point of view, present the highest interest. These are the discovery of the "New Green Pigment" (1778), ever since called Scheele's green, and of glycerine, which he prepared from oils and fats by a process which is carried on up to the present time almost precisely as described by Scheele in 1784.

In conclusion it was pointed out that Scheele was essentially an experimenter, and meddled very little with theory. In the opinion of the lecturer the more diligent cultivation of experiment is the one thing needful in the chemistry of the present time.

[The lecture was illustrated by appropriate experiments.]

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The ninth session of the above association was opened on Thursday, Febuary 13th, with a lecture by F. T. Mott, Esq., F.R.G.S., on "The Classification of Plants;" Mr. F. Parsons, pharmaceutical chemist, in the chair. The lecture, which was of a very interesting and exhaustive character, was illustrated with various coloured diagrams, and was listened to with marked attention. The lecturer described the different systems of classification originated by Ray, Jussieu and Linnæus; and in remarking upon their various merits, expressed an opinion that the system now usually adopted is open to many objections, as to whether it can be a truly natural arrangement. In connection with the classification, the geographical distribution of plants was also mentioned, and an outline of the manner in which groups of species are distributed in various parts of the World given.

At the conclusion, a very hearty vote of thanks was given to the lecturer, who briefly responded. The usual vote of thanks to the chairman having been passed, the meeting terminated.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL ASSOCIATION.

The monthly meeting was held on Wednesday, 19th February, when a lecture was delivered by Mr. W. Ward, F.C.S., President, "On Potassium and some of its Formations." The lecture, which was well delivered and profusely illustrated by capital experiments, was listened to with great attention, and at its close a cordial vote of thanks was accorded to Mr. Ward. The attendance was not so satisfactory as the Council wish it to be; and this was the subject of serious comment at the close of the lecture, it being felt to be injurious to the best interests of the Society if these meetings are not well attended. The election of two gentlemen as associates concluded the business.

MANCHESTER CHEMISTS' ASSISTANTS' ASSOCIATION.

The ninth ordinary meeting of the session was held on Monday evening in the class-room, 37, Blackfriars Street; the President in the chair. Mr. Pidd read an interesting paper "On the Alkalies and their Tests." The remaining part of the evening was taken up with a discussion on the poison regulations.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, 20th February, 1873; Dr. Frankland, F.R.S., President, in the chair.

The first paper read, after the usual business of the society had been transacted, was entitled "Solidification of Nitrous Oxide," by Mr. T. Wills. The gas, having been previously liquefied by compression in a strong iron vessel, can be caused to solidify by the rapid evaporation of the liquid in a current of air. It somewhat resembles solid carbonic acid in appearance.

A paper "On Aurin," by R. S. Dale, B.A., and C. Schorlemmer, F.R.S., was then read, giving an account of the author's investigation of the composition and chemical properties of this dye. "Researches on the action of the copper-zinc couple on organic bodies. I. on iodide of ethyl," by J. H. Gladstone, F.R.S., and A. Tribe, was read by Dr. Gladstone; and the last communication, "On the determination of ammonia in the atmosphere," was read by the author, Mr. A. H. Smee, jun. The method employed is to collect and examine the moisture condensed from the atmosphere on the external surface of a suitable glass vessel filled with ice. The lecture was illustrated by carefully made drawings of the magnified crystalline forms which are left on evaporating the liquid. The meeting finally adjourned until Thursday, 6th March, when papers will be read "On the action of hydrochloric acid in codeine," by Dr. C. R. A. Wright; "New process for mercury estimation, with some observations on mercury salts," by P. Hannay; "On a method of estimating nitric acid," by T. E. Thorpe; and a "Note on the action of acetates upon solutions of plumbic salts, with remarks on the solubility of plumbic chloride," by F. Field.

Parliamentary and Law Proceedings.

Prosecutions for Adulteration in the Isle of Man.

A short time since a series of prosecutions were instituted under the Manx Adulteration Act, when several of the most respectable merchants in Douglas were fined in small sums for selling brandy of a less strength than seventeen degrees under proof, the Manx Act providing that any spirit so sold shall be considered for the purposes of the Act as being adulterated. These were followed by prosecutions against four leading tradesmen, named William Allen, James Coole, D. E. Gelling, and Messrs. F. and W. Stephen, for selling adulterated tea.

Dr. Campbell Brown, of the Royal Infirmary, Liverpool, the public analyst for the Isle of Man, certified that the sample of tea purchased from Mr. Allen was adulterated and faced with mineral matter, Prussian blue, and other colouring matter, and was weighted with sand.

For the defence, a witness named Gill, a shopman in Mr. Allen's employ, was called, and deposed that the tea was purchased from Messrs. Peake Brothers, of London, and was sold in the same state as that in which it was received.

Mr. D. D. Lewin, a merchant, who had been in the tea trade over thirty years, gave evidence that the colour of green tea was artificial entirely, and was coloured in China, and the very finest quality was slightly coloured.

In the case of F. and W. Stephen, the certificate of Dr. Campbell Brown stated that the tea was adulterated, and was faced with mineral matter and Prussian blue.

For the defence, Mr. D. D. Lewin gave similar evidence to that above quoted.

In the case against Mr. Coole, Dr. Brown's certificate was exactly similar to that given in Stephens' case. In the case against Mr. D. E. Gelling, the certificate was also similar. The cases having been held over for consideration.

His Worship, the High Bailiff of Douglas, gave judgment on Saturday last. He said,—In the cases of the adulteration of green tea he was of opinion that they all more or less come under the operation of the Manx Act, which was very much more stringent than the Act passed in England, under which several cases have been dismissed, on the ground that the seller had no knowledge that the articles he sold were adulterated. He could not find any reported cases in other parts of the kingdom in reference to the colouring of tea. Under the Manx Act the teas in these cases were, according to the evidence, undoubtedly adulterated, and he should, therefore, be compelled to fine the defendants; but he was very desirous that the opinion of the Appellate Court should be had on the subject. He considered that the colouring matter used in the tea was a sufficient adulteration of the material to justify him in fining the defendants, but he thought it very desirable that in case of an appeal the question should be argued before the Court whether, under the Manx Act, the party selling without a guilty knowledge of the fact that the articles were adulterated is liable to be fined. In those cases they had the evidence of the public analyst that the adulteration was effected by means of mineral substances and colouring matter. He saw no difficulty, therefore, in deciding that there was adulteration, but there appeared to be a difference in the four cases; that against the defendant, William Allen, was the worst, and it would be necessary to inflict a heavier penalty on him than on the others. The fact, however, appeared to be that all the parties sold the teas as unadulterated—at least they gave no notice they were adulterated. There was no notice of adulteration in the knowledge of the sellers. No doubt the defendants sold the teas as they got them, and, therefore, it was desirable that there should be an appeal, in order to decide whether, under such circumstances, the defendants were strictly liable. He would, therefore, draw the attention of the learned counsel to the fact that the law is different in England to what it is in the Isle of Man. In the case of William Allen, the certificate was as follows:—"This sample is adulterated and faced with mineral matter, Prussian blue, and other colouring matter, and is weighted with sand." Under the circumstances of this case the defendant was fined twenty shillings and costs, or twenty-one days' imprisonment in default of payment. The certificates in the other three cases—those of James Coole, Daniel Edward Gelling, and F. and W. Stephen—were all alike, viz., that the teas were "adulterated, faced with mineral matter, Prussian blue, and other colouring matter." In each of those cases the penalty would be ten shillings and costs, or fourteen days' imprisonment in default of payment.—*Liverpool Daily Post.*

The Compounding of Prescriptions in Ireland.

On February 22nd, an undefended action was heard in the Court of Queen's Bench, Dublin, before Mr. Justice Barry and a special jury, in which the Governor and Company of the Apothecaries' Hall sought to recover two penalties of £20 each, under the Apothecaries Act, from the defendant, Mr. Robert Croskerry, of Portrush, for having practised the art and mystery of an apothecary, without having obtained the necessary certificate from the plaintiffs, authorising him to do so, as required by the Act of 31 George III. chap. 34.

The defendant is the proprietor of two medical establishments—one at Portrush and the other at Coleraine. He had lately presented himself for examination at Apothecaries' Hall, but was unsuccessful.

Mr. Purcell, Q.C. (with whom were Mr. Anderson and Mr. Kaye, instructed by Mr. G. H. Belas), in stating the case, said the defendant possessed the diploma of surgeon from the College of Surgeons, England, and the diploma from the College of Physicians, Edinburgh. His name did not appear on the medical register as an apothecary, and this was conclusive evidence under the Act. The offence was committed on the 16th and 17th October last, when Mr. Croskerry compounded prescriptions.

Mr. Thomas Hanley and Dr. Charles Henry Leet, Secretary to the Apothecaries' Hall, having been examined, a verdict was returned for the amount.

His Lordship certified for a special jury, as it appeared the defendant had intimated that he would take the case to the House of Lords.

The West Auckland Poisoning Cases.

On Tuesday, February 25th, Mary Ann Cotton, who at West Auckland on the previous Friday was committed to Durham Assizes on a charge of having murdered Joseph Nattrass, a former lodger, was again brought up on a charge of having murdered her stepson, Frederick Cotton, aged ten, and Robert Robson Cotton, her own child, aged fourteen months.

The evidence of the neighbours showed that the prisoner would allow no one but herself to attend to the children, and one witness stated that although she made some beef-tea for Frederick Cotton after he had told her that he wanted something, still Mrs. Cotton would not allow him to have it.

Dr. Scatterwood, of Leeds School of Medicine, said he had no doubt whatever that the children died from arsenical poison.

A witness named Thomas Detchon, assistant to Mr. Owen, chemist, Newcastle, said, in January, 1869, a woman who called herself Mary Ann Booth, came with another woman to the shop and purchased three pennyworth of soft soap and arsenic. That woman was the prisoner, and he pointed her out among a dozen women at Durham Gaol. He saw her photograph in the early part of November, and he pointed her out in the latter part of the same month.

A witness named Jane Hedley, formerly a neighbour of the prisoner, said she had employed Mrs. Cotton to assist her in cleaning her house. On one occasion Mrs. Cotton recommended a composition of arsenic and soap, in order to kill the vermin. Witness went to the prisoner's house for it, and found it there.

Dr. Kilburn, who attended Robert Robson Cotton, said he saw him early in the morning, and apparently in excellent health, prattling on his mother's knee. He was astonished at nine to hear that the child was dead, for there was nothing the matter with him to cause death.

At the conclusion of the examination the prisoner was committed on a charge of wilful murder in each case. In answer to the usual question as to whether she had anything to say, prisoner replied in the negative. During the hearing of the case the prisoner complained that the person to whom she had intrusted her defence was not fulfilling his duty. The Bench assured her that she would be provided with an able counsel. Her case comes on at the assizes. During the proceedings prisoner has not shown much anxiety, and she has only put one question—a question of time—through the whole examination.

Review.

THE OWENS COLLEGE JUNIOR COURSE OF PRACTICAL CHEMISTRY. By HENRY E. ROSCOE, B.A., F.R.S., Professor of Chemistry in Owens College, Manchester, and FRANCIS JONES, Chemical Master in the Grammar School, Manchester. Macmillan and Co. 1872.

This little book of 171 pages is evidently intended to be used along with Professor Roscoe's popular 'Lessons in Elementary Chemistry.' It is indeed a partial embodiment of such experiments as would fitly illustrate the course of reading given in the larger volume.

The first forty pages (Part I.) contain directions for the preparation of the gases, and their chief compounds, of iodine, bromine, and caustic soda. The apparatus to be employed and the mode of fitting them up are described with a minuteness and clearness which will recommend themselves to teacher and pupil alike; and that nothing may be wanting to give a clear conception of the meaning of the author, the description is occasionally illustrated by the judicious insertion of a well-executed woodcut. Every chemical change in this part of the book is represented by an equation, the value of which to the young student is augmented by the addition of a second equation showing what are the reacting proportions by weight, thus—

$$\begin{aligned} 2P + O_5 &= P_2O_5 \\ 62 + 80 &= 142. \end{aligned}$$

This is one step in the right direction: another (in respect of gases) would be the introduction of a third equation, pointing out the reacting volumes. These double (and triple) equations will doubtless be more extensively employed both in text-books and in class-teaching than they have been hitherto. They may be introduced to the young student as soon as he has been told that the different forms of matter unite in definite proportions to form chemical compounds, and they should be held before him until his mind is so saturated with facts illustrative of this, that they may rapidly crystallize into those general expressions which are the primary forms enabling us to classify and explain the multifarious and sometimes apparently contradictory aspects presented to us by experiment; expressions which are only too frequently the uncertain result of a slow process of painful elaboration.

We presume that the equations employed in the 'Junior Course' are intended to be nothing more than short representations of chemical changes, without any reference to theoretical considerations. But even supposing this to be so, we venture to think that greater uniformity in the representations would make the book more valuable to the young people for whom it is intended; who, are only too apt to see difficulties where there are none, especially the more painstaking among them. For example on page 6 we find—

$$H_2 + O = H_2O$$

and on page 11— $2H + O = H_2O$;

a difference which is sure to be puzzling to a student who is anxious to apply his knowledge of molecules, and of the functions of figures according as they precede or follow the symbol of an element in the free state. The equation previously quoted would be a still greater puzzle. We trust to see these defects remedied in the next edition.

The rest of the book is devoted to qualitative analysis. In fourteen pages which treat of the blowpipe is found an exceedingly good introduction to the employment of this useful but somewhat neglected instrument. How to use the blowpipe is clearly indicated; and no intelligent boy can fail to obtain the different blowpipe flames and to understand their properties, and the properties of the different parts of the Bunsen flame, after carefully reading the two or three pages in which they are described, and following the plain directions given therein. If we mistake not, this will be the most popular part of the book with those who use it, and the author has done well to give it such prominence. Then come tables of directions for the Preliminary examination of single salts, soluble or insoluble, followed by the reactions of the commoner metals grouped in the ordinary way according to their analytical relations, and by schemes for the separation of the metals. As far as possible the acids are grouped similarly. Notice of the organic acids is restricted to eight, two or three of which we should have thought of minor importance as compared with others that are omitted.

The least satisfactory part of the book is that which gives tests for organic alkaloids and certain other organic bodies,—the list of bodies might be, and we think should be, extended.

On the whole we congratulate Mr. Jones on his work, and think it so good that we could well wish there were more of it. We hope, however, not to be told in a subsequent edition as we are in this, that "certain metals such as zinc yield hydrogen gas when they are acted on by acids."

Professor Roscoe's three injunctions (given in the preface) should be taken to heart by every young chemist.

1. Be sure you understand the theoretical explanation, as well as the practical part of the experiment.
2. Keep careful notes of each day's laboratory work.
3. Learn to work neatly.

Notes and Queries.

[329.]—LIQ. AMMONIAT. VALERIANÆ.—'H. D. W.' speaks from personal knowledge of Mr. B.'s preparation, and had some difficulty about dose. "L." writes to say, that the following formula for such a preparation is given at page 637, in M. Ferrand's 'Aide Mémoire,'

"VALÉRIANATE D'AMMONIAQUE (Pierlot):
Pr. Eau dist., ... 95
Ac. Valérianique 3
Carbonate d'Amm. q.s.
Jusqu'à saturation; ajoutez,
Extrait de Valériane 2
F. dissoudre, filtrez.—6 à 30 gouttes et plus en potion," etc.

M. Ferrand previously states:—"—— il est nécessaire d'employer du carbonate provenant de l'urine, plutôt que de la fabrication du gaz."—L.

If the prescription in which liq. ammon. valerianæ appeared hailed from Southsea, it would, I believe, be a solution of the salt in aq., strength about 3 grains in each dose. I remember meeting with precisely the same difficulty, and was fortunately able to ascertain, beyond any question, that the above was intended.—ALPHA.

Correspondence.

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

A Valentine's Reply.

"Press me not, 'beseech you, so;
There is no tongue that moves, none, none i' the world,
So soon as yours, could win me; so it should now,
Were there *necessity* in your request, although
'Twere needful I denied it."—*Winter's Tale.*

Did I possess a trace of wit and the pen of a ready writer,
The ladies' virtues I'd describe, and nothing should be brighter.
How much I prize their loving hearts when in their proper places,
And how I sorely dread to see them kicking o'er the traces!
I know that at the bedside of the dear and suffering sick
Their kindness and their gentleness, their ready help and quick,
Are loved beyond the sympathy that man can ever show,
And sometimes valued more than all the *skill* he can bestow.
How well they shine at Christmas-time in the merry mazy dance,
In all the little children's games of forfeits and of chance!
At conversaziones and at private scenes theatrical,
Garden fêtes and croquet too, pleasures good and practical;
In *magazines* of many kinds they are never out of place,
Could man descant as well as they on *point* and *Brussels* lace;
Or measure, make, and well design the newest bridal dresses,
And fit their little feet with shoes and curl their golden tresses?
I cannot reconcile the thought e'en in imagination
That ladies, like the Yankee, should expect to beat creation.
I could not bear to see their hands as soft as alabaster
Begrimed all o'er with dirty pill and nasty smelling plaster.
Oh! may I never see them with their chignons in profusion
Attempt to shake the tinctures or prepare the cold infusion.
How could they climb the shaky steps to clean the bottles dusty,
Or go below amongst the *wets* into the cellar musty?
Their sleek round arms were never made to work the iron mortar,
But some opine they might assist to cut the *salary* shorter.
How gladly, I ween, would he resign unto the beauteous fair
The cares, the trials, the honours too, of the Presidential chair,
Could he but be persuaded that the *shades* of Allen, Payne, and Bell,
Would whisper in his ear *these words*, Mr. President, 'Tis Well.

M. P. S.

L-nd-n, 24th February, 1873.

Pharmaceutical Women.

Sir,—The question of admitting ladies to the ranks of the Pharmaceutical Society will probably be a subject of discussion at our next annual meeting, and as the action of the Council regarding their admission has recently been commented on by the editor of the *Chemist and Druggist* in a way to mislead readers who are not fully acquainted with the difference between *registration* under the *Pharmacy Acts of* 1852 *and* 1868;" and *enrolment* in the *Pharmaceutical Society*, I venture (knowing how extensively that journal is read by men who also read your Journal) to trouble you with a few remarks. I feel the more at liberty to do this because my name has appeared somewhat prominently in opposition to the ladies—an unenviable position it may be, but one which my sense of the welfare of the Pharmaceutical Society has compelled me to assume.

The *Chemist and Druggist* says of the refusal to elect three females as "Apprentices of the Society:"—

"The Board of Examiners had no authority to refuse these ladies; the Board simply enacts definite requirements, and these were complied with to the letter. Putting it in the mildest form, it was scarcely delicate in the Council to upset the natural working out of the decision of the Examiners."

Your readers should be informed that the Council had neither the power nor the inclination to upset the decision of the Board of Examiners. On the report of the Board, the *Registrar* places the names of all who pass the examinations on their respective registers without reference to the *Council*, and persons so registered have all the rights of exercising their business to the fullest extent under the Pharmacy Acts.

The only question which came before the Council on the 5th of February was, whether Alice Marion Hart, Louisa Stammwitz, and Rosa Coombes Minshull should be admitted as apprentices *of the Pharmaceutical Society.*

Now, Sir, these ladies are utter strangers to me, therefore no personal feeling could influence me in moving that they be not admitted; but as I have always held that the Pharmaceutical Society was intended to be a Society of men, that certain disadvantages would arise from its being a mixed Society of men and women, and that the admission of females as apprentices would be only a stepping-stone to their admission as members, I felt bound to oppose them on the threshold.

As to the concluding words of the *Chemist and Druggist*, that the decision of the Council is "*as illegal as it is unjust*," I cannot dispute that point, because it is neither one nor the other. It is not unjust, because these ladies will still be allowed to continue their studies, and, if they pass future examinations, to become chemists and druggists or pharmaceutical chemists, just as men do who never connect themselves with the Pharmaceutical Society.

It is not illegal, because all power to elect or reject candidates for admission to the Society is vested in the Council, and having given my "*serious attention*" to the remarks of your contemporary, I rise from the consideration with my "*sense of honour*" unembarrassed. I should indeed be sorry to throw any impediment in the way of ladies who desire to work out for themselves a means of self-support, *and in this case I am not doing so.* I think, however, there may be more fitting occupations for them than listening to the description of bodily ailments over our shop counters. It is true you may retort on me that in our bodily afflictions none can minister so well to our sufferings as women, but this is in the privacy of the household, and I cannot help thinking the tendency of the present day is too much towards upsetting that natural and scriptural arrangement of the sexes which has worked tolerably well for four thousand years.

George W. Sandford.

February 24th, 1873.

Sir,—Albeit that I am generally considered a peaceably disposed man, I cannot but feel the call that is made for the expression of a strong and unqualified protest against the steps that are now being taken to open the gates of pharmacy to female students.

Now, Sir, I have never had the slightest objection to partake of such preparations from the hands of my fair friends as emanate from the department of culinary chemistry. I drink my cup of tea with a grateful acknowledgment of the rights of the sex; I am content to remain silent on the subject of untinned copper vessels, and the cleansing of leaden cisterns; my wife's bottle of home-made pickles is consumed with absolute trustfulness and mental tranquillity. But I must say that if in a state of semi-consciousness from serious illness, I were dependent on the feminine perception of the distinction existing between Croton oil and its milder brother Castor, or again oxalic acid and magnesic sulphate, I say that I should hasten to make my peace with this world. Do not we read continually of hospital nurses dosing their patients with carbolic acid? Can we forget the ludicrous incident of the nurse who exhibited diluted sulphuric acid, in immediate sequence to chalk mixture, and so converted the internal arrangements of her patient into a gasometer?

We have, Sir, in the present day, female colliers, fishmongers, clerks and doctors. The aspirations of the sex have been encouraged until they have overstepped the bounds of decorum of by-gone days. The landmarks have been removed, and encroachments, whose results are visible in the universal depreciation of all labour, both in quality and remuneration, force themselves at length upon our notice, and demand our indignant appeal.

When we consider how immeasurably the feelings of women surpass those of men in delicacy of organization, we can well believe that if the trifling incidents of ordinary business life affect them so strongly, how great must be their mental confusion, when harassed by some disappointed affection, or family affliction, they are called upon to unravel the mysteries of a death-dealing or life-giving prescription! It is age alone which gives to women care and prudence, and I can only look with terror on the proposition to confide to young and possibly thoughtless girls the issues of life and death.

And, Sir, let me add a word in justice to the thousands of assistants who, after a severe apprenticeship, honestly fulfilled, after a well-tried service in duties of the most precarious and important character, see themselves confronted with the vision of female competition, and its inevitable pecuniary results. It is not the mere question of jealousy or rivalry that prompts the impulse of opposition, although in this respect the success of female candidates at Examinations might serve as a stimulus to laggards. Nor can we look for the cause in the prospect of fair traders in drugs. It is rather to be believed that the duties themselves, which, though laborious and inadequately paid, convey yet to the performer a sense of pride and reposed confidence, are the points really at stake. When these attractions are removed, and the functions rendered purely clerical in their nature, there remains but the trifling remuneration, soon to be reduced by competition, to contend for.

But, Sir, there is another, and, I apprehend, clearly fatal objection to the employment of female pharmaceutists. I refer to the common occurrence of prescriptions and remedies dealing with maladies of the most revolting nature. It is impossible to suppose that these cases could be entirely prevented from passing through their hands, and necessarily arousing an inquiry, whose inevitable tendency would be to blunt the moral feelings, and open the pathway to an exceedingly undesirable field of investigation. I cannot for a moment believe, although we have lady doctors, that a truly conscientious and right-minded mother would knowingly expose her child to familiarity with subjects which possess the power to appal and disgust the sternest member of the sterner sex.

H. L.

Uxbridge Road, Shepherd's Bush.
February 25th, 1873.

THE EXAMINATIONS.

Sir,—Perhaps you will not consider a few animadversions on the Preliminary and Minor examinations out of place in the Journal.

With regard to the Preliminary, I think *Cæsar*—whose Latin is little more than a concatenation of military terms—might be advantageously replaced by *Celsus*, since it is not military but medical technicalities which we want to learn.

I think, moreover, that besides the metrical system which is, in the curriculum for 1874, very properly transferred from the Minor to the Preliminary, botanical geography should be, likewise—or, rather, that a general knowledge of geography should be required therein. The same may be said of algebra (to simple equations), a knowledge of which would be most useful in working the chemical equations required in the Minor.

With regard to the Minor itself, all I have to say is that it seems to me hard, when a candidate fails in only one subject, that he should be held to have failed in all; supposing one to have got even honour marks in all except pharmacy, is it fair because his memory proved a little treacherous in this dry branch that he should have the anxiety of keeping up his other subjects to the boiling-point for another three months?

In conclusion, allow me a word on the subject of our titles.

An Associate is nothing more than the lowest grade of all scientific societies; therefore, why not give this title to those who have passed the "Preliminary?" A "Chemist and Druggist" is to all intents and purposes licensed to practise pharmacy; then let him be called a "Licentiate of the Pharmaceutical Society," and since "Major" men may fairly consider themselves something better than oddfellows, why not call them "Fellows of the Pharmaceutical Society?" At present, I assure you, Sir, they are frequently mistaken for the former.

L. V. REES.

520, Oxford Street, London, W.C.

P.S.—I know that with reference to "minors" being called licentiates, it may be objected that it is the examination diploma, not the belonging to the Society, which licenses one to practise pharmacy. To this my answer is, that the sooner the Pharmaceutical Society is converted from an anomaly of this sort into a society such as that of the apothecaries (to belong to which does not cost a guinea a year—to swell surplus funds—but simply an examination) the better.

Sir,—A few weeks ago I noticed in the Journal an unusually large number of rejected candidates for the Minor examination—twenty-five being rejected out of a total number of forty-two. This state of things is much to be regretted, but I think if the candidates would adopt a very simple precaution, much disappointment would be avoided.

I need scarcely say at the onset, that the success of every student depends entirely upon his own exertions, and it matters not whether he be at Bloomsbury Square or in a remote country town, he has to depend upon his own individual efforts; and I would say, in passing, that there is nothing required in the Minor examination, but what a little determination can successfully accomplish. My experience has taught me that the best precaution any young man can take to prevent his rejection, is to get some one who possesses the Major qualification to ask him a few questions now and then upon the several subjects upon which he will be examined. It takes little time, but does an immense deal of good; for it not only gives him an idea of the questions that will be asked, but it points out to him his deficiencies, which a really earnest student will soon master. Fortunately, it is a remedy that is in the reach of nearly every one who will seek it, as there are few towns that do not contain one or more persons who have passed the Major, and I venture to say, there are but few (if any) who would decline to render such a simple though useful service to any really anxious young man. I have seen so much good done by it, that I recommend every student to adopt it.

Out of many instances which have come under my notice I will mention two. One was that of a gentleman actively engaged in business on his own account, and with but little spare time for study—he attended for a very short time a chemistry class, but was entirely self taught in pharmacy, materia medica and botany. He called upon me one day and asked me to allow him to come some spare evening with a view of my examining him as to his fitness to pass—it was easily seen he had worked well, but the first six questions I asked him he could not answer; he said they were questions that never occurred to him, and yet they were very simple; after spending an hour with me he went home, and I never saw him again until I had read his name in the Journal, when I saw he had passed with honours.

The other instance was an assistant, who, when he came to reside with me, literally knew nothing either of chemistry or botany, but had within him a great desire to know them and also to pass the then voluntary examinations. He attended no class or lecture whatever, either in botany or chemistry, but was entirely self-taught, the only assistance I rendered him being to answer an occasional question he would ask me, and these were mostly appertaining to the subjects it was necessary to be perfect in. But there was no mistake about it; he worked well, and entirely out of business hours. He went to London on Monday morning, and with the kind assistance of Mr. Hills obtained a ticket for the Botanical Gardens, where he saw the majority of medicinal plants for the first time. The next day he passed his Minor examination, and not only passed, but passed with honours, and at the end of the year received the prize of books for passing the best during that year, and it is with much pleasure I occasionally see his name in the Journal as a lecturer to the students of a provincial pharmaceutical institution.

Compare this with the state of things that exists in most of the large towns where classes and lectures are provided. Ask the gentlemen who lecture how many students they see at the end of a course, or how many they see at all, compared with the number they should. No; it is now as it was sixteen years ago, when I heard a laboratory pupil at Bloomsbury Square ask the assistant there, if there was any difficulty in passing the examinations; his answer was, "You will pass if you try," and that is the great secret.

I should also like to add that there is often much harm done by the examiners asking the candidates for the Minor questions, which I consider, should only be asked in the Major; such questions rapidly spread among intending candidates, which sometimes have the effect of frightening them, and preventing their appearance at all. There were two young men from this part rejected about a year or so ago, who, residing in the heart of the black country, have about as much opportunity of studying live plants as they would in Clerkenwell Green, and yet they were asked questions in botany, which in my humble opinion were far too difficult. I think the examiners cannot be too particular in this respect, as perhaps they are not aware that the questions asked are most freely sought after by others who are now compelled to go through the same ordeal.

WILLIAM YATES BREVITT.

Wolverhampton, February 24th, 1873.

MILK ANALYSIS.

Sir,—The milk question seems to have excited more than an average amount of interest, and induced a variety of correspondence. There are a few remarks I should like to make before the subject is closed, as sources of error or misapprehension have been introduced by some of your correspondents.

Mr. Slade, page 580, has noticed a yellow colour in milk, and attributed it to annatto; and Mr. Bottle, page 640, suggests yellow from eggs. I have seen this yellow colouration a few times—once in boiled milk thickened by the addition of some farinaceous substance as the milk gave the blue reaction with iodine; the colouring matter in this instance was probably the turmeric of some culinary powder and the adulteration performed in the kitchen.

The colouring matters of anatto, turmeric, or eggs, may be extracted from milk by precipitating the casein and fat in the manner I have before indicated (page 501). Most of the colouring matter remains in the alcoholic solution; evaporate the alcohol from this solution of lactose, etc., and shake with ether. The colouring matter is then abstracted by the ether, and may be obtained by its evaporation; turmeric and anatto give a solid, and eggs an oleaginous residue. Either of these are harmless, and unimportant, except as adulterants. Eggs, however, would be rather expensive a matter for the vendor's consideration; but I have seen another yellow colouring matter in milk connected with disease. We must carefully guard against confounding this indication of disease with either of the above-named harmless adulterants. The sample of milk I now refer to was slightly coagulated and became more so when boiled, indicating albumen, and with the microscope I detected pus, and some curious misshapen globules, some of these latter having the character of ferments and produced strings of ovoid cells. This sample was obtained from a cow having an inflammatory complaint affecting the nostrils and udder, and the colour, etc., was owing to disease.

Since the analysis was made I have been gratified by the confirmatory evidence afforded by a paper of Dr. Husson "On the Analysis of Cows' Milk taken from Animals while attacked by Typhus" (Compt. Rend., Dec. 1871) in which he notices "the yellowish rose hue" and the partial substitution of albumen for casein in febrile disorders—partial coagulation and a yellow colour must not, therefore, be considered as a proof eggs and milk; a careful microscopical examination is then absolutely necessary.

I recommended Vogel's lactoscope for two reasons. 1st. It gave with *unskimmed* milk the useful information of a preliminary analysis; and, 2nd, it could be used without incurring loss of the milk; with skimmed milk it is not quite so trustworthy and must be used with an altered scale.

Farina, eggs, dextrine, etc., must not be calculated as "milk residue," or that item will be worthless; other and more conclusive data of adulterations are necessary, as this calculation makes poor milk and diluted milk synonymous terms. It is also materially affected by the soda often added to milk as a preservative. The estimation of milk sugar by the copper test (I prefer Fehling's formula) cannot be calculated as glucose, it is somewhat less than glucose in reducing power, (about seven-tenths, Watts, Dict. vol. iii.). I have easily avoided this difficulty by titrating my copper solution with milk sugar instead of glucose. The calculation may be confirmed if necessary in analysis by dividing the milk-whey into two equal parts: in A, estimating the sugar by the copper test, and in B, by the separation process of Mr. Ekin, (page 482). I have, however, perfect confidence in the accuracy of the first method.

An abstract of Mr. Wanklyn's paper on the "Analysis of Milk by the Ammonia Process" will be found in the Pharm. Journ., August 12th, 1871, page 123. Of course Mr. Bottle's eggs must be coagulated and removed from the milk before the albuminoid ammonia can be correctly estimated as casein—or some other plan of analysis than Wanklyn's must be adopted.

GEO. BROWNEN.

Laboratory, 143, *New Bond Street, February 24th* 1873.

TINCT. QUININE.

Sir,—Every one has noticed the considerable deposit that occurs in making the tinct. of quinine, B.P. Having lately had a considerable quantity of the preparation required for immediate use, I tried the experiment of gently heating it in flasks over a water bath; it soon became quite clear, but on cooling deposited an abundant crop of crystals, which arranged themselves with remarkable symmetry like feathery stars.

I was at first disposed to consider these crystals as due to a contamination; but on examination under the microscope found the *stellar rays* were composed of true acicular crystals.

Herewith I beg to forward for your inspection a bottle containing some of this curious deposit.

The inference that may be drawn from this circumstance is, either that there is a larger proportion of quinine employed than is necessary, or that the menstruum of proof spirit is not sufficiently strong to effect the solution of the drug. Were it not contrary to instructions, the practical pharmacist would most likely add a little acid to the tincture, thus rendering available the full quantity of quinine, and preventing unnecessary waste of a costly article.

Your kindly directing attention to the subject will be esteemed a favour by

Richmond. R. GOODWIN MUMBRAY.

COST OF DISPENSING.

Sir,—Let me suggest to your correspondent 'One of the Hornets,' in reference to those people who go round to all the chemists asking the price of dispensing a prescription, that many pharmaceutists refuse altogether to quote a price before dispensing, and that others take the opportunity of referring to the dispensing counter and there just marking the prescription. I have known this plan answer on more than one occasion, and strongly recommend all chemists to adopt it. If there is no recognized trade mark, Bell's "you and them" may be used, as it is known everywhere.

W. J. CHURCHILL.

Birmingham.

W. Fox.—We think the opinions you express are very mistaken ones, and that the suggestions you make could not be carried out with advantage.

"*A Chemical Student.*"—So far as we are able to decipher the name, we are unacquainted with the substance referred to.

"*Bell.*"—The examiners are not restricted to any particular book.

"*Unbeliever*" writes to recommend "A Chemist" to read Dr. Zerffi's 'Spiritualism and Animal Magnetism,' published at 1*s*. 6*d*., by Hardwick, in which book he is of opinion that the pretensions of the spiritualists are disposed of most satisfactorily.

The Preliminary Examination.—*An Apprentice* writes in reference to this subject, that on the occasion of his own examination, the local secretary brought the examination papers into the room already opened, and after staying a few minutes, left the room, and with the exception of looking in now and then, he left the candidates to themselves. *Apprentice* adds, that after the examination the secretary put the papers open into his desk, so that they were neither opened nor sealed up in the candidates' presence.

J. Roberts.—See a description of Anatto in the last volume of this Journal, p. 574.

J. Rawlinson.—The method proposed by Professor Attfield (Pharm. Journ. [2], vol. iv. p. 338) for obtaining a solution of quinine in cod-liver oil was to produce an oleate of quinine by digesting the alkaloid, well-dried, with thrice its weight of oleic acid at 212° F. for an hour or two. The oleate of quinine, which has the consistence of a soft resin, is perfectly stable, and may be diluted whenever necessary, and to any required extent.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. J. T. Holmes, Mr. T. Collier, Mr. J. G. Evans, Mr. Fox, Mr. Brownen, Mr. J. Hughes (Sydney, N. S. W.), Mr. Rogerson, Mr. A. J. Pidd, "An Older Druggist," "Alpha."

LEGAL PHARMACEUTICAL PREPARATIONS.*

BY CHARLES SYMES. PH.D.

The intimation given by Dr. Redwood at the last Pharmaceutical Meeting, that an Appendix to the Pharmacopœia is under consideration, calls up to the mind of the pharmacist some of his past reflections whilst perusing that book of pharmaceutical authority.

It is very generally admitted that the present work is far more perfect than its predecessors; and in being so is, of course, in accordance with the progress of science and advancement of the age; nevertheless, imperfections crop up here and there—most of them are very palpable—are probably oversights, and have from time to time been pointed out either in the Journals or at Pharmaceutical meetings.

Now the adoption of the formulæ in this work is not optional, but is enforced on us under certain pains and penalties; hence it becomes in itself a book of pharmaceutical law, and its preparations the only legal ones of the same name. It is nothing uncommon for imperfections to be legal, but that deviation from them should be illegal is an anomaly which, in our profession at least, we should all be gratified to have remedied.

Let us take as a familiar example liquor bismuthi; probably 95 per cent. of samples in the market answer the B.P. characters and tests, and yet it is equally probable that not 50 per cent are prepared strictly according to the B.P. process, *ergo*, 50 per cent are illegal.

The only inducement, however, to deviate from the process given would be greater facility or economy in manufacture, or the production of a better article. Were it a question of a new edition of the Pharmacopœia, these difficulties could be readily got over by a more complete description in many cases of what the article should be, and an extension of the license which already exists with regard to some chemicals, viz., to use any process which will produce the article possessing definite and uniform characters, and answering the tests given. In the case of the chemicals, for example, sulphate of magnesia, no process is given; but in the case of preparations, a formula capable of producing the article described should in every case be given; but this should be open to real improvements, provided the strength and general characters be not interfered with. It is a somewhat difficult question to deal with perhaps, and that more particularly in the issue of an appendix; but it is in good hands, and we can hope that Dr. Redwood's deep perception will enable him to see his way well through it.

We shall also probably see a page of "Errata," including not only the corrections which were pointed out shortly after the publication of the work, such as the addition of suppos. plumbi co. to the opium preparation; confect. opii and confect. scammonii as preparations into which syrup enters; but one or two more important, viz., under the head of syr. ferri phosph., for "the product should measure exactly twelve fluid ounces," read "the product should measure from ten and a half to eleven fluid ounces," varying slightly according to the greater or less amount of moisture left in the precipitate,—if it be pressed between folds of bibulous paper as directed (which, by the way, is quite unnecessary), it never measures more than ten ounces and six drachms.

Under the tests for the purity, etc., of calcis phosph., for "the solution continues clear when an excess of acetate of soda is added," read "the solution continues clear when a *dilute* solution of acetate of soda is added in excess," for if the solutions are concentrated, a precipitate does occur on their admixture, even if the phosphate is all that can be desired.

As a matter of course, preparations not included in the Pharmacopœia are lawful to dispense when prescribed by the medical practitioner; and for the sake of uniformity, as many of these in general use as have been proved to be effectual as remedies, should be included in the appendix. Succus digitalis, succus belladonnæ, amyl nitris, chloral hydras, tinct. aurantii recentis, etc.

Syr. phosph. co. has been largely prescribed throughout the country for many years past, and has every right to find itself in the appendix. It is not a secret preparation, the formula having been published by the late Professor Parrish, the originator. Then, syr. ferri et quinæ et strychniæ phosph. has a well-established reputation as a remedial agent, and should also be added.

I do not advocate that the Pharmacopœia should recognize all new medicines that are introduced, or even that become popular, otherwise it would have to include Winslow's syrup, Allcock's plasters, Brown's troches, etc.; but it must be borne in mind that a great number of the preparations contained therein were originally popular remedies, such as Gregory's powder, Dovers' powder, James' powder, etc. Now, the object of the work under consideration is to ensure uniformity in character and effect of medicines recognized by the medical profession and in general use. In this way we get ext. opii liq. as a substitute for liq. opii sed., made by Battley and a score of imitators. It is still competent for medical men to prescribe Battley's preparation, and they do so very frequently. We know, too, that a liq. chloroformi co. was contemplated, and even printed in the proof sheets of the present B.P., but why it was withdrawn and replaced by so absurd a substitute as tinct. chloroformi co. is a matter we are not quite so clear about. It is even questionable if the proprietor of "the original chlorodyne" would have suffered by its retention, as medical men would still have prescribed "Brown's" if they wished it used, and the public would doubtless be duly "cautioned against purchasing any other."

As it will be some time before the appendix is in print, we shall probably have expression of various opinions as to what substances and preparations should be legally recognized.

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, March 5, 1873.

EMULSIONS.

BY HERBERT G. ROGERSON.

The appearance in a recent number of this Journal of a paper bearing the above title, transcribed from the *New York Druggists' Circular*, leads me to offer a remark or two on the same subject.

The paper referred to was mainly devoted to a consideration of the merits of a combination of gum acacia and glycerine, in the preparation of emulsions of various kinds. Believing, however, that gum tragacanth affords us a mucilage which, when prepared under certain conditions, is capable of giving results in every respect superior to any producible by the combination recommended in the paper, I propose briefly to outline its more advantageous applications, and extremely convenient method of preparation. In doing this I am led to recur to a formula sent by me to this Journal some three years ago, and published under the title of "Cod Liver Oil Cream," which may be taken as a type of this class of emulsions; and the fact of the extensive and successful adoption of that formula having come to my knowledge, emboldens me to reproduce it in a slightly modified and improved form.

Before doing so, however, I may state it as a *sine quâ non*, that the tragacanth employed for this and allied preparations should be of exceptionally fine quality. It should possess a pretty uniform whiteness, and freedom from dark patches and specks, or if these latter be present they should be broken off and rejected. The selected pieces are then cut up into fragments about one quarter of an inch square, and immersed in soft or distilled water for 48 or more hours in the proportion of about 2½ oz. to the gallon, stirring at intervals to prevent agglomeration. The addition afterwards of a small percentage of glycerine ensures almost indefinite keeping qualities. To avoid disappointment and secure the best results it will be well not to rely on any ordinary sample of the gum, but to apply to one's wholesale house for a small parcel of exceptional quality. In this way we succeeded in obtaining a sample almost free from blemish, and requiring no material weeding; while but for this precaution one might improve but slightly on the Pharmacopœial mucil. tragac., a dark and muddy product.

The formula referred to above, as amended, runs thus—

℞	Ol. Jecor. Aselli . . .	℥ v.
First shake together.	Ess. Limon	
	,, Amygd. (1 in 16) aa	♏ xxiv.
	Spts. Vini Rect. . . .	℥ iss.
	Syrup	℥ ss.
	Mucil. Tragac. (prepared as above) ad . . .	℥ xvi.

The mere act of shaking together these ingredients for an instant or two suffices to unite them into an elegant semi-transparent, and permanent emulsion, with attractive custard-like flavour that can scarcely fail to commend itself to the votaries of "Elegant Pharmacy."

Other oils as castor, almond, turpentine, etc., or balsams may be substituted for the one above specified. The proportion there given may be held to be only *relative*, the precise quantity of any oil "emulsifiable" by a given quantity of mucilage depending directly upon the degree of viscosity of the latter. If it be desired to combine an oil in much larger proportion than appears in the formula given, this may be effected to an almost incredible extent by substituting brisk stirring in a mortar during the adding of an oil, for the mere agitation that sufficed in the former case. It is probable that a great variety of substances upon which I have not yet experimented may be treated advantageously as above.

My experience has been mainly with the oils of castor, cod-liver, olive and turpentine, and the success attending the use of these was perfect, none of them showing any disposition to separate after many months keeping, and retaining then a degree of sweetness and freshness that proved keeping qualities of a very perfect order.

THE MICROSCOPE IN PHARMACY.

BY HENRY POCKLINGTON.

Continued from p. 664.

Canellæ Albæ Cortex.—A somewhat harder but not more difficult bark than either of the preceding. It requires a little care to secure a perfect section, on account of the ease with which certain cells on the exterior tear away from the softer cells beneath, but if the cutting be from the outer surface inwards, this source of difficulty is reduced to a minimum. The usual reagents are used, with the additional use of the B.P. solution of indigo, which in this case has advantages over the magenta solution generally used.

Beginning with the outside of the bark, we have first, 'stellate' cells, analogous to those found in cassia and cinnamon, but somewhat different in size and shape, and are wholly situate on the outer surface of the bark, where they form a tolerably continous layer of varying thickness, ranging from two to six or eight cells thick. They are porous, the pores being few and large. The successive deposits of thickening matter are not very evident without the use of powerful reagents, and they stain intensely with magenta, prolonged boiling in alcohol not removing the colour entirely. Indigo and logwood solutions do not permanently stain them, but the latter stains the original cell wall of these thickened cells and also the pores, rendering these latter very perceptible. This latter reaction is probably not chemical but mechanical, the minute pores retaing the dye longer than the exposed cell surfaces. The whole of the other tissues of the bark excepting the resin receptacula, it may be noted, permanently stain with the logwood fluid. The general shape of the thickened cells is ovate, but more or less globose ones are frequent. Within the layers of stellate cells are many layers of thin-walled parenchymatous cells containing various minute granules of starch and other matters, some of which, apparently allied to chlorophyll, stain intensely with magenta. Amongst these cells are distributed very irregularly large receptacula containing a light yellow coloured oleo-resinoid substance. On removing this it is found that the walls of the containing-cell are thin, imperforate, that they stain intensely with magenta, and do not permanently stain with logwood. That their walls are very thin is shown by their slight action upon a selenite plate by polarized light; for when freed from their contents they scarcely raise or depress the colour of even the *teint sensible* film, the very delicate red-violet. With these parenchyma cells are a few liber bundles, not many. The liber proper forms the lighter internal surface of the B.P. description. It is chiefly remarkable for the great number of sphæraphides arranged linearly among the liber cells, as seen in cross section, and apparently composed of oxalate of lime. These are almost wholly confined to the layer bounding the inner surface of the bark. The liber cells are hollow, little thickened, and frequently contain minute granules of starch and other granular substances. The medullary rays and oblong or sub-cylindrical cells associated with the liber are not very interesting. The cells of the medullary rays are nearly square, with incomplete parietal adhesion and contain considerable quantities of minute starch granules, spherical or ovate, doubly refractive, and giving a black cross. A large number of cells associated with these square cells, and forming part of the medullary rays, contain, each cell singly, sphæraphides imbedded in a semi-granular substance (probably semi fluid when the bark is fresh) of apparently a saccharine nature, and unless this be removed by maceration in water, and subsequently alcohol, the polariscope and chemical reactions of the crystals will be but feeble.

In conclusion it may be remarked that the structure of *Canella alba* bark is somewhat complex, but not difficult of study to a microscopist of moderate experience, although there are features, such as the nature of the contents of some of the cells, notably of the liber cells and medullary rays, that are almost or quite beyond the reach of present micro-chemical histology.

Granati Radicis Cortex. — Pomegranate Root Bark.—The cells of this bark are altogether very different from either of the preceding both as regards size and shape. The external cells are small, subglobose and some of them porous. The cells of the layers beneath, excluding certain ligneous cells, are sub-cylindrical, thin-walled and small in cross outline. Their contents are starch granules, very minute and sphæraphides of which each cell contains one, imbedded in a substance of which I am unable to determine the nature. These raphides are minute, with feeble optical qualities, and their prismatic constituent crystals not clearly discernible as is usual in this class of crystalline cell contents. Their great number is the first thing one notices in examining the section, and further study shows that the inner layers of cells contain by far the greater number of them, very few cells in this position being without one. The more external cells contain fewer, the outermost cells none. The starch granules are very minute and most numerous in the middle layers. Their polariscope reactions are obscure. The ligneous cells are distributed in twos and threes, are large, porous, much thickened, and the successive layers of thickening deposits very evident without the aid of reagents.

In conclusion it may be remarked that the only difficulties in the examination of this bark arise from the minuteness of the cells, and their being filled with various matters that are difficult to remove without altering the general structure. Maceration in very dilute sulphuric acid for a few hours appears to be most effectual in preparing sections for examination, so far as a general view of the size and shape of the cells is concerned.

THE CHEMICAL RELATION OF PHOSPHORUS TO OIL OF TURPENTINE.

The result of an investigation by Köhler and Schimpf into the chemical relation of phosphorus to oil of turpentine, and the action of the latter as an antidote in cases of phosphorus poisoning, has been published recently in the *Chemisches Centralblatt*. The authors state that a crystalline white solid having an acid reaction, is obtained upon cooling, if ¾ of an ounce of phosphorus be gradually added to two pounds of ordinary oil of turpentine containing oxygen, while heated to 40° C. This substance is separated from excess of phosphorus by crystallization from alcohol. It changes, upon exposure to the air, into a resinous substance with the smell of pine oil and slightly of phosphoric acid. Placed in a stream of hydrogen at 40° C., inflammable phosphoretted hydrogen is evolved, and at above 50° C. it undergoes decomposition into a resinous mass. The name of turpentine phosphorous acid has been given to this new acid. When oil of turpentine is administered as an antidote in cases of phosphorus poisoning, it appears to form this compound, and as such to be discharged in the urine, being found in the alkaline distillate when the urine is distilled. The distillate has the property of reducing mercuric to mercurous chloride, and also of precipitating metallic silver from solutions of silver salts.

SYNTHESIS OF TARTARIC ACID.*

BY M. JUNGFLEISCH.

The synthetic researches of chemists have, during the last twenty years, yielded such marvellous results as to make it appear possible that the artificial production of the principal materials of which living beings are composed would be accomplished within a comparatively short time. Meanwhile, however, a physical property, the rotatory power, common to a great number of natural compounds, has not hitherto been found in any of the organic substances obtained by chemical synthesis. According to certain opinions, put forth first by Biot, and shared in by many scientific men, substances possessed of rotatory powers were considered to be produced solely in living organisms and by agencies that science was powerless to set in motion. This is the problem which I believe I have solved. In fact, taking olefiant gas, a compound easily obtained by synthesis, I have transformed it into tartaric acid optically inactive; then I have separated the product so obtained into two acids symmetrical between themselves, clearly characterized by optical and crystallographic phenomena. The one possesses a dextro-rotatory power; the other a lævo-rotatory power: the dextro-acid is identical with the natural acid.

The splendid researches of M. Pasteur have established that there exist four varieties of tartaric acid, viz.—

(1). Natural tartaric acid, hemihedral, and possessed of a power to rotate a beam of polarized light to the right.

(2). Lævo-tartaric acid, hemihedral, and possessed of a power to rotate to the left.

(3). Racemic acid, an optically neutral combination of the two active acids, which may both be reproduced from it.

(4). Inactive tartaric acid, like the preceding, neither hemihedric nor possessing rotatory powers, but not decomposible into the two active acids.

In a former series of researches, I studied the conditions under which inactive tartaric acid is transformed into racemic acid, and I have demonstrated how this transformation can be realized in a regular manner and on large quantities of material. I have also shown that the racemic acid so obtained may be broken up into dextro- and lævo-tartaric acids conformably with the method of Pasteur.

In 1860 Perkins and Duppa showed that† succinic acid could be transformed into tartaric acid; the acid which they obtained was examined by Pasteur and recognized by him to be a mixture of racemic and inactive tartaric acids.‡ But the researches of these eminent English chemists, although remarkable in a chemical point of

* 'Comptes Rendus,' vol. lxxvi., p. 286.

† Quarterly Journal of the Chemical Society,' vol. xiii. p. 102.

‡ 'Annales de Chimie et de Physique' [3] vol. ix. p. 234.

view, did not settle the question of the artificial production of the rotatory power. The researches were made with ordinary succinic acid, which is obtained, as is known, from various natural substances, a fact which justified Pasteur in asking,* whether, this succinic acid "is really inactive by nature," whether it were not rather "inactive by compensation," or even whether it were "not an active body, the action of which upon polarized light was so feeble as to be demonstrated with difficulty."

A short time after the publication of the experiments of Perkins and Duppa, Maxwell Simpson formed the happy idea of extending to the polyatomic compounds the facts relative to the nitriles discovered by Dumas, Malaguti and Le Blanc; he thus formed, among other remarkable syntheses, succinic acid by means of olefiant gas or ethylene, by the intervention of cyanide of ethylene. Ethylene may be easily obtained from acetylene, produced by the direct union of the elements, carbon and hydrogen, as shown by Berthelot. If then, starting with olefiant gas, succinic acid could be prepared, and with it the experiments of Perkins and Duppa repeated; and if the tartaric acid so obtained could be split up into two acids, optically active, the question would be completely elucidated.

I therefore first prepared succinic acid from ethylene. The yield was very small, and I operated upon no less than 3800 grams of pure bibromide of ethylene. This product was transformed by portions of 300 grams into dicyanide of ethylene, according to the method of Simpson; the coloured dicyanide obtained was dissolved in five or six times its volume of water and heated in a water-bath. Nitric acid diluted with its own weight of water was then added little by little, giving nitrate of ammonia and succinic acid.

$$C_4H_4\,(C_2N)_2 + 2NO_5, HO + 4H_2O_2 = C_8H_6O_8 + 2NO_5,NH_4O.$$

or in the modern notation—

$$C_2H_4\,Cy_2 + 2HNO_3 + 4H_2O = H_2C_4H_4O_4 + 2NH_4NO_3$$

The acid was neutralized by potash and precipitated by a salt of lead, and the acid of the succinate of lead afterwards set free by sulphuretted hydrogen. The quantity of pure and perfectly crystallized succinic acid thus obtained, notwithstanding the inevitable loss attending a lengthened manipulation, was upwards of 300 grams.

Following the methods indicated by Perkin, Duppa and Kekulé, with a few modifications, 247 grams of the succinic acid obtained from ethylene yielded 62 grams of crystalline and colourless tartrate of lime, identical with that obtained from the succinic acid of commerce. The lime salt was converted into free acid and all the inactive acid into racemic acid.

Lastly, the racemic acid was converted into the double tartrate of soda and ammonia, according to the method of Pasteur. The liquor yielded three kinds of crystals; some, very clearly hemihedric to the left, identical with the laevo-tartrate, and forming a solution possessing the power of rotating polarized light to the left; others hemihedric to the right, identical with the dextro-tartrate, a solution of which was capable of rotating it to the right.

These facts appear to demonstrate that the rotatory power can be produced without the intervention of life, and by means of compounds formed entirely by synthesis from the elements.

OPIUM TRADE OF INDIA.

The official annual 'Statement of the Progress and Condition of India' has been issued. It relates to the financial year 1870–71. The balance-sheet shows revenue and receipts amounting to £51,413,686 and expenditure amounting to £49,930,696, presenting in the net result an improvement of £1,387,678 over the preceding year, whereof £961,801 was due to the increase of the Income-tax. The accounts show an increased expenditure on opium, the results of increased cultivation and manufacture in Bengal and the North-West Provinces. The gross receipt from opium was £8,045,459, which was reduced to a net sum of little more then six millions by an expenditure amounting to £2,014,425. Opium, however, is still the most lucrative source of the Indian Revenue next to the land, and will remain so while a preference is shown to the Indian drug in the Chinese market. The systems of raising opium revenue in Bombay and Bengal are different. In the former all that is done is to levy a heavy export duty on the opium as it enters British territory from the native States of Central India, where it is grown and manufactured. On the Bengal side advances of money are made by Government to the ryots to enable them to grow the plant, and the manufacture is under the charge of a special department. The sales are made in the open market in Calcutta, and the profits are even larger than those realized by the export duty at Bombay. The opium thus sold in Calcutta is termed "provision" opium, while that portion which is sold at the Government treasuries to licensed retail vendors for consumption in the country is called Abkaree opium. The land under cultivation in the Behar and Benares agencies in 1870–71 was 530,557 acres, against 500,750 in 1869–70. There were 49,030 chests of provision opium sold, being 3350 in excess of the sale in 1869–70. Abkaree or excisable opium—that is, the opium consumed in India—bears a very small proportion to the quantity exported to China, and brings in hardly 5 per cent. of the entire opium revenue. Its value, however, has been much increased by the prohibition in 1860 of opium cultivation in Assam, where the drug was and still is largely consumed by the Indo-Chinese races. This prohibition has largely restricted the use of opium by raising its price, and has been followed by a perceptible improvement in the physical condition of the people. In the North-Western Provinces the monopoly of opium is farmed out in each district. The Bombay report shows pass fees paid in the year on the large number of 39,978 chests, nearly all from Indore. The habit of opium-eating is described as now almost universal in Rajpootana and Central India. In 1820 the ordinary value of opium land was 4*s.* the beegah (in Malway a little more than half an acre), but within 20 years it quadrupled, and now it will command from 20*s.* to 100*s.*, and in many places even more. So long as the free cultivation of the poppy is prohibited in India, no produce can be so remunerative in the native States; and the report on Central India states that it is computed that there are now 900,000 beegahs of the best land devoted to it, to the exclusion of the food supplies of the people. With the growth or sale of the drug in native territory the British Government has nothing to do; the cultivator and trader sell to whom they please, and, after paying the duty, the owner receives a pass authorizing him to remove the chest when and where he chooses. Recently permission has been given to Sindia to provide an establishment within his own territory for weighing the opium intended for export; and during the last year 12,643 chests were brought to scale at Onjein, an old city which had become almost deserted, but is now fast recovering its former importance. Scales are also established at Oodeypoor.—*Times.*

MEETING OF CHEMISTS AND DRUGGISTS AT GREENOCK.

At a recent meeting of the chemists and druggists in business at Greenock it was unanimously resolved to raise the prices of drugs to the new Glasgow standard. At the same meeting it was also unanimously agreed to close entirely at eight o'clock on ordinary nights, and at nine o'clock on Saturdays.

* 'Annales de Chimie et de Physique [3] vol. ix. p. 234.

The Pharmaceutical Journal.

SATURDAY, MARCH 8, 1873.

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

THE PROPOSED APPENDIX TO THE BRITISH PHARMACOPŒIA.

Professor Redwood's remarks on the necessity for an Appendix to the British Pharmacopœia were characterized by his usual sagacity, and they will doubtless be read with much interest. Therapeutical remedies are multiplying in such a ratio as to make the interval of ten years between successive editions of the Pharmacopœia far too long for the scientific pretensions or practical usefulness of that work. Since the publication of the last issue numerous remedial agents have been discovered or invented; their virtues tested and approved; and their existence made known throughout the medical and pharmaceutical professions by the various periodicals, English and foreign. Not only so; but better modes of preparing drugs already in use are from time to time being suggested and adopted, to say nothing of alterations in the doses according to the varying types of disease and the practice of physicians. To insist on having a new edition of the Pharmacopœia on every occasion when a useful accession has been made to its subject-matter would, of course, be absurd. Even to abridge by a few years the ten-year interval between successive editions, for the embodiment of new matter, would be attended by many inconveniences. But the occasional issue of an appendix is open to no objection whatever; while the benefits it would confer on practitioner and pharmacist alike are as great as they are incontestable.

We need not follow Professor Redwood into his observations on the new preparations. In many cases their addition to the Pharmacopœia requires no justification. In others, the disposition *stare vias super antiquas* may prompt resistance to innovation; and that conservatism which has its legitimate place in science as well as politics may evoke defenders of old usage even in the face of justice and convenience. All this may be looked for in the discussion which will take place on the Professor's remarks at the next meeting, But no divergence of opinion prevails as to the necessity for supplementing the Pharmacopœia from time to time, so as to make it a fair reflex of contemporary pharmacy. Nor should this be deferred till the admission of new drugs and new modes of preparation is forced into recognition. A vigilant look-out should be kept on the progress of pharmacy, whether continental, transatlantic, or colonial. Every suggestion or well-founded criticism should be welcomed at head-quarters. Pharmacist and physician should be in constant and amicable communication for the common benefit of the work, until an amount of matter has been accumulated sufficient to justify the issue of a supplement or appendix.

"Alterius sic
Altera poscit opem res et conjurat amicè."

While no limit should be put to the number of cooperators in the work; while information or criticism should be courted from every good quarter; it would be a mistake to spread the responsibility for the issue of an appendix, or of a new edition, over too great a body of men. The present Pharmacopœia Committee of the Medical Council is sufficiently, though not more than sufficiently, numerous; and the principle on which it has been composed—that of leaving the responsibility for the work in as few hands as is compatible with efficiency—will be endorsed by every candid and intelligent well-wisher to the cause of sound pharmacy and therapeutics. At the approaching meeting of the General Medical Council, the issue of a supplement to the Pharmacopœia will be discussed; and while it is difficult to suppose that the necessity for such an issue will not be admitted and practically recognized, there is no doubt that the Council will have been materially assisted towards such a conclusion by the able remarks of Professor Redwood.

THE SALE OF POISONS.

When we referred to the proceedings of the Whitehaven chemists and druggists a fortnight since, as being calculated to ensure the sellers of vermin poison against those annoying and perhaps injurious expressions of censure which we have had so frequently to record as coming from magistrates, coroners and juries in cases of poisoning, we believed that the desirability of preventing the recurrence of such incidents would be sufficiently obvious to all who were engaged in dealing with these commodities, and that they would both understand as well as appreciate the idea that the action taken by our brethren at Whitehaven was commendable as a politic means of self-protection. But the letter of Mr. Tibbs, which will be found at page 719, shows that we were to some extent mistaken in this belief; and since there may be others who take the same view of the matter that he does, it will not be superfluous to state more specifically the grounds on which we base the views which have caused him so much surprise, and at the same time to point out some grave misconceptions under which our correspondent labours.

First, then, let us repeat that in recommending the registration of "vermin killers" in accordance with the regulations applying to poisons comprised in part 1 of Schedule A, we had in view simply the interests of chemists and druggists dealing in such preparations. We offered this suggestion as indicating a means by which they could protect themselves against the inconvenience and damage likely to result from charges of negligence in the sale of such poisonous materials. Practically, it matters little, in this respect, whether or not there be any grounds for charges of the kind; and those against whom they have been made will doubtless know that, however unfounded they may have been, it is very difficult to avoid their disadvantageous consequences.

It was from this point of view, and bearing in mind the numerous instances in which chemists and druggists have been regarded as in some way blamable in cases of poisoning, that we regarded the subject when, speaking in terms of commendation of the course taken at Whitehaven, we remarked that the chemists and druggists of that place had earned the thanks of the trade at large for having set a good example. The contrary opinions expressed by Mr. Tibbs appear to be the result of exaggerated ideas as to interference with trade supposed to be involved in the observance of regulations as to the sale of poisons.

Such ideas we regard not only as illusory but mischievous, inasmuch as they make a self-protective proceeding appear as a grievance and a hardship. It must also be remembered that the demand for the observance of certain regulations in the sale of poisons was urged in the interest of the public, and that it was upon this basis that they were made obligatory. The law having defined what the chemist and druggist is bound to do in order to satisfy the demands of the public, it is unnecessary for him to consider whether or not the prescribed regulations affect the safety of the public: his duty, however, is clearly that of complying with the regulations; for his extra trouble in doing so he has a right to be remunerated by the public in whose interest they have been prescribed; and for his own sake it is desirable that his observance of precautionary measures should rather exceed than fall short of the literal requirements of the Act. It is for this reason that we have recommended registering the sale of "vermin killers" containing phosphorus, for although this substance is not a "poison" according to the Act, it is, in fact, a very dangerous poison; and while the course we have suggested is in accordance with the spirit of the Act, its adoption is consistent with that careful discretion on the part of the Trade which we have always regarded as the most real and thorough safeguard against poisoning which the public can hope for.

We trust that these remarks will contribute towards "setting right," not only Mr. Tibbs, but others who may share what we feel bound to call his mistaken notions. With the same object it may be well to correct some errors he has fallen into. First, as regards the interpretation of the Act by Mr. Kitchin; while we cannot look upon Mr. Tibbs's argument that a vermin killer containing strychnine is not a preparation of strychnine as anything but an evasion of fact, it is also necessary to remind him that he is totally wrong in stating that the addition made in 1869 to Schedule A of the Pharmacy Act ignores preparations of strychnine, for, in fact, it specifically introduced them for the first time.

Again, though Mr. Tibbs holds it to be a fallacy to regard paregoric as a preparation of opium, and is astonished that it is held to be one by so many chemists, we think few will be found to agree with him, inasmuch as that view would involve a disregard of the fact that in many of the cases where paregoric or even syrup of poppies are used they are undoubtedly poisons, and should therefore be treated as such.

While speaking of poisons and their sale, we may take the opportunity of replying to some correspondents' inquiries as to the yellow prussiate of potash, or ferrocyanide of potassium. This substance is well known not to be a poison; and for that reason it would be unnecessary to observe any of the prescribed poison regulations in selling it. One of our correspondents, writing from Manchester, says that this salt is "beyond a doubt" a metallic cyanide, and refers to Davis's poison-book as indicating that its sale must be registered. He is, however, in error on this point. The salt is not a metallic cyanide, but a ferrocyanide—a compound as distinct from cyanides as formates are from acetates. And, further, the work he quotes as an authority is also in error; and we may here add, that it is entirely a mistake to suppose that book is certified by Mr. Bremridge as correct. The only authoritative publications on this subject are the Schedules to the Act of 1868, and the addition to it in 1869. These are to be found in the Register and in the Society's Calendar, and in the *résumé* recently issued by order of the Council of the Pharmaceutical Society.

HOSPITAL OUT-PATIENT SYSTEM.

At a recent meeting of the Association for reforming the system of furnishing medical attendance and medicine to out-patients, it was proposed that "a lay officer attached to each hospital be instructed to see that the charity is not abused by persons being admitted as out-patients while well able to pay the usual fees of practitioners, or to obtain medical attendance by provident dispensaries or otherwise. Also that patients shall no longer be tempted to crowd to hospitals by the offer of medicine gratuitously, and therefore that no medicines should be supplied to out-patients at hospitals, but that advice and prescriptions be alone given."

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

March 5th, 1873.

MR. A. F. HASELDEN, F.L.S., PRESIDENT, IN THE CHAIR.
MR. W. SCOTT BROWN, VICE-PRESIDENT.

Present—Messrs. Atherton, Betty, Bottle, Frazer, Greenish, Hampson, Hills, Mackay, Radley, Sandford, Savage, Schacht, Shaw, Stoddart, Urwick and Williams.

The minutes of the last meeting were read and confirmed.

ELECTIONS.

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

Evans, Gwilym .... Swansea.
Little, Arthur Nicholas ...... Bristol.
Rossiter, John .... Queenstown.

MEMBERS.

Pharmaceutical Chemists.

The following Pharmaceutical Chemists were elected members of the Society:—

Bemrose, Joseph .... Montreal.
Clayton, Francis Corder...... Birmingham.
Colchester, Wm. Markham, jun. Hoxton.
Cryer, Henry .... Sydenham.
Iredale, George.............. Leeds.
Jackson, John Pim .... London.
Munro, John Morrison ...... Edinburgh.
Paine, Charles .... Usk.
Rimmington, Felix Wm. Elgey Bradford, Yorks.
Robertson, Fredk. Freer Leslie. Camberwell.
Rossiter, John .... Queenstown.
Samuel, Edward .... London.
Swift, William Philip .... Spalding.
Walton, George Chapman .... Dartford.
Wharton, William .... London.

Chemists and Druggists.

Curtis, Theophilus .... Kensington.
Dawson, William .... Slough.
Dyson, Joseph Edward ...... Sheffield.
Guthrie, John .... Edinburgh.
Noble, John .... South Shields.
Richards, James Edgcome .... Truro.
Taylor, Matthew .... Peckham.
Woolstencroft, John .... Carnforth.

ASSOCIATES.

The following, having passed their respective examinations, and being in business, were elected Associates in Business of the Society:—

Minor.

Banks, Edward.............. Pendlebury.
Crossby, Richard Summerby .. Stony Stratford.
Field, Alfred William .... Taunton.
Hinds, Howell David .... Pontardulais.
McLean, Kenneth .... Lofthouse.
Smith, Richard Fox .... Barton-on-Humber.
Williams, Joseph Bower...... Kingswinford.

Modified.

Backhouse, Headley Noah .... London.
Blunt, Walter Buswell ...... Derby.
Bush, George .... Chelmsford.
Courtenay, Alexander .... London.
Cutforth, John Dixon .... London.
Hardy, George.............. Malton.
Harrington, Philip John...... Middlesbro'-on-Tees.
Hill, Edward .... Wellington, Somerset.
Meredith, John.............. Brecon.
Orton, William Billing ...... Stockport.
Plumridge, Charles .... London.
Romans, Thomas Wood ...... Wrotham.
Sheel, Robert .... Gateshead-on-Tyne.
Sirett, Henry, jun. .... Brackley.
Stafford, John .... Ross.
Steed, Robt. Owen .... London.

The following, having passed their respective examinations, were elected Associates of the Society:—

Minor.

Bake, Alfred Benjamin ...... Guildford.
Barlow, Frederick............ Macclesfield.
Barnes, Edward .... Cosham.
Betts, Alick Stephen .... Woodbridge.
Cann, Charles John .... Greenwich.
Carroll, George.............. Bath.
Harris, Francis George ...... Leamington.
Hefford, Charles .... Sydenham.
Heyland, Charles Philip...... Hammersmith.
Kirton, Christopher Henry .. Hull.
Maitland, Alick .... London.
Newhill, John William ...... Huddersfield.
Radford, John Storer .... Nottingham.
Rayson, Arthur John .... Diss.
Russell, George Hannah ...... Frome.
Steele, Samuel .... Plymouth.
Stoddart, Joseph .... Alresford.
Thomas, James Phillip ...... Hay.
Weddell, Arthur .... Stamford.

Modified.

Ball, Samuel................ Oxton.
Beer, James Henry Elias .... London.
Brown, Roger .... Skipton.
Busby, Henry Horton........ London.
Edwards, Thomas Roberts .... London.
Godolphin, Geo. Fredk. Alfred.. Notting Hill.
Hough, William .... Doncaster.
Miller, William Edwin ...... Liverpool.
Sharman, William .... London.
Trick, William Borrow ...... Stoke Newington.
Turner, Henry Prosser ...... Ledbury.
Watson, William .... London.
Welton, Henry .... Coventry.

APPRENTICES OR STUDENTS.

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

Abbott, Thomas Eastoe ...... Darlington.
Ashweek, John Sydney ...... Torquay.
Baker, Matthias .... Hanley.
Balchin, Edward Samuel...... Devizes.
Barcham, Henry .... Hackford.
Bennett, Samuel Kingdom.... Harlesden Green.
Bibbings, John Henry ...... Exeter.
Brooks, Charles Theodosius.... London.
Clegg, Edmund.............. Manchester.
Clegg, James................ Heywood.
Collier, William James ...... Reading.
Cullingford, Lewis James .... Bletchingley.
Dear, Theophilus............ Hornsey Rise.
De Carle, Horace Edward .... Norwich.
Gadd, Charles Frederick...... Lincoln.
Garratt, Arthur .... Guildford.
Hobson, George William .... Buxton.
Jackson, Henry John .... Bawtree.
Jones, William.............. Bagillt.
Lawson, John Robert .... South Shields.
Maxwell, James Ashworth .... Altrincham.
Morgan, Alfred William...... Rochester.
Owen, John Edward .... London.
Perkin, Thomas .... Stourbridge
Pickup, John Arthur .... Bacup.
Porter, William .... Bury Bridge.
Radford, Charles .... Nottingham.

Robins, George Norman......Highgate.
Swindle, Norman Vickers ....Northwich.
Warren, Francis William ....Weston-super-Mare.

ERRATA.

In the list of persons elected last month printed at p. 629, *under* "*Associates in Business* (*Minor*), *Geo. D. Wenham*" *should have been included in the list of* "*Associates* not *in business.*"

"*Associate in Business* (*Modified*), *Black, James, Leslie, N.B.*" *should have been included in the list of* "*Minors.*"

FINANCE.

The Report of the Finance Committee was received and adopted, and sundry payments were ordered to be made.

Mr. BETTY suggested that the Committee should be authorized to engage the services of a professional accountant to assist them and the auditors in preparing the annual statement of accounts.

Mr. SAVAGE thought such a measure quite unnecessary and uncalled for.

Mr. URWICK approved of Mr. Betty's suggestion, but after some conversation, the matter was dropped.

BENEVOLENT FUND.

The report of the Benevolent Fund Committee was received and adopted.

On the recommendation of the Committee, a grant of £10 was made to a registered chemist and druggist residing at West Derby, Liverpool.

An application for relief from a registered chemist and druggist, aged 87, residing at King Stanley, Gloucestershire, was submitted to the Council, the application having been received too late for consideration by the Committee. A grant of £10 was also made in this case.

The Chemists' Ball.

The Secretary reported that a subscription of ten guineas had been handed over to the Benevolent Fund by the Committee of the Chemists' Ball. A vote of thanks to the Committee was recorded.

PARLIAMENTARY COMMITTEE.

The report of this Committee was read and received. The PRESIDENT said he had a long letter from Mr. Vizer, with reference to the proposed new bye-law. He did not know whether the Council would like to have it read.

Mr. FRAZER said, in his opinion, it would be quite irregular to read such a letter. Any letter on such a matter should be sent to an individual member of Council, and not to the Council generally, or they might have letters from members all over the country, and they would never get through the business.

The VICE-PRESIDENT being of the same opinion, the letter was not read.

AMENDED BYE-LAWS.

The Solicitor attended the Committee, and submitted draft of proposed bye-laws as approved by himself, which, on comparison with the suggested alterations printed last month, were found to contain in some places considerable verbal alteration. The whole of the proposed alterations were considered *seriatim*, with the following result:—

FIRST SCHEDULE. PRESENT.	SECOND SCHEDULE. PROPOSED.
SECTION 1.	
Clause 10.	*Clause* 10.
All subscriptions for the current year shall become due upon election, and all annual subscriptions shall become due on the first day of January in every year; and if any Member, Associate, or Apprentice or Student, shall not have paid his annual subscription before the first day of May in any year, his name shall be omitted from the Register of Members, Associates, and Apprentices or Students of the Society, certified by the Council at the annual meeting.	All subscription for the current year shall become due upon election, and all annual subscriptions shall become due on the first day of January in every year; and if any Member, Associate, or Apprentice or Student shall not have paid his annual subscription before the first day of May in any year, his name shall be omitted from the Register of Members, Associates, and Apprentices or Students of the Society, certified by the Council at the annual meeting.
It shall be competent to the Council to restore any defaulter to his former status in the Society on payment of his arrears and any fine which it may be thought fit by the Council to impose, not exceeding half-a-guinea.	It shall be competent to the Council to restore any person whose name has been so removed to his former status in the Society on payment of his subscription for the then current year, and a sum not less than the amount of half of one year's subscription nor exceeding five guineas as for and in commutation of his arrears of subscription.
SECTION 3.	
Clause 3.	*Clause* 3.
The Common Seal shall not be set or affixed to any deed, instrument, or writing whatsoever, unless in the presence of the Council of the Society, and in pursuance of an order or minute entered in their books.	The Common Seal may be set or affixed to any deed, instrument, or writing in pursuance of an order or minute of the Council entered in their minute book, and in the presence of the President, or Vice-President, or two Members of the Council, and not otherwise.
SECTION 4.	
BYE-LAWS.	BYE-LAWS AND REGULATIONS.
The making, altering, or abrogating any Bye-law shall be in the following manner:—	The making, altering, or abrogating of any Bye-law or any Regulation, to be prescribed by the Society, in accordance with any statute, shall be in the following manner:—
Clause 1.	*Clause* 1.
A written formula for any proposed Bye-law, or for altering or abrogating any Bye-law, being delivered by a Member of the Council to the Chairman, shall thereupon be read, and, if seconded and approved, shall be referred to two subsequent ordinary or special Meetings of the Council for confirmation, and then to a special General Meeting of the Members of the Society, and afterwards to the Privy Council, according to the provisions of the Statute, 1852, as amended by the Act, 1868.	A written formula for any proposed Bye-law or Regulation, or for altering or abrogating any Bye-law or Regulation, being delivered by a Member of the Council to the Chairman, shall thereupon be read, and, if seconded and approved, shall be referred to two subsequent ordinary or special Meetings of the Council for confirmation, and then to a special General Meeting of the Members of the Society, and afterwards to the Privy Council, according to the provisions of the Pharmacy Act, 1852, and the Pharmacy Act, 1868.

Present.	Proposed.
Section 9.	
Clause 1.	*Clause* 1.
This Committee shall consist of not less than four Members, two of whom shall constitute a quorum. The Committee shall meet once in every month, and report from time to time to the Council.	This Committee shall consist of not less than five Members, three of whom shall constitute a quorum. The Committee shall meet once, or oftener, in every month, and report from time to time to the Council.
Section 10.	
Clause 1.	*Clause* 1.
The Board of Examiners heretofore appointed shall continue in office until the first monthly meeting of the Council after the general meeting in the year 1869.	The Boards of Examiners respectively heretofore appointed shall continue in office until the end of the year 1873.
Clause 2.	*Clause* 2.
The Council shall, at the first monthly meeting of the Council after the general meeting in 1869, and in every subsequent year, appoint such competent persons as they shall think fit, to be examiners to conduct all such examinations as are provided for or contemplated by the Charter or by the Statute, 1852, and the persons so appointed shall constitute and be called the Board of Examiners for England and Wales.	The Council shall, at their first meeting, in December, 1873, and in every subsequent December appoint such competent persons as they shall think fit, to be examiners for the year to commence on the then following first day of January, to conduct all such examinations as are provided for or contemplated by the Charter or by the Statute 15 and 16 Vict. c. 56, and the persons so appointed shall for the period of their appointment constitute and be called the Board of Examiners for England and Wales.
Clause 3.	*Clause* 3.
The Council shall, at the first monthly meeting of the Council after the general meeting in 1869, and in every subsequent year, appoint fit and proper persons in Scotland to be examiners, and to meet in Edinburgh or Glasgow, or such other place or places as the Council may think desirable, and to conduct there all such examinations as are provided for or contemplated by the Statute, 1852, and the persons so appointed shall constitute and be called the Board of Examiners for Scotland.	The Council shall, at their first meeting in December, 1873, and in every subsequent December, appoint fit and proper persons in Scotland to be examiners for the year to commence on the then following first day of January, and to meet in Edinburgh or Glasgow, or such other place or places as the Council may think desirable, and to conduct there all such examinations as are provided for or contemplated by the Statute 15 & 16 Vict. c. 56, and the persons so appointed shall for the period of their appointment constitute and be called the Board of Examiners for Scotland.
Clause 4.	*Clause* 4.
The President and Vice-President of the Society shall, *ex officio*, be members of the Boards of Examiners, and shall preside at all meetings of such Boards at which they shall be present.	The President and Vice-President of the Society shall, *ex officio*, be members of the Boards of Examiners, and either of them present at any meeting of either of such Boards shall preside thereat.

Present.	Proposed.
Clause 5.	*Clause* 5.
After the first day of January, 1871, the Council shall not appoint any person who has attained the age of sixty-five years at the time of the appointment to be an examiner, unless such person shall be the President or the Vice-President of the Society.	The Council shall not appoint any person who has attained the age of sixty-five years at the time of the appointment to be an examiner.
Clause 6.	*Clause* 6.
After the first day of January, 1871, no person shall be appointed an examiner who at the time of appointment is, or who during one year prior to the time of appointment has been, a Member of the Council, other than the President or Vice-President; and the election of any examiner to be a Member of the Council shall vacate his appointment as an examiner.	No person shall be appointed an examiner who at the time of appointment is, or who during the six months prior to the time of appointment has been, a Member of the Council, unless he shall within the said six months have been the President or Vice-President; and the election of any examiner to be a Member of the Council shall vacate his appointment as an examiner.
Clause 12.	*Clause* 12.
All persons who shall tender themselves to the Examiners for Examination in accordance with the Charter and the Statute, 1852, shall be examined in their knowledge of the Latin language, in English Grammar and Composition and Arithmetic, which Examination shall be called the First Examination.	All persons who shall tender themselves to the Examiners for Examination in accordance with the Charter and the Statute, 1852, shall be examined in their knowledge of the Latin language, in English Grammar and Composition and Arithmetic, which Examination shall be called the First Examination.
Such of the said persons as shall desire Certificates of competent skill and qualification to be engaged or employed as Assistants shall be examined in the First Examination, and also in the translation and dispensing of Prescriptions, in Botany, in Materia Medica, in Pharmaceutical and General Chemistry, the Chemistry of Poisons and Posology, which examination shall be called the Minor Examination; and such of the said persons as shall desire Certificates of competent skill and qualification to exercise the business or calling of Pharmaceutical Chemists shall be examined in the Minor Examination, and in more extended knowledge of Botany, Materia Medica, the translation and dispensing of Prescriptions, Pharmacy, General Chemistry, the Chemistry of Poisons and Posology, which examination shall be called the Major Examination.	Such of the said persons as shall desire Certificates of competent skill and qualification to be engaged or employed as Assistants shall be examined in or produce Certificates of having previously been examined in the First Examination, and shall be examined in the translation and dispensing of Prescriptions, in Botany, in Materia Medica, in Pharmaceutical and General Chemistry, the Chemistry of Poisons, and Posology, which examination shall be called the Minor Examination; and such of the said persons as shall desire Certificates of competent skill and qualification to exercise the business or calling of Pharmaceutical Chemists shall be examined in or produce Certificates of having previously been examined in the Minor Examination, and shall be examined in more extended knowledge of Botany, Materia Medica,

	the translation and dispensing of Prescriptions, Pharmacy, General Chemistry, the Chemistry of Poisons, and Posology, which examination shall be called the Major Examination.
Clause 16.	*Clause* 16.
All persons before registration as Apprentices or Students shall pass the First Examination, and shall pay a fee of Two Guineas, whereupon they shall be registered as Apprentices or Students.	All persons before registration as Apprentices or Students shall pass the First Examination, and shall pay a fee of Two Guineas, whereupon they shall be registered as Apprentices or Students.
	After the 31st day of December, 1874, no person shall be admitted to the Major or the Minor Examination who shall not have attained the full age of twenty-one years; and after the 31st day of December, 1876, no person shall be allowed to pass the Major or the Minor Examination unless he shall satisfy the Examiners that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translation and dispensing of prescriptions.
	Persons who have passed the Minor Examination at least three months previously may be admitted to the Major Examination, and all other persons desirous of passing the Major Examination may make application to the Board of Examiners for special leave in that behalf.

Mr. Sandford moved:

"That the bye-laws shall be altered in the sections numbered respectively 1, 3, 4, 9, and 10, by erasing therefrom the several portions of the said sections in that behalf appearing in the first schedule hereto, and substituting for the respective portions of sections so erased, the several clauses and words in that behalf appearing in the second schedule hereto."

Mr. Williams seconded the motion.

Mr. Betty then proposed another alteration which he thought would be generally accepted, although, when he mentioned the same matter at an earlier period of the meeting, it came upon some members by surprise. It was to add to the 2nd clause of section 8, which defines the duties of the Finance Committee, the words "with the assistance of a professional accountant," so that the last clause would read as follows: "This Committee shall also prepare *with the assistance of a professional accountant* a balance-sheet for the auditors previous to the annual meeting."

Mr. Williams suggested the addition of the words "if necessary."

Mr. Mackay said the motion as proposed by Mr. Betty would render it imperative on the Committee to obtain professional assistance.

The Vice-President thought it would be perfectly out of the question to pass such a bye-law.

Mr. Urwick seconded the proposition, thinking it was much more desirable to call in a professional auditor when everything was going on smoothly, and when all were satisfied with the way in which the accounts were kept, than it would be to do so if it should ever happen that things were not so satisfactory. As they were altering the bye-laws, he thought this addition might easily be made.

The Vice-President said the present alterations of the bye-laws had been referred to a committee, which, after discussion with the solicitor, had sent them back to the Council, and he considered it was perfectly out of order to add to them any other matter without notice having been given. He had no doubt that if the committee really required the assistance of an accountant they might obtain it at any time without a bye-law being made for the purpose.

Mr. Betty then withdrew the motion, saying he would introduce the matter in another form.

Mr. Hampson moved the following amendment:—

"That the proposed new bye-laws be accepted, save and except the one,—viz. section 10, clause 16,—beginning at the words 'after the 31st day of December, 1876, no person shall,' etc., to the end of the paragraph."

He said the solicitor had endeavoured to carry out the wishes of the majority of the Council by the proposed alterations, and to which he objected he was using a process of "fine steering" to keep as near to the law as possible, rather than preparing such bye-laws as would carry out the full intention of the Act of Parliament. He contended that this restriction as to the three years, this hard and fast line, was unnecessary. and was not the intention of those who framed the Acts of Parliament. In the majority of cases, a youth entered the business in the usual manner as an apprentice, and acquired practical knowledge. But cases might occur in which it would be difficult to conform to the three years' regulation, and why should a man who was capable in two and a half or two years of qualifying himself be restricted from passing his examination? He maintained that the examination might be, and was about to be, made thoroughly practical. It appeared also that whereas some months ago it was usual for forty candidates a day to be examined, now only twenty were examined in a day. This showed that greater time was taken, and that a more practical turn was given to the examinations. The position he took was this, that the Statute did not give power to the examiners to inquire into the antecedents of any man who presented himself for examination, but only to test his practical knowledge, and this he maintained the examiners were perfectly competent to do without insisting on a three years' apprenticeship. He therefore asked the Council to pause before they stretched the powers of the Act of Parliament in this way, especially as it appeared to him there was no imperative necessity for such a change.

Mr. Williams said this subject had already been discussed several times and voted upon, and he did not think it was in order to bring it forward again.

The Vice-President said it was perfectly in order to propose an amendment at this stage of the proceedings, though he did not agree with the one brought forward by Mr. Hampson.

Mr. Bottle called attention to the 4th section of the Pharmacy Act, 1868, to show that the Legislature did intend that persons should have been three years engaged in the business before they were admitted to pass the Modified examination. He therefore thought it must also be their intention that any one entering the business in future should conform to the same rule.

Mr. Urwick said he had great pleasure in seconding the amendment, and he did not think Mr. Bottle's observations at all touched the point, as they referred entirely to the Modified examination, which in future would be entirely abrogated; and the qualification would be shown by the candidate passing the Minor examination, which could be made strict and practical. It lay with the examiners to test candidates in any way they thought proper; and if they could pass the examination, no certificate of servitude ought to be required in any shape or form. He perfectly understood that it was desirable, and most members would insist in their private capacity, on an assistant having at least three years' experience, but what they did in their individual establishments must not be made the foundation for a formal bye-law when opposed to the Act of Parliament.

Mr. Mackay supported the bye-law as it stood, and thought that the daily practice of each individual should be the guide of what should be recommended to others. He looked upon this proposition which Mr. Hampson now sought to set aside as one of the best in the new code. Three years formed the minimum time in which any one could acquire a practical knowledge of the business, and that term ought to be insisted upon. In his own establishment young men were never taken as apprentices unless they agreed to serve for five years.

Mr. Schacht said these regulations came from the Board of Examiners, upon whom the responsibility rested of testing the candidates; and unless for some very strong reason their recommendations ought to be adopted. These gentlemen stated over and over again that they felt it would be a great assistance to them in giving credentials to candidates who came before them, if this regulation were introduced. And he might mention in corroboration of this that at the recent conference, at Brighton, Dr. Michael Foster said that one of the most arduous portions of his public duty was to properly estimate the capabilities of candidates presenting themselves before him, and that he was greatly assisted in so doing when he had some knowledge of their antecedents.

Mr. Frazer supported the amendment, not so much because he thought it was in any way sailing very near to the law, but because it appeared to him that it was an unnecessary restriction upon trade, tending to add another to the many difficulties which now existed in the way of getting assistants. He deprecated the age being limited to twenty-one for the same reason; but he should certainly support the amendment.

Mr. Williams said that the bye-law as passed at the last Council would have excluded a young man who had been dispenser to a surgeon, or to an hospital, or any post of that kind, which there was no wish to do; and the solicitor had therefore taken some pains to alter the words so as to include all those who really had a practical knowledge of the business.

Mr. Hills said three years was the very least a young man should spend practically learning the business; and, in fact, his experience was that the longer a young man was engaged in the trade the more interested was he in the studies connected with it, and the more efficient he became. He certainly considered three years was the minimum.

Mr. Stoddart said there was no difficulty in getting young men, the only difficulty was in getting good ones; and that would, he thought, be diminished rather than increased by the new regulation.

The Vice-President also thought that the proposed bye-law would have the effect of making young men learn their business thoroughly, before coming up to pass the examination, and that a better class of assistants would be the result.

Mr. Hampson said he must not be understood as intending to say a word against the advisability of apprenticeship. What he objected to was what he believed to be the illegality of the action about to be taken. He valued experience as much as any one, but as to this being a recommendation of the examiners he contended it was the duty of the Council to subject their proposition to the test of argument and discussion, and decide for themselves. He desired to leave the trade as free as possible, and to obey the statute. And he also thought there had been no argument of any kind brought forward to show the necessity of the change about to be introduced. The examiners were constantly rejecting large numbers of young men who were not able to pass, which showed that they were making the examination more practical and stringent. That was quite sufficient without drawing a hard and fast line, which they were now asked to adopt.

The amendment was then put with the following result:—

For—Messrs. Frazer, Hampson and Urwick.

Against—Messrs. Atherton, Betty, Bottle, Brown, Greenish, Haselden, Hills, Mackay, Radley, Sandford, Savage, Schacht, Shaw, Stoddart and Williams.

The amendment was therefore negatived.

Mr. Frazer then moved an amendment for omitting the clause limiting the age to twenty-one years; but as he failed to find a seconder, it fell to the ground.

The original proposition was then put and carried.

Regulations made in Pursuance of Section 9 of the Pharmacy Act, 1868, for Regulating the Register.

The Secretary presented the following Form of Regulation and Forms of Application for Restoration to the Register, under the provision set forth in section 10 of the Pharmacy Act, 1868, of the names of such persons whose names have been erased from the Register in pursuance of the provisions of the said section. The forms had been prepared by the Society's solicitor:—

"Application for restoration to the Register, pursuant to clause 10 of the Pharmacy Act, 1868, shall be made by a writing signed by the applicant and attested by a person whose name appears on the Register for the time being, and shall be supported by a Statutory Declaration made by the applicant, verifying that he is the person who was formerly registered, and disclosing his addresses and occupations from the first day of the year of publication of the printed Register in which his name last appeared to the date of his application, together with words importing that his name has not been erased from the said Register for any offence against the Act; and no such application shall be received by the Registrar unless accompanied by the sum of One Guinea, to be received by him for the purposes of the Pharmaceutical Society of Great Britain in discharge of all expenses incurred in relation to the erasure of the name of the applicant and the presentation of the application."

"*To the Council of the Pharmaceutical Society of Great Britain.*

"I, the undersigned, whose name appeared in the Register of the names of Pharmaceutical Chemists and Chemists and Druggists, printed and published in year 18 , under the direction of the Pharmaceutical Society of Great Britain, pursuant to the Act passed in the 31st and 32nd years of the reign of Her Majesty Queen Victoria, c. 121, entitled 'An Act to regulate the Sale of poisons and alter and amend the Pharmacy Act 1852,' by the name and description following, that is to say [*The name and description to be here inserted should correspond with that in the printed Register*] do hereby make application that my name may by your direction be restored to the Register of [*Pharmaceutical Chemists or Chemists and Druggists*].

"Dated this day of 18 .

"Witness to the signature of the said

Signature ,,
Address

"*Description whether Pharmaceutical Chemist or Chemist and Druggist.*"

"I, of
in the County of
do solemnly and sincerely declare that I am the person whose name appeared in the Register of the names of Pharmaceutical Chemists and Chemists and Druggists printed and published in the year 18 under the direction of the Pharmaceutical Society of Great Britain pursuant to the Act passed in the 31st and 32nd years of the reign of Her Majesty Queen Victoria, c. 121, entitled 'An Act to Regulate the Sale of Poisons and Alter and Amend the Pharmacy Act, 1852,' by the name and description following that is to say [*The name and description to be here inserted should correspond with that in the printed Register.*] And that since the first day of the said year of publication I have at the several dates resided at the several places and exercised the occupations following, that is to say [*The applicant should here account for the time.*]

"And I further solemnly and sincerely declare that I have not within the meaning of the 26th Section of the said Act been convicted of any offence against the said Act. And I make this solemn declaration conscientiously believing the same to be true, and by virtue of the provisions of the Act made and passed in the fifth and sixth years of the reign of His late Majesty King William the Fourth, intituled 'An Act to Repeal an Act of the present Session of Parliament intituled An Act for the More Effectual abolition of Oaths and Affirmations taken and made in various Departments of the State, and to substitute Declarations in lieu thereof, and for the more entire Suppresion of voluntary and extra-judicial Oaths and Affidavits and to make other Provisions for the abolition of unnecessary Oaths.' [*To be declared before a person duly authorized to administer oaths.*]

"Taken and declared at
"This day of 18
"Before me ."

Mr. Williams moved that these forms be adopted, but in doing so he called the attention of the Council to that part of the Regulation which provided that a fee of One Guinea should be paid by the person applying to have his name restored to the Register. He thought this provision a very proper one, as unless some kind of penalty were incurred by the negligence of the registered person in allowing his name to be struck off when so much trouble was taken to find him, the trouble and expense of keeping the Register in anything like a correct state would be enormous.

Mr. Savage thought that half a guinea would meet all the requirements of the case.

Mr. Bottle supported the guinea fee most decidedly. Any one who wilfully neglected to comply with the conditions of the Pharmacy Act, and had his name removed from the Register in consequence, ought to pay at least a guinea in order to be restored.

The Secretary explained that there was a great expense incurred in keeping the register correct. Although much care and trouble were taken last year to correct the Register, and the corrected Register was used in addressing the poison regulations just issued, between three and four hundred had been returned through the "dead letter office."

Mr. Mackay said it must also be remembered that nearly all these parties had been put on the Register in the first place without the payment of any fee.

Mr. Shaw said that a person carrying on business and whose name was not on the Register was open to various pains and penalties for so doing, and he thought they were sufficient without imposing a fine.

The Secretary said the guinea was not a fine, but a fee to cover the expenses of his removal and reinstatement.

The regulation and forms of application were then approved of and adopted.

Library, Museum and Laboratory.

The report of this committee was received and adopted. It recommended the purchase of the following books:—'Annuaire Pharmaceutique;' and 'United States Pharmacopœia' (new edition). It also recommended the purchase of a drying stove, a sketch of which was presented by the curator of the museum, and of a wooden press for the purpose of pressing botanical specimens.

House.

The report of this committee was received and adopted.

North British Branch.

Mr. Mackay presented a list of specimens which the Edinburgh Board of Examiners suggested would be desirable for their use in conducting the examinations. He said the list was rather a long one, and it might be a question whether all the articles there named were required, but he was quite willing that the matter should be referred to any members of the London Board to pick out such specimens as it was thought desirable should be obtained, or the board in Edinburgh could do the same thing. He also drew the attention of the Council to the approaching examination in April, when he hoped a deputation would come down and inspect the new arrangements.

It was resolved that the list of specimens be referred to the Library, Museum and Laboratory Committee, with power to make a selection and to arrange for a supply of all that was deemed to be necessary. A grant of £100 was also made to the North British Branch for current expenses, and the President, Vice-president and Secretary were appointed a deputation to attend at the approaching examination in Edinburgh.

Annual Statements of Accounts.

Mr. Betty then moved—

"That the Finance Committee so desiring it be assisted by a professional accountant in preparing the statements of accounts of the year 1872."

Mr. Radley seconded the motion.

Mr. Williams asked if any gentleman had been selected?

Mr. Betty said he was prepared to name a gentleman if required, who he believed would be perfectly acceptable to all, but, of course, it would be in the hands of the committee or of the Council to make the appointment.

Mr. Williams thought the Council should appoint the accountant if such assistance were decided upon.

Mr. Savage said he believed it was understood that if the Finance Committee required the services of a public accountant, they should be allowed them. He thought the reasons ought to be stated for adopting such a course.

Mr. Betty said he brought forward this motion because the Finance Committee felt themselves individually and collectively somewhat in a false position in presenting the auditors with a statement of accounts to the amount of some £10,000 per annum without that assistance which a commercial firm carrying on business to the same amount would, in such a case, call in. They looked upon it as necessary to relieve themselves, and everybody connected with the accounts, from a position of very grave responsibility. The Committee, in fact, were unanimous in their request that this assistance might be granted to them.

The Secretary said as far as he was concerned individually, he should be very glad if a professional accountant were called in. This question had been brought forward for the last two or three years, and it would be a satisfaction to him if a first-class man went over the books in order to examine and report as to whether the accounts were kept properly.

The Vice-President did not think it was desirable that any individual should be specified. He saw no objection to passing the resolution if it simply authorized the Committee to call in an accountant, but if it rendered it imperative upon them to do so, he should certainly vote against it.

Mr. Schacht said if it was the opinion of the Finance Committee that this would be a necessary annual charge upon the Society, he could see many objections against such a course. At the same time he thought there might be a feeling at the present moment that the accounts were not kept in the best possible form, and that if they were improved in form, the work, in future, might be done as it had been done without requiring assistance of this kind.

Mr. Urwick, as a member of the Committee, said, as far as his observation went, the accounts were kept in the most perfect way.

Mr. Betty, in reply to Mr. Schacht, said the desire of the Committee was to get the assistance of a professional accountant on this occasion, to see if any improvement could be made in the form in which the accounts are presented to the general body of members. If they found that one investigation of this kind was sufficient, they need not have it repeated, but, on the other hand, if it were necessary to continue it, then the Finance Committee next year could make a similar request.

This motion was then agreed to.

Report of Examinations.

February, 1873.

ENGLAND AND WALES.

Examinations.	Candidates. Examined.	Passed.	Failed.
Major	5	3	2
Minor	56	34	22
Modified	38	27	11
	99	64	35

Certificates received in lieu of the Preliminary examination:—

University of Cambridge	2
,, ,, Oxford	3
College of Preceptors	2
	7

Provincial Education.

The report and recommendations of this committee were received and adopted, including a grant to the Nottingham and Notts Chemists' Association of £5 for the purpose of purchasing chemical specimens and diagrams, and £10 for glass cases for chemical and materia medica specimens for the museum. Application had also been received by the committee from the Society of Chemists and Druggists at Aberdeen, and the committee were of opinion that that society should be informed that a grant of £10 had been made to them in 1871, which was still at their disposal.

The Conversazione.

It was resolved—

"That a Conversazione be held on Wednesday the 21st of May, and that the Secretary be instructed to apply to the Lords of Her Majesty's Council on Education for permission to use the South Kensington Museum on the evening of that day for such purpose."

Lecture Class Prizes.

Mr. Hampson, pursuant to notice, then moved:—

"That inasmuch as according to the Regulations, published in the Calendar, all students attending the Courses of lectures delivered by Professors Redwood and Bentley are entitled to compete for the Prizes and Certificates given in those classes, this Council hereby revokes a decision to the contrary passed at the Council of January 8th ult."

He did not wish to trouble the Council with any lengthy remarks on the present occasion, but thought they ought to be consistent in the matter. And in order to remove any doubt as to the eligibility of ladies to compete for the prizes referred to, he brought forward this motion.

Mr. Sandford seconded the resolution, thinking that the Council had rather committed a mistake in saying that all students were not eligible to compete for these prizes. This matter had nothing whatever to do with the question of the admission of ladies as members of the Society, on which point he had in no way changed his views.

Mr. Williams opposed the proposition, thinking it inconsistent with the honour and consistency of the Council to pass resolutions at one meeting and rescind them at another.

Mr. Bottle rose to order, and requested that the Secretary might refer to the minute of January 8, referred to in the motion.

The Secretary read the motion referred to, which was one proposed by Mr. Hampson, that all persons attending the classes, etc., should be eligible to compete for the prizes, which motion was lost. There was, therefore, no resolution passed which could be rescinded.

The Vice-President, as seconder of the motion proposed in January, thought Mr. Hampson was out of order in bringing it forward on the present occasion in the shape he had, and suggested he should give notice for the next meeting to bring it forward in the proper manner.

Mr. Sandford said it was difficult to understand what was the meaning of the vote come to in January. They had decided that all persons were not eligible, but they did not say who were not to compete for these prizes. It might be contended on that resolution that the Professors might pick out any three or four candidates, and say that the rest were not to compete. The matter stood in the most awkward position, and therefore he thought it would be better to make it clear by passing the resolution which Mr. Hampson now brought forward.

Mr. Hills said he had taken a long time to consider whether ladies should compete for these prizes, or whether they were confined to registered apprentices or students of the Society; but the more he thought of it, the more he was inclined to the conviction that all students should have the same privilege, and he hoped the matter would be settled then and there. With regard to the prize given by himself, he would only add that if it were decided that ladies should not compete, he would give a similar prize which should be restricted to them.

After some further discussion the President said, in his opinion, Mr. Hampson would do well to withdraw the resolution and leave the matter as it stood. There was nothing on the records of the Council to prevent ladies being eligible for *certain* prizes, and he thought the best course would be to leave the matter just as it was according to the bye-laws and regulations. At the close of the session the Professors would report the successful candidates; this report would come before the Council, and then the Council would say to whom the prizes should be given, and he did not believe for one moment if a professor awarded a prize to a lady, the Council would say she should not have it. He would remind Mr. Hampson, that on a former occasion, a gentleman belonging to the medical profession attended the laboratory course and obtained the largest number of marks. The next candidate to him also obtained sufficient number of marks to obtain the prize, and when the matter came before the General Purposes Committee, the opinion was expressed that a gentleman outside the

Society was not a person who should compete for this prize, but in order not to appear ungenerous, a medal was given to that gentleman, and a second medal was voted to the second candidate.

Mr. HAMPSON said he was quite in the hands of the Council. He did not wish to weary them by the continual reproduction of this subject, and if it were generally understood that ladies were eligible to compete for these prizes, that was quite sufficient; but still he should wish this to be clearly understood.

Mr. WILLIAMS said that was a matter which ought to be decided one way or the other. He did not agree in the opinion expressed by the President.

Mr. BOTTLE said he would give notice of a motion for the next Council, which would raise the question clearly, and in the meantime he would ask that the solicitor's opinion be taken upon it.

Mr. SHAW thought it was not a matter for legal opinion, but was rather one of grace on the part of the Council.

After some further discussion,

Mr. HAMPSON said he would withdraw the resolution, and take care that when he reproduced it there should be no informality or misunderstanding as to its purport.

Mr. BOTTLE then read the notice of motion which he had prepared for the next meeting, to the effect that it having been brought under the notice of the Council that lecture and laboratory pupils not connected with the Society had been permitted to compete for prizes, it be an instruction to the professors that no class of pupils other than those registered as apprentices or students of the Society be admitted in future to such competition.

Mr. SCHACHT suggested that as Mr. Hampson had withdrawn his resolution, Mr. Bottle should do the same, and allow the whole matter to stand over until after the annual meeting, when no doubt it would be further ventilated.

Mr. BOTTLE said he was quite willing to do so.

Mr. HAMPSON then moved pursuant to notice:—

"That notice be given to the members, by advertisement in the PHARMACEUTICAL JOURNAL, of all resolutions to be brought before the next annual meeting, of which sufficient notice has been given to the Secretary."

Mr. BETTY seconded the motion, which was unanimously agreed to.

REGISTRAR'S REPORT.

The REGISTRAR presented the following report:—

REGISTRAR'S REPORT.

ANALYSIS OF EXAMINATIONS.

ENGLAND AND WALES, 1872.

Number of meetings for Major, Minor and Modified Examinations 24
Average attendance of the Board of Examiners . . . . 11·75

Examinations.	Number of Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average number of Candidates at each Meeting.	Average number of Rejections at each Meeting.	Percentage of Rejections.
Major	81	35	12	6·75	2·916	43·2
Minor	472	208	21	22·476	9·904	44·067
Preliminary . .	939	357	4	234·75	89·25	38·019
Modified . . .	127	44	3	42·333	14·666	34·645

SCOTLAND, 1872.

Number of meetings for Major, Minor and Modified Examinations 5
Average attendance of the Board of Examiners . . . . 5·6

Examinations.	Number of Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average number of Candidates at each Meeting.	Average number of Rejections at each Meeting.	Percentage of Rejections.
Major	8	2	4	2	·5	25·
Minor	35	12	5	7	2·4	34·285
Preliminary . .	129	58	4	32·25	14·5	44·961
Modified . . .	22	9	5	4·4	1·8	40·909

THE REGISTER, 1872.

Additions during the Year.

Number of persons who have passed the Modified Examination		96
Minor "		287
Major "	52*	
Number of persons registered on payment of the registration fee having been in business before 31st July, 1868 . .	. .	47
		430
Decrease of numbers on the Register	. .	485
		915

* These having already been included in the number who passed the Minor, do not increase the numbers on the Register.

Erasures during the Year.

Deaths:—		
Notices from Registrars	83	
" " other sources	150	
		233
Erased by order of the Council		5
Erased at the request of registered persons themselves	. .	28
Erased by the Registrar in pursuance of the provision set forth in Section 10 of the Pharmacy Act, 1868, after sending two registered letters, to which no answer has been given	. .	649
		915

Number of Pharmaceutical Chemists on the Register, 1873	2,368	
Number of Chemists and Druggists	10,389	
		12,757

PHARMACEUTICAL MEETING.

Wednesday, March 5, 1873.

MR. A. F. HASELDEN, F.L.S., PRESIDENT, IN THE CHAIR.

The minutes of the last meeting were read and approved.

The following donations to the library were announced, and the thanks of the Society were voted to the donors:—

'Proceedings of the Royal Society,' from the Society; 'Pharmacopœia of the United States,' and 'Proceedings of the American Pharmaceutical Association,' from the Association; 'Pharmaceutical Times,' vols. i. ii. (1846–7), from Professor Attfield; 'Remarks on the Ipecacuan Plant,' by Professor Balfour, from the Author.

Legal Pharmaceutical Preparations.

A paper upon the above subject, by Charles Symes, Ph.D., was, at the request of the Chairman, read by Professor Attfield. The paper is printed at p. 701.

Fluid Extracts Illustrative of American Pharmacy.

Mr. Umney placed upon the table several fluid extracts illustrative of American pharmacy.

Upon being requested by the President to make some remarks upon them, he said that he had placed these fluid extracts upon the table that evening to call the attention of the meeting, and of pharmacists generally, to fluid extracts as prepared by the formulæ given in the recent edition of the United States Pharmacopœia, published in January of this year. Of the forty-six there enumerated (twenty-two of which were introduced for the first time), he had experimented with six, the selection having been made from the drugs in daily use in this country, viz. cinchona, calumba, ergot, rhubarb, taraxacum, pareira. Percolation was the mode of preparation entirely resorted to in the production of these fluid extracts, the menstruum being a novel one (at any rate to this country), a mixture of alcohol, glycerine, and water. The proportions might be expressed generally as about 50 per cent. of alcohol, 20 per cent. (fluid) of glycerine, and 30 per cent. of water; they varied, however, according to the drug to be operated upon. By alcohol was intended a spirit of wine about 57·5 per cent. overproof (·835), a little stronger, in fact than our officinal rectified spirit, and not alcohol as we understand it. The drug having been brought into the proper state of division, it is moistened with a portion of the menstruum. And here he would remark that the American Pharmacopœia defines its powders by giving a table of the number of meshes to the inch through which they are to pass; for instance, the powder passed through a sieve of eighty or more meshes to the linear inch being designated *very fine*, through one of sixty meshes *fine*, one of fifty meshes *moderately fine*, one of twenty meshes *coarse*, and so on. This he thought the compilers of our British Pharmacopœia might copy with advantage. The drug then was allowed to stand in a moderately warm place for four days, the rest of the menstruum then added, and percolation proceeded with as slowly as possible to call it percolation at all. Displacement of this menstruum was then carried on by diluted alcohol, a spirit about 20 under proof (Sikes hydrometer), or ·941 sp. gr. Operating upon sixteen troy ounces of the drug, the first fourteen fluid ounces were reserved, the remaining percolate of ten ounces or more according to the drug operated on was evaporated, one ounce of glycerine being previously added. This being reduced to two fluid ounces was mixed with the first fourteen ounces, making in all sixteen fluid ounces, equal to sixteen troy ounces of the drug, corresponding in strength very nearly to some of the fluid extracts of the British Pharmacopœia. As far as one could judge the aim of our American friends had been to economise alcohol, labour, and fuel, of course not losing sight of the most essential points—reliability and stability of the extracts themselves. As to the elegance of these preparations, he would ask the meeting to judge. He was personally of opinion that they far surpassed the fluid extracts of British pharmacy, as prepared by several aqueous infusions of the drug, and concentration by evaporation. He might add the preparation of taraxacum was much stronger than any officinal preparation we have of the same root in our Pharmacopœia; it is, at least, ten times the strength, as far as the weight of dry taraxacum root it represents, as the succus taraxaci of the British Pharmacopœia, and has therefore a more decided bitter flavour.

Mr. Sandford said that he had examined with interest the specimen of fluid extract of pareira brava, as it was a preparation to which he had given considerable attention, and he was of opinion that it by no means excelled, if even it were equal to, the preparation made according to the British Pharmacopœia.

Material for Suppositories.

Mr. A. W. Gerrard called the attention of the meeting to some specimens of suppositories and pessaries which were on the table. He said that through the remarks of Professor Redwood, at the last evening meeting, concerning some objections which had been made by medical men to the present basis used in their preparation, he was induced to make a number of experiments with the view of obtaining a substance which should not have the objections then urged. It was not necessary for him to give the details of every experiment, but it would suffice if he mentioned that he tried combinations of glycerine and isinglass, glycerine and gelatine, glycerine and starch and glycerine and soap, but had disdiscarded them all as unsuitable for the purpose. With respect to glycerine and soap he might mention a curious fact, and one he believed not generally known,—it was that those substances can be made to combine on heating them together, in the proportion of 80 per cent. of the former to 20 of the latter. The mixture on cooling had a solid consistence, and moulded easily, forming apparently an elegant suppository; but he found that in a few hours the suppositories so prepared were covered with an exudation of glycerine which rendered them objectionable, as would be seen by some that were on the table. The other specimens were mixtures of paraffin and oil of theobroma and wax and oil of theobroma in various proportions. Paraffin was a substance of a somewhat novel character to the pharmacist, having a melting-point varying from 111° to 130° F., and being remarkable for its want of chemical properties; hence it had been suggested to him for the purpose, and he thought it gave excellent results. The combination to which he should give the preference would be that of equal parts of paraffin and theobroma oil. Such a combination softened readily at the temperature of the body, which is about 98° F. He trusted that on some other occasion he should be able to give the results of further experiments.

Mr. Mackay said that the use of suppositories was to a great extent introduced into medical practice by the late Sir James Simpson, of Edinburgh, who attached very considerable importance to that mode of administering medicines. He had even expressed the opinion that by the application of certain drugs in the form of suppositories, the use of medicines by the mouth might to a certain extent be superseded. Several materials had from time to time been used as bases for the preparation of suppositories and pessaries, and at first the mixture was principally wax and oil. These, however, proved awkward, as they required to be varied according to the season of the year, the preparations answering the purpose in hot summer weather requiring to be varied in cold wintry weather. Among the most successful substitutes for the above were found to be a mixture of gelatine and glycerine, and such a combination still continued to be used in Edinburgh in the preparation of both pessaries and suppositories.

The great object to be gained is of course to have a material which will stand the heat of the hand, and yet melt slowly but surely when introduced. Now, he thought nothing could be found better fitted for the purpose under discussion than the theobroma oil or fat, but considered the introduction of a certain portion of paraffin well worthy of a trial.

The Proposed Appendix to the British Pharmacopœia.

Professor Redwood said that when he brought the subject of the proposed appendix to the British Pharmacopœia before the Society at the last meeting, he had not the opportunity of saying as much as he otherwise might have said, in consequence of the lateness of the hour. He was very happy to find that the few observations he made on that occasion had to a great extent realized already what was contemplated, namely, the eliciting certain suggestions and remarks bearing upon the subject, which could not fail to be of very great value and assistance to those who were engaged in considering what additions should be made to the Pharmacopœia when the reprint came out. He had given a sort of implied promise to make some further remarks, and had intended to bring before the meeting a more formal communication than he was now in a position to make; but when it was considered that the subject had not yet come before the Medical Council officially, and that it was merely suggestive matter, it would be seen that he could not enter very much into detail. At the same time, the desire was to elicit as much information as possible, and especially to elicit information from those who were acknowledged to be most capable of giving information, namely, the members of the Pharmaceutical Society. He believed there was no body to which the Medical Council and all connected with them looked with so much confidence, for aid and assistance and guidance, for determining what alterations or additions should be made in reprinting the Pharmacopœia, as the Pharmaceutical Society. He proposed to refer briefly to what had already been suggested for the consideration first of the Pharmacopœia Committee of the Medical Council, and subsequently of the Council themselves, when they met towards the end of this month. The Council had not yet determined to make any additions, but the Committee were in favour of such a course, and he had no doubt that the Council would endorse the recommendation of the Committee in that respect. The question then was, what should this appendix or supplement consist of? In the first place it must be obvious that on the present occasion they could make no essential alteration in any of the existing processes of the Pharmacopœia. They could add to, but not alter the present Pharmacopœia. Once in ten years was thought quite often enough for a new edition, but nevertheless certain additions at intermediate times might properly and advantageously be made. New medicines could be superadded to those already existing, and what was under consideration now was what new medicines or new forms of medicine it would be desirable to recommend for insertion in the appendix. At the last meeting of the Society he had mentioned a certain number of proposed additions, but the list had since been somewhat extended, and it now included the following:—Acetum ipecacuanhæ, æther aceticus, ammoniæ nitras (now so extensively used for the preparation of nitrous oxide), amyl nitris, aqua chloroformi, bismuthi oxidum, calcis hypophosphis, charta sinapis, chloral hydras, extractum glycyrrhizæ liquidum, hydrargyri oxidum præcipitatum, liquor magnesiæ citratis, oleum phosphoratum, oxymel ipecacuanhæ, pepsina, pilula jalapæ composita, pulvis elaterii compositus, sapo animalis, sodæ hypophosphis, succus belladonnæ, succus hyoscyami, suppositoria carbolica cum sapone, suppositoria morphiæ cum sapone, suppositoria tannica cum sapone, tinctura aurantii recentis. Some of these might be thought unworthy of the position proposed for them, and others might be suggested as being of equal or greater importance; and it was open to the Pharmaceutical Society as well as the medical profession to express their opinion in reference to those points, and also as to the forms which should be adopted, and the processes which should be recommended or enjoined. Taking the first, acetum ipecacuanhæ, a process had been given a short time ago by Dr. D. Duckworth, which could not well be improved upon. With regard to acetic ether, he thought it was unnecessary to give a detailed process for its production, and that it would be sufficient to express in general terms the method by which it was produced. He agreed with the spirit of the suggestion made by Dr. Symes, that there should be something to indicate at least the manner in which the various products were obtained. Next came amyl nitris, a therapeutic agent, he believed, of great value, although very potent, and in some respects dangerous. It was most important if its use in medicine was to be extended that there should be some definite description given of it, and some means of identifying and testing it. Then there was aqua chloroformi. Some doubts were thrown upon the advisability of introducing another form of chloroform, but this had some strong claims. It was a saturated aqueous solution, and he considered it one of the most agreeable and elegant of the aqueous menstrua that had been introduced into medical use, calculated to assist the action of a certain class of medicines, and to cover the flavour of others. With regard to bismuthi oxidum, it had been suggested that it was scarcely required in addition to the other forms of bismuth; but he thought that this would be more uniform and more to be relied upon with regard not only to its purity but also to its perfectly definite nature. It was suggested to be introduced not merely as a substitute for either of the other solid preparations of bismuth, but with a view to its subsequent employment in the preparation of liquor bismuthi itself. Then there was,—of course there was,—chloral hydras. It was not necessary to do more than describe its production in general terms, leaving it to the chemical manufacturer to carry out the details or vary them as he thought proper, but putting into the hands of the pharmacist and medical man such tests as could not fail to indicate any of the known impurities or adulterations which might find their way into it. At the last meeting, he (Professor Redwood) had suggested that some liquid form of liquorice might be added to the appendix. He had received communications from one or two gentlemen. One of them stated that after a good deal of experience he had come to the conviction that fluid extract was preferable to a syrup. He (Professor Redwood) agreed with that opinion, and he had commenced preparing a fluid extract of liquorice according to the instructions given in the new 'American Pharmacopœia,' but he soon gave up that process, considering it unnecessarily prolix and troublesome, and that an equally good result could be obtained much more easily by dissolving extract of liquorice of the pharmacopœia in a mixture of glycerine and proof spirit. It was suggested that in addition to the present red precipitate, a precipitated oxide of mercury should be added. Then among the liquors, he thought a solution of citrate of magnesia would be desirable. The French Codex had had such a preparation for many years, and he had made some of it, though not exactly as directed in the Codex, nor exactly as directed in the American Pharmacopœia, which had copied from the Codex, because the solutions there seemed to be unnecessarily strong. It was an exceedingly agreeable purgative draught, and entirely devoid of the bitter taste which the sulphate of magnesia possessed. One advantage probably in introducing it would be that as citrate of magnesia had become so thoroughly established as a popular medicine, we should have a true citrate which might either replace the fictitious citrate of magnesia, or at any rate lead to the adoption of some less objectionable name than that which was now given to an article which really was not citrate of magnesia at all. Another substance included in the list was phosphorated oil. It had been a question among medical men what was the best form for the administration of phosphorus in different kinds of disease. It had been found that in certain cases phosphorus, not in any state of chemical combination but simply in solution, was more efficacious than in any other form. The phosphorated oil was a solution of phosphorus in oil of almonds. Such a preparation was found in the Paris Codex, but the formula there given was not by any means satisfactory. Some few years back a very valuable paper, or a notice of it, appeared in the Society's Journal, detailing the results of investigations made by M. Méhu, upon the best means of producing a solution of phosphorus in oil of almonds that should be uniform in composition and permanent also. If phosphorus were simply dissolved in ordinary oil of almonds as directed in the Paris Codex, the solution very speedily underwent a change, and a reddish yellow precipitate was thrown down, which appeared to be caused by some organic compound in the oil—albumen and resinous matter. By heating the oil up to a temperature of 300 degrees for a quarter of an hour, the aqueous vapour was driven out. Then the temperature was raised to 480 degrees for another quarter of an hour, and during that time the organic matter was decomposed, and the oil as it cooled became slightly opaque. When it was filtered it was found to be colourless, and this purified colourless oil dissolved phosphorus to the extent of something more than one part in 100 parts by weight of the oil. It would keep for a length of time without undergoing change. It appeared that the most satisfactory mode of administering phosphorus in its unaltered condition was in oil. Other things had been tried, but not so successfully as oil. Then there was oxymel ipecacuanhæ which had been already described in the Journal. Pepsin was also down in the list. He felt a little difficulty as to what form of pepsin should be recognized in the Pharmacopœia. All persons seemed to agree that the time had arrived when it was imperative upon them to recognize pepsin as a therapeutic agent. He believed it to be a really efficacious and very important medicine. There were, however, a great many different preparations of pepsin; and the manner in which it was originally introduced and in which it gradually got into medical practice had led to the employment of it in several different forms. There was pepsin with starch, and pepsin without starch, and pepsin with different proportions of starch, and pepsin with acid and pepsin without acid. Some medical men preferred administering it in one form; and other medical men preferred administering it in others. If we could get pepsin in the greatest state of purity in which it could be produced practically for use in medicine, it would be still but a mixture of substances. But what was contemplated in the Pharmacopœia was to have something which should be as far as possible definable. With regard to the compound powder of elaterium, which he referred to at the last meeting, it was suggested by a distinguished member of the Medical Council some time ago; and the reason for suggesting it was that elaterium, a powerful medicine, was liable either in process of dispensing or otherwise not to be accurately weighed or uniformly mixed with the other materials to which it was to be added, and that in a more diluted form it could be more safely and advantageously administered. Then came the question of suppositories. Now he had been making experiments upon suppositories, because it was suggested that a new form was very desirable; and he was glad to find that so much light had been thrown upon the subject at this meeting. He gave up gelatine and glycerine, because there was a good deal of trouble in preparing a combination which should contain these substances in proper proportions, and such a mixture could not be made extemporaneously. His suggestion was to use soap. Curd soap, made with pure animal fat, consisting principally of stearine, would have some valuable applications in place of the olive oil, soap, or castile soap. With regard to morphia suppositories he used, in addition to the curd soap, half its weight of glycerine of starch; but in making carbolic acid suppositories, the glycerine of starch was not required. Then, lastly, tincture of fresh orange-peel was one of the suggested additions, and he proposed that this should be made with rectified spirit.

The President said he thought it would be useless to attempt to enter into any discussion of this subject at so late an hour.

The discussion was therefore adjourned to the next meeting, which will be held on Wednesday, April 2.

NORTH BRITISH BRANCH, EDINBURGH.

The fourth meeting of this society for the present session was held on Friday evening, February 21st, in St. Giles Street; Mr. H. C. Baildon, president, in the chair. A lecture was delivered by Dr. J. G. M'Kendrick, Assistant to the Professor of Physiology in Edinburgh University, on "Muscles and Nerves." In a most lucid and interesting style the lecturer explained the structure and function of these wonderful tissues which enter so largely into the formation of sentient beings, and with the help of delicate apparatus, the contractility of muscles was illustrated; and it was shown that contraction could be produced either by stimulating the muscle itself by means of a current of electricity or by stimulating the nerve connected with it. The force exerted through this contractility was also brought to the test of ocular demonstration, a small muscle from a frog being, by the mere passage of an electric current, made to lift 900 grains. The structure of muscle and nerve was shown in a series of microscopic preparations, and the lecturer explained the apparatus by which it could be proved that living muscular tissue evolves electricity, and that impulses travel through nerves very considerably slower than the electric current through a wire. The lecturer succeeded in inspiring his audience with his own enthusiasm, and maintained their attention unflaggingly for a couple of hours. At the close, on the motion of the president, seconded by the vice-president, a cordial vote of thanks was accorded to Dr. M'Kendrick.

BENEVOLENT FUND.

Subscriptions Received during February, 1873.

SUBSCRIPTIONS.

London.

	£	s.	d.
Applegate, Edwin, 5, Hercules Terrace, Holloway, N.	0	10	6
Ball, the Chemists (Committee of)	10	10	0
Best, James, 11, Jonson's Place, Harrow Road, W.	0	10	6
Bird, Robert, 103, High Holborn, W.C.	0	10	6
Bird, William Lionel, 42, Castle Street East, W.	1	1	0
Bolton, Horatio Nelson, 22, Quadrant Road, Canonbury	1	1	0
Bowden Edward and Ambrose, 13, Charles Street, St. James's, S.W.	1	1	0
Buckle, Christopher Francis, 77, Gray's Inn Road, W.C.	0	10	6
Chubb, James Carpenter, 102, St. John Street Road, E.C.	1	1	0
Cooke, John, 126, Hoxton Street, N.	0	10	6
Cooper, William Temple, 26, Oxford Street, W.	0	10	6
Corbyn and Co., 300, Holborn, W.C.	1	1	0
Covell, William Mann, 302, Mare Street, Hackney, E.	0	5	0
Cracknell, Charles, 217, Edgware Road, W.	2	2	0
Croyden, Charles, 37, Wigmore Street, W.	0	10	6
Cruse, James Charles, 27, Canonbury Place, N.	0	5	0
D'Aubney, Thomas, 82, Shepherdess Walk, N.	1	1	0
Davenport John Thistlewood, 33, Gt. Russell Street, W.C.	2	2	0
Davies, William, 292, Gray's Inn Road, W.C.	0	10	6
Dinneford and Co., 172, New Bond Street, W.	2	2	0
Eade, George, 72, Goswell Road, E.C.	0	10	6
Eade, James, 72, Goswell Road, E.C.	0	10	6
Faulconer, Robert Stephen, 270, Walworth Road, S.E	1	1	0
Fisher and Haselden, 18, Conduit Street, W.	1	1	0

	£.	s.	d.
Froom, William Henry, 75, Aldersgate Street, E.C.	1	1	0
Gadd, Henry, 102, High Street, Kingsland, E.	1	1	0
Gaunt and Fuller, 221, Union Street, Southwark, S.E.	1	1	0
Glover, George, 19, Goodge Street, W.	1	1	0
Gristock, Thomas, 42, South St., Manchester Square, W.	1	1	0
Harris, Daniel Rotely, 55, St. James's Street, S.W.	1	1	0
Hickley, Thomas P., 297, Edgware Road, W.	0	10	6
Hodsoll, Thomas William Henry, 17, Cross St., Hoxton, N.	0	10	6
Horncastle, John, 17, Craven Road, W.	0	10	6
Howell, Morris, 61, High Street, Peckham, S.E.	0	10	6
Humpage, Benjamin, 6, Albert Place, Turnham Green, W.	0	10	6
Jeynes, George, William, 62, Princes St., Edgware Rd., W.	0	5	0
Jones, William, Oswald, 135, Ladbroke Grove, Notting Hill, W.	0	5	0
Kemp, Robert, 205, Holloway Road, N.	0	10	6
King, Thomas, William, 108, Crawford Street, W.	0	5	0
Large, John Hood, 65, New North Road, N.	0	10	6
Linford, John Samuel, 146, Holborn Bars, E.C.	0	10	6
Matthews, William, 12, Wigmore Street, W.	0	10	6
McCulloch, Frederick, 13, Hart St., Covent Garden, W.C.	1	1	0
McGeorge, William, 346, Essex Road, N.	0	10	6
Mitchell, John, 254, Upper Street, Islington, N.	0	10	6
New, Walter William, 238, Essex Road, N.	0	10	6
Newzam, Henry Samuel, 40, Theberton St., Islington, N.	0	10	6
Nicholson, Frederick, 216, St. Paul's Road, Highbury, N.	1	1	0
Owen, John, 234, Upper Street, Islington, N.	1	1	0
Palmer, Robert, 35, Ovingdon Square, S.W.	1	1	0
Penrose, Arthur Wellesley, 5, Amwell Street, E.C.	0	10	6
Quinlan, Joseph, 59, Barnsbury Road, N.	0	10	6
Radermacher, Charles John, 18, Albion Road, Islington, N.	1	1	0
Roach, Pope, 8, St. James's Street, S.W.	1	1	0
Robbins, John, and Co., 372, Oxford Street, W.	1	1	0
Rose, Alfred, 441, Edgware Road, W.	0	10	6
Rowson, Henry, 2, Chichester Street, W.	0	10	6
Samuel, Edward, 217, Edgware Road, W.	0	10	6
Sandford, George Webb, 47, Piccadilly, W.	2	2	0
Shephard, Thomas Frederick, 46, All Saint's Road, W.	0	10	6
Slipper, James, 86, Leather Lane, E.C.	0	10	6
Smith, William Frederick, 280, Walworth Road, S.E.	1	1	0
Starkie, Richard Stringer, 4, Strand, W. C.	1	1	0
Stevenson, William Law, 165, Edgware Road, W.	0	10	6
Stoneham, Philip, 45, Craven Road, W.	0	10	6
Taylor, Matthew, Rye Lane, Peckham, S.E.	0	10	6
Taylor, Thomas, 81, High Street, Peckham, S.E.	0	10	6
Turner, Edward Anstee, 116, Ball's Pond Road, N.	0	10	6
Wallis, John Thomas Ward, 27, Bishopsgate St., Within	0	5	0
Weston, Samuel John, 151, Westbourne Terrace, W.	1	1	0
Whincup, William, 404, Essex Road, N.	0	10	6
Whitburn, Augustus R., 174, Regent Street, W.	0	10	6
Wilkinson, Thomas, 270, Regent Street, W.	1	1	0
Wise, Walter, 43, Duke Street, Manchester Square, W.	0	10	6
Wisken, Robert, 175, Old Street, St. Luke's, E.C.	0	2	6

Country.

	£.	s.	d.
Alnwick, Newbigin, James Lesslie	0	10	6
Alresford, Huggins, John	0	10	6
Ashbourne, Bradley, Edwin Silvester	0	10	0
,, Osborne, James	0	5	0
Ashton-under-Lyne, Bostock, William	0	5	0
Banbury, Ball, George Vincent	0	10	6
Belfast, Green, Thomas	0	2	6
Berwick-on-Tweed, Carr, William Graham	0	10	6
,, Davidson, John	0	10	6
Beverley, Robinson, James Mould	0	5	0
Birkenhead, Dutton, John	1	1	0
,, Reece, John	0	5	0
Birmingham, Clayton, Francis Corder	1	1	0
,, Conforth, Edwin	0	2	6
Bowness-on-Windermere, Birkett, Charles	0	7	6
Bradford, Blackburn, Bailey	1	1	0
,, Rimmington, Felix Marsh	0	10	6
,, Watts, John	0	10	6
Bridlington, Smith, John	0	1	0
,, *Quay*, Dickins, John	0	2	6
Brighton, Else, William	0	10	6
,, Foster, Frederick	0	10	6
,, Savage and Son	1	1	0
Bristol, Butler, Samuel	0	10	6
,, Hatch, Richard M., and Co.	1	1	0
,, Hodder, Henry	0	5	0
,, Kear, Henry Frederick	1	1	0
,, Margetson, James	0	10	6
,, Sircom, Richard	0	10	6
,, Stoddart, William Walter	0	10	6
Bruton, Hill, Richard	0	5	0
Burry Port, Olive, William Thomas	0	10	6
Burslem, Guest, George Christopher	0	2	6
Canterbury, Amos, Daniel	0	10	6
Carlisle, Hallaway, John	0	5	0
,, Thompson, Andrew	0	5	0
Carnarvon, Jones, John	0	5	0
Castlebar, Divors, Hugh J.	0	10	0
Chelmsford, Baker, Charles Patrick	0	10	6
,, Baker, Garrard	0	10	6
,, Seaton and Metcalfe	1	1	0
,, Tomlinson, James	1	1	0
Chew Magna, Milton, Thomas	0	5	0
Clapton, Lower, Goodwin, John	1	1	0
Colsterworth, Wing, Samuel Whaley	0	10	6
Croydon, Clarke, Arthur Henry	1	1	0
,, Long, Henry	0	10	6
Desborough, Yeomans, George	0	10	6
Douglas, Brearcy, William A.	0	5	0
Exeter, Brailey, Charles	0	5	0
,, Bromfield, Charles	0	5	0
,, Cooper, George	0	10	6
,, Delves, George	0	10	6
,, Husband, Matthew	0	10	6
Exeter, Napier, George L.	0	5	0
,, Stone, John	0	5	0
Fareham, Batchelor, Charles	0	5	0
,, Franklin, Alfred	0	10	6
Freshwater, Wellington, Henry Aplin	0	10	6
Gainsborough, Marshall, John Ferris	0	10	6
Glastonbury, Mayhew, Thomas	0	10	6
Gosport, Mumby, Charles	0	10	6
Guildford, Busby, Henry H.	0	7	6
Halifax, Hebden, William Carr	0	10	6
Harpenden, Busby James	0	10	6
Heckington, Summers, Michael Cole	0	5	0
Huddersfield, Kaye, Hamor	0	2	6
Hull, Baynes, James	0	10	6
Hulme, Wealthall, Alfred	0	10	0
Kidderminster, Haddock Benjamin	0	10	6
Landport, Langton, James	0	5	0
Leeds, Taylor, Samuel	1	1	0
Lewes, Head, John	0	10	6
,, Martin, Thomas	0	10	6
,, Saxby, Henry	0	10	6
Lincoln, Evison, William	0	2	6
,, Tomlinson, Charles Knowles	0	10	0
Liverpool, Butler, Charles	0	10	6
,, Clay and Abraham	1	1	0
,, Morris, Thomas Edmund	1	1	0
,, Parkinson, Richard	0	10	6
,, Raimes and Co.	1	1	0
,, Thompson and Capper	1	1	0
Longton, Prince, Arthur George	0	10	6
Ludlow, Cocking, George	0	5	0
,, Foster, Henry	0	5	0
,, Grieves, Herbert	0	5	0
,, Marston, Alfred	0	5	0
,, Nickson, James	0	5	0
Market Drayton, King, William George	1	1	0
Middlesborough, Taylor, William Reay	0	5	0
Minchinhampton, Simpkins, John	0	10	6
Netley, Borchet, Heinrich T. G.	1	1	0
Newtown, Morgan, Richard	0	10	6
North Walsham, Bailey, George William	0	5	0
Norwich, Caley, Albert Jarman	0	10	6
,, Cooke, William	0	5	0
,, Sutton, Francis	0	10	6
Oakham, Parnell, Thomas	0	2	6
Odiham, Hornsby, John H.	0	10	6
Oldham, Shepherd, James	0	10	6
Paulton, Bush, Thomas	0	5	0
Penzance, Cock, John	0	10	6
Peterborough, Heanley, Marshall	0	10	6
Plymouth, Balkwill, Alfred Payne	0	10	6
,, Burdwood, James	0	5	0
,, Essery, William	0	5	0
,, Northcroft, Jonathan	0	5	0
,, Sloggett, Thomas Chubbs	0	2	6
Putney, Jones, Thomas	0	5	0
Rhydlydam, Hughes, Robert	0	2	0
Settle, Procter, William	0	10	6
Shanklin, Brown, Andrew Henry	0	10	6
Shefford, Baigent, William Henry	0	10	6
South Petherton, Wellington, Frederick, G. N.	0	5	0
South Shields, Wood, George	0	10	6
Stacksteads, Turner, James	0	5	0
Stamford, Dickinson, Frederick	0	10	6
,, Patterson, George	0	10	6
,, Provost, Wright	0	5	0
,, Rees, Thomas George	0	5	0
Stockport, Kay Brothers	1	1	0
Streatham, Robinson, Charles James	0	10	6
Sydenham, Pocklington, James	0	10	6
Sydney, N.S.W., Hughes, James	3	3	0
Tenby, Davies, Moses Prosser	0	5	0
Tickhill, Crowther, Thomas	0	10	6
Tunbridge Wells, Sells, Robert James	0	10	6
Usk, Paine, Charles	0	10	6
Uttoxeter, Woolrich, Charles Bromley	0	10	0
Walthamstow, Steer, Philip Richardson	0	10	6
Wrotham, Romans, Thomas Wood	0	10	6
Yeovil, Manning, Thomas Davys	1	1	0

DONATIONS.

	£.	s.	d.
Hanbury, Daniel, Clapham Common, S.W.	10	10	0
Wright, George Henry, 103, High Street, Borough, S.E.	5	5	0

Provincial Transactions.

CARLISLE CHEMISTS' ASSOCIATION.

The monthly meeting of the Carlisle Chemists' Association was held on Tuesday evening, February 25th. There was a fair attendance of associates, but few members were present. A paper, by Mr. Sawyer, on "The Human Heart," describing its formation and its functions, was in the absence of that gentleman read by Mr. Sawyer, jun. The paper was listened to with great interest and attention, and at its conclusion a vote of thanks to the author was passed.

It was resolved that the president of the association should be requested to write a letter to Mrs. Moss of sympathy and condolence with her in the great affliction she has sustained in the loss of her husband, and also to convey to her the feeling of great respect the members had for him and how sincerely they deplore his loss from among them.

The class lately under the care of Mr. Moss (materia medica) will be taken by Mr. Hallaway, who will also combine with that subject practical pharmacy.

The committee have great pleasure in announcing that Mr. Joseph Pattinson, of Baldwin Holm, has kindly undertaken charge of the chemistry class, and it is hoped that a large number of students will thus be brought together.

Mr. Hallaway was requested to perform the duties of secretary *pro tem.* to the association.

OLDHAM CHEMISTS' ASSISTANTS' ASSOCIATION.

On Wednesday, Feb. 26, the annual meeting of the Oldham Chemists' Assistants' Association was held in the Church Institute, Mr. John Taylor, president of the association, in the chair. The report, read by Mr. S. Bateman, the secretary, stated that the committee, in presenting their annual statement, felt great pleasure in congratulating the association on the arrival of its third anniversary. In accordance with the decision of the members, no meetings were held during the summer, and during the recess the business of the association was conducted by a committee of five. Weekly meetings were recommenced in October, and in the intervening time two lectures had been given, the first by Mr. Nield on "The Natural History of Chalk," which was well illustrated by diagrams and prepared slides of foraminifera, etc., exhibited under several binocular microscopes, kindly lent by Mr. Pullinger. The second lecture, which was on "Mercury and its Preparations," was delivered by Mr. F. A. Johnson, the subject being elucidated by experiments. In conclusion, the committee was glad to inform the members that the funds of the society were in excess of former years, and the number of members encouraging, when it was remembered that more powerful inducements were offered by the Manchester Association than can be afforded at Oldham. The election of officers for the coming year was then proceeded with. Mr. Taylor was re-elected president; Mr. W. Potts was appointed vice-president; Mr. F. A. Johnson, secretary; and Mr. Bateman treasurer and librarian. The usual votes of thanks were accorded to the officers for the past year, after which the proceedings terminated.

UNITED SOCIETY OF CHEMISTS AND DRUGGISTS OF IRELAND.

A meeting of the above society was held on Monday evening, March 3rd, at 12, Grafton Street, Dublin. There was a very large attendance, nearly all the principal druggists of the city being present.

In the absence of the president of the society, Mr. J. Brooks was elected chairman.

The hon. secretary, Mr. W. Hayes, said the chief subject to be brought before the meeting was the consideration of the means best adapted for elevating the trade and obtaining a status similar to that of the Pharmaceutical Society of Great Britain. He would put forward three suggestions for the consideration of the meeting. First, that it should endeavour to make some terms with the Apothecaries' Company of Ireland, with a view to the establishment of an examination similar to that of the Pharmaceutical Society, as a qualification for compounding physicians' prescriptions; secondly, that it should petition the Pharmaceutical Society of Great Britain to extend its operations to Ireland; and, thirdly, that an attempt should be made to obtain a special Act of Parliament for the purpose.

Mr. Wells said he was of opinion that the most practicable method of attaining their object would be in connection with the Apothecaries Hall, as he had reason to believe that that body would be disposed to meet them.

Mr. Marshall considered the Pharmaceutical Society would, from its present position, be the most likely quarter to apply to for support.

After considerable discussion, in which Messrs. Goodwin, Simpson, Bermingham, Grindley and Holmes took part, it was proposed by Mr. J. T. Holmes—"That a deputation from this society, consisting of Messrs. Hayes, Goodwin and Wells, with power to add to their number, wait upon the governor and company of the Apothecaries' Hall, and ascertain their views on the subject.

Mr. Brownrigg seconded the proposition, which was carried unanimously.

After some further business, principally in connection with the financial position of the society and the desirability of possessing permanent offices and reading-rooms, the meeting adjourned.

Correspondence.

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

The Sale of Poisons.

Sir,—I shall be very glad to be put right if I am wrong in my ideas, but I cannot endorse the action taken by our Whitehaven brethren in the matter of vermin killers, nor the views with which (to my surprise) you support them. I think Mr. Kitchin misinterprets the Act when he says, "Vermin killers being mostly preparations of strychnine and arsenic come under and are included in part 1 of the Amended Schedule." Now, so far as arsenic is concerned, there is a special Act; and as to strychnine, in part 1 of Schedule in 1868 Bill, it is put, "Strychnine *and its preparations,*" which in the Amended Act of 1869 is altered to "Strychnine and *all poisonous vegetable alkaloids and their salts,*" so that the amended Act really ignores "preparations of strychnine." But I maintain that vermin killers are not preparations of (although they may contain) arsenic or strychnia, any more than paregoric is a preparation of opium, a fallacy which I am astonished is still held by so many chemists. The registration of the sales of those articles scheduled in the Act was instituted for the prevention of their being employed as poisons for the purpose of poisoning; what, then, shall we say to such a commentary on the Act, that those things known to be, published as and required and used only for poisons should be registered also?

And, Sir, you will not be able to stop here. If we are to register vermin killers because they contain (or are supposed to contain) arsenic or strychnia, shall we not also have to register preparations for the hair containing (or supposed to contain) cantharides; lotions, such as Gowland's, containing (or supposed to contain) corrosive sublimate; cough remedies, containing (or supposed to contain) tartar emetic? Who is to say that the many female pills do not contain both cantharides and savin? In short, where are we to stop? As I said at first, I shall be glad to be set right if all this is mythical, but these were the thoughts of my mind when I had recovered from the surprise that the editor of the PHARMACEUTICAL JOURNAL should have considered anybody initiating such a system, worthy " of the thanks of the trade at large."

FREDK. TIBBS.

81, *Chalk Farm Road, N.W., March 5th,* 1873.

WOMEN *versus* MEN.

" O would some power the giftie gie us
To see ourselves as others see us;
It would from many a blunder free us
And foolish notion."—*Robert Burns.*

Dear Sir,—It is no trifling thing again to seize the lance,
And strive against *three* mighty foes " the ladies' cause t' advance."
An " M. P. S." in flowing verse gives a " Valentine's Reply "
And seeks to whisper in our ear ' O do not let them try;
To all things else they may aspire, but *not* to Pharmacy."
Then the " ex-President " defends the course *he* took before,
And says they may be " *C's* and *D's* " but we will close *our* door.
Tho' for 4000 years and more, they've *nursed* and *trained* as well,
They must not touch the " garment's edge " of *Allen, Payne* and *Bell.*
Two years ago we were *advised* " Inspectors " to admit,
But when three ladies gently knock—" *Away!* you are not fit! "
Our " peaceful " friend from " Shepherd's Bush " would almost lose his life
If a lady mixed his medicine or used the palette knife!
Though his arguments, if rightly used, cut his own throat, I think,
For *ignorance*, not knowledge, gave the wrong " effervescing drink."
'Tis true that " earnest WOMEN " now on every hand we view,
But they've a *right* to push their way as well as I or you;
And if amidst ten thousand sons old " *Celsus* " trains a daughter,
O, never fear! she'll hurt us not! nor " cut our *salaries* shorter."
H. L. hints—if some recipes of a " peculiar " kind
Were brought to *females* to dispense, 'twould hurt their virtuous mind!
Nay, rather like their Lord, they'd seek the *fallen* to restore;
And while administering relief say, " Go and sin no more."
Some would even make them tools, and to be like *beasts* " inspected,"
But God made them " helpmeets " for man, to be *honoured, loved, respected.*
Yea, e'en within our ranks there's room for such as Mrs. Fry,
To raise the downcast and to shed the tear of sympathy.
Mothers, and wives, and daughters too, have nobler work on earth,
Than to *dress* and dance and spend their time in vanity and mirth.
If some desire or *duty bids* that they midst drugs should dwell,
I'd kindly whisper in their ear, " Cheer up! 'twill all be well;
You never *would* have been cast out by Allen, Payne, or Bell.
Yea, I believe the gallant knights who took your part before
Will shortly cheer ' our President ' as he unlocks the door;
Till then, with steady careful steps, your onward course pursue,
And rest assured the distant prize will *yet* be won by you."

And now, dear Editor, " Good night;" I'll cast this pen away,
Calmly peruse what *others* write, and *wait* the " Event " of May.

Ashton-under-Lyne, March 4th, 1873. W. BOSTOCK.

PHARMACEUTICAL WOMEN.

Sir,—I think the arguments adduced against the admission of women to the Pharmaceutical Society are senseless, selfish, narrow-minded, and unworthy of the profession to which we belong. Certainly neither William Allen nor Jacob Bell would sympathize with the doggerel rhymes of M.P.S. They were large-minded men who, from their association with the Society of Friends, had learned to value woman at her true worth; not as the puppet and thing which society has hitherto valued her at—a doll, an amusement, a toy, but at her true estimate, the equal and the helpmate of man. This true esteem is not felt by those who flatter with sickly gallantries, and who would bar every avenue to a dignified and worthy position. I believe it may be considered an axiom that the true civilization and position of any nation may be gauged by the place women hold in it.

The time has passed in England when the true position of woman could be ignored. One by one the learned bodies are glad to open their doors to her, and it must come in our Society; it is only a question of time? Shall the benighted obstructives who are half a century behind the age make us the last to do this simple duty. I do not suppose we shall ever be inundated with applicants—a few here and there—perhaps the wife or daughter of a poor member in some village or small town whose death might otherwise destroy the comfort of his family, some one or two studiously disposed girls; but there is no likelihood that a profession involving such brainwork as ours at such small remuneration would, like drapers and milliners, attract any numbers of the fair sex.

F. P. BALKWILL, M.P.S., F.L.S., etc.

Plymouth, March 1st, 1873.

TINCTURE OF QUININE.

Sir,—In reply to Mr. Mumbray's communication in your last week's issue, I beg to inform him that if tincture of quinine is made by using a tincture of orange made with spirit of *full-proof* strength, there will then be no deposition of quinine crystals, except perhaps in very cold weather.

I have found the same difficulty with this preparation as Mr. Mumbray has, but on investigation I traced the cause to insufficient strength of the spirit; since then I have had no trouble at all.

With regard to the addition of sulphuric acid, my experience is that it does not in the least tend to keep the quinine in solution; indeed, upon two occasions when I tried the effect of adding a small quantity of the dilute acid, I got if anything more crystals than before, certainly larger ones.

Seeing, however, that the Pharmacopœia process if strictly followed so as to have a really *proof* spirit, yields a perfectly satisfactory preparation, we need not trouble ourselves about the addition of another agent which would change the character of the preparation, and, worse still, be taking liberties with official formula, which there is already too much disposition to do.

J. H. BALDOCK.

South Norwood, March 3rd, 1873.

" *Inquirer.*"—We should prefer the dry specimen of iodide of potassium and should reject the specimen you describe. Iodide of potassium contains no water of crystallization, therefore any water present (and we imagine it would be less than 5 per cent.) must be adherent or hygroscopic. The crystals in the London market of British manufacture are not very variable, as they are produced by two makers. The pressure upon manufacturers last month for immediate delivery of iodides consequent upon the sudden decline in value of iodine in January, with the chances of advance for forward delivery, was doubtless the cause of the crystals having been less perfectly drained and dried than usual.

" *Jestyn.*"—The deposit consists principally of kinate o lime, and we believe contains little of the cinchona alkaloids. The amount of deposit varies according to the variety and age of the bark used. We have noticed it in Battley's Liquor, P. L. Infusum Spissatum, as well as the B.P. preparation you refer to. See PHARM. JOURN., 2nd ser., vol. V. pp. 110, 162, and 328.

T. Collier.—Your letter was returned, accompanied by a note stating the reasons for its non-publication.

A. P. S.—Your communication should have been addressed to the advertising department of the Journal.

Hugh M. Williams.—We are compelled to defer the publication of your letter until next week.

B. B.—The designation of such a firm as that described by you as " pharmaceutical chemists " would be incorrect, and therefore illegal.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. J. Abraham, Hickling, Chaplin, Houghton. R. T. Clarke, Green, Martin, Fourness, Thompson, Hustwick, Williamson, Wise, Country Pharmaceutical Chemist, Two Apprentices, Cornubia, An Associate, Deva, Minor Associate, Dallas, G. C., A. P. S., J. C., W. B. B., W. C. M.

LEGAL PHARMACEUTICAL PREPARATIONS.

BY ALFRED E. TANNER.

Having been struck—not for the first time—by the singularly happy title Dr. Syme has chosen for his paper, I take the liberty of making use of the same, and venture to offer some remarks upon what seems to me at this present time a most important subject. How many of my brother pharmacists, while perusing, and still more while working out, the formulæ contained in our Pharmacopœia, must have regretted being bound down hard and fast by the rigid details of the processes therein contained, and being allowed no latitude for the carrying out of modifications which an extensive experience perhaps has from time to time pointed out as conducive to a more perfect product; and no one who makes it his practice to manufacture for himself his own preparations instead of buying them (as I have more than once in these pages advocated), can fail to see that in a very large proportion of the processes given some improvements or modifications of working are desirable. To take an example which must be familiar to every one who makes his own tinctures even,—why is it that with all the various substances which are formed into tinctures, we have only two strengths of spirit allowed, ·838 and ·920? A moment's consideration must convince any one these are wholly inadequate for the purpose of extracting completely and satisfactorily the principles contained in all the drugs we operate upon in forming our tinctures. I would wish to see each drug separately considered as to its soluble constituents, and as to those constituents which it is wished to have present in the tincture, and a particular strength of spirit assigned to each in accordance with these considerations. This, it appears to me, would be far more rational than rigidly assigning but two strengths of spirit for every possible contingency. And while on the subject of tinctures, I would suggest that more particular directions be added for carrying out the process of percolation, as adapted to each particular drug, and the degree of fineness expressed in meshes to the inch to which each drug should be reduced. Experience has shown me that for many tinctures it is better to pack dry in the percolator and pour on sufficient of the menstruum to moisten the whole, and either proceed with percolation at once or allow maceration to take place for a stated time. With regard to vin. ipecac. treated in this manner, I have found in operating on 1 gallon all the soluble matter of the root in the first ounce, the root being reduced to No. 30 powder. In these particulars it seems that American pharmacy leaves us considerably behind.

The sp. gr. of each tincture would also be a useful guide to its correctness, and should be given. Very excellent and useful work in this department has been done by Messrs. Stoddart and Tucker, and forms the subject of a paper read before the Pharmaceutical Conference last year. Surely, if necessity exists for it in syrup. rhamni it exists also in the case of that far more important class of preparations, the tinctures; and if in syrup. rhamni, why not in syrup. rhei.? Liq. am. acet. also would be better for the addition of this information.

Liq. bismuthi, which Dr. Symes has chosen as an example in which *illegal* pharmacy is practised to a considerable extent, seems scarcely a happy choice, so far as my experience goes. I should say very far from "95 per cent. of samples in the market answer the B.P. characters and tests," some containing more ammonium nitrate, some less, some none at all, being prepared probably by the process given by Wood, and which, by the way, I should very much wish to see introduced in the place of the present liquor, as it seems to me in every way satisfactory. A more forcible example of this (illegal pharmacy), to my mind, is the much-handled compound sp. ether. nit., which, as I understand, is seldom or never prepared by the B.P. process, excepting by those who, like myself, prepare it for their own consumption and sale. I see no reason why this and others of its class may not be prepared by any process so long as they answer the description and tests required of them; but, of course, with a vast number of preparations, whose characteristics cannot be so described, and whose reactions are not sufficiently marked to be tested by ordinary chemical means, the case is different. We should then have the process minutely described so as to produce a certain result. The process of sp. ether. nit., excellent though it be, is still capable of some improvement and modification. Experience in the working of it has shown me that a much larger proportion of finished product may be produced from the quantity of spirit ordered than is indicated in the B.P., and this result is obtained by continuing the addition of small quantities of HNO_3 until something like 50 per cent. more is used than ordered. I produce by this means about 35 per cent. more of the finished product, answering the B.P. tests; but as I intend shortly making this the subject of a separate paper, I will do no more here than state the bare results obtained.

Then as to the difficulty with regard to the syr. ferri phosph., which so many have stumbled over, complaining that it will not make the quantity ordered; I take it to be more imaginary than real. Surely the paragraph stating how much it *should* measure is unmistakable; and if it does not measure this it ought to do so, and, indeed, should be made to do so by the addition obviously of aq. dest., nothing else being admissible. A much graver error exists, I think, in the information contained in the concluding paragraph. To assert dogmatically that it contains 1 grain of phosphate of iron in 1 fluid drachm, when the quantity of $FeSO_4$ ordered is only just sufficient to produce this quantity, carries with it its own refutation; for if any one will take the trouble to test the filtrate produced in the first part of the process, he will find it contains a considerable quantity of iron salt, and that the introduction of acetate of soda to prevent this is, as the formula now stands, a failure. But if the solutions, after being mixed, be heated to boiling for a few minutes before being filtered, none of the iron is lost.

With an addition to our Pharmacopœia in the form of an Appendix as proposed by Dr. Symes and others, I fully agree.

Syr. phosph. co. has now become quite an established remedy and should on no account be omitted, the formula published by the late Professor Parrish producing a preparation in every way unexceptional if the directions be carefully carried out. Nitrite of amyl certainly deserves a place, together with a process for its preparation in a state of medicinal purity, and for this purpose no process seems so well adapted as that of Professor Redwood for the preparation of nitrous ether, if the precaution be adopted of using the HNO_3 diluted, as pointed out by myself in the Pharm. Journal, 3rd series, vol. II. p. 225.

Trusting to see this important matter taken up with spirit by the whole of our profession, and result in an appendix which will do us honour, I here for the present leave it.

TINCTURE OF QUININE.

BY T. H. HUSTWICK.

The subject I am desirous of bringing forward is apparently so trivial as to have escaped, in this age of research, the attention of those who, from calling and experience, are better able than myself to deal with it; but considering the importance that apparently trivial matters sometimes possess on the bearings of our profession, and this in particular belonging to the domain of pharmacy, and being near to that of chemistry, will, I trust, be a sufficient excuse.

Tincture of quinine has been an official preparation only since 1851, but some time before then it was evidently recognized as an extra-pharmacopœial preparation, from the fact that in vol. V. of the first series of our Journal, amongst answers to correspondents, a form is given for its preparation similar to the present one, except that it contained one minim of dilute sulphuric acid to each grain of quinine. We may suppose therefore it has long been a favourite method of exhibiting the alkaloid, the dead bitter of the quinine being modified and aromatized by the warm and pleasant flavour of the orange-peel; while the appearance, portability, and convenience of the preparation cause it to be held in favour by both patient and prescriber. It is one of the simplest preparations of the pharmacopœia, being merely a solution of sulphate of quinine in tincture of orange-peel, in which menstruum, when slightly warmed, the salt is, or should be, completely soluble; yet the result is not always satisfactory, sometimes there is considerable deposition of quinine in a crystalline form, and invariably a precipitate, occasionally necessitating more than one filtration before it is finally got rid of. The directions given in the London Pharmacopœia, 1851, are simple digestion for seven days, with subsequent filtration; this, however, is insufficient, the quinine salt being very slightly soluble in cold tincture, but in the translated edition the editor recommends the tincture to be slightly warmed, in order that complete solution may take place. This suggestion is embodied in the recent Pharmacopœia, where the quinine salt is ordered to be dissolved with the aid of a gentle heat, and a subsequent digestion for three days. Now as the solution is complete on warming the tincture with the quinine salt, and since it is permanently effected at the first if too much heat be not used, what is the use of the subsequent digestion? The tincture, on cooling, is very nearly bright, no appearance of undissolved sulphate being visible; however, within a short time we have evidence of a change taking place, the tincture becomes a shade lighter in colour, and a precipitate shows itself. I conclude that it is to allow time for this precipitate to form completely and entirely, that the term of digestion is ordered, and then the extraneous matter is got rid of by filtration. Supposing the tincture be filtered immediately after it is made, a second filtration would ultimately be required. I have frequently heard this precipitate spoken of as tannate of quinine; and that it is so seems to have been taken for granted, especially when we consider that orange-peel does contain tannin, as is shown by its behaviour with a salt of iron, and that tannates are generally insoluble, so that it is easy to jump at the conclusion that the precipitate in question is tannate of quinine. In the first volume of the Pharmaceutical Journal Professor Donovan is cited as an authority for the statement that an insoluble tannate is formed from a solution of quinine in tincture of orange-peel, as it is with tincture of cinchona. Ten years afterwards Mr. Bastick suggests a similar proposition; and later, Mr. Squire, in his 'Companion,' assumes the same to be the case. Whether this be so or not seems hardly to have been thought worth the while of any one to question, till Mr. Groves casually mentioned, at a recent evening meeting, that he had ascertained the deposit in tincture of quinine, prepared from fresh orange-peel, to be a salt of lime; a remark that will apply equally to a tincture of dried peel. Having often noticed a deposit in tincture of quinine, and vainly speculated as to its character and composition, this suggestion seemed to offer a ready solution of the question; and such few opportunities as have presented themselves to me have been devoted to this subject. The precipitate from four pints of tincture was collected on a filter and washed with two ounces of proof spirit in small quantities at once (in my first attempt, distilled water was used for washing, but I found the precipitate gradually diminishing); this when dried, I found to weigh on different occasions from 16 to 26 grains; the variation is probably owing to different lots of peel being used; it was nearly all soluble in boiling distilled water, what was left being apparently only a mechanical residue from the filter. A solution of ferrous sulphate, containing a small quantity of a ferric salt, gave no evidence of tannin; both oxalate of ammonium and chloride of barium gave copious precipitates of their respective compounds of lime and sulphuric acid, while exposure of the precipitate to a red heat produced no change beyond turning it from white to ash grey, showing its comparative freedom from organic matter, such as quinine.

Having so far settled the composition of the precipitate, the next question was, How came it there? The quinine salt furnishes one of the constituents; the other must be supplied either by the water of the proof spirit or by the orange-peel, but as I have always used distilled water, that, as a source, is out of the question. I am unable to find any published analysis of orange-peel, but two or three experiments seem to show that the lime is derived from that ingredient, for infusions both recent and concentrated, as well as tincture, give ample evidence of the presence of lime by their behaviour with oxalate of ammonium. But what may be relied on as the most conclusive test is that afforded by the ash of the peel; this, when well incinerated, is to be treated with hydrochloric acid, evaporated to dryness, and the residue boiled with distilled water; then filtered and the oxalate added, showing at once that lime is present. From these premises we may build up a theory as to the formation of this salt; the quinine supplying the acid, and the orange-peel the base, a mutual decomposition takes place, which is doubtless completed within the three days ordered in the Pharmacopœia, for if the tincture be then filtered, no further deposit of lime takes place. Some time ago, being under the impresion that this supposed precipitate of tannate of quinine might be diminished or prevented by reducing the amount of tincture of orange-peel one-eighth, and substituting for it that proportion of water with the addition of half a minim of dilute acid to each grain of quinine, I adopted this plan, but without any noticeable change, save that tincture made in this way would deposit its quinine in a crystalline form on a reduction of temperature, the deposit, however, being easily redissolved by a gentle heat, when the solution remained permanent. When the tincture is made according to B. P., I have not noticed this change.

It is only reasonable to suppose that a tincture made with absolute quinine would be free from this deposit; and to satisfy myself, I recently prepared a small quantity. The proper quantity of sulphate was dissolved in acidulated water, precipitated by ammonia and washed till no smell of that reagent was perceptible. The precipitated quinine was then well pressed between blotting-paper, and at once dissolved in the tincture; a little cloudiness was apparent, which, in a few days, settled down into a light brownish flocculent precipitate; very different in appearance from the white dense deposit of the former. This, when collected on a filter, was very small in quantity, and after washing with proof spirit, remained brown. It was insoluble in boiling water, but nearly all dissolved in water acidulated with sulphuric acid; so that I conclude it was principally quinine, contaminated with and possibly thrown down by colouring and astringent matter, especially when a little placed on a white slab and touched with a drop of solution of sulphate of iron gave a slight blackish discoloration, showing the presence of tannin, but in so minute a quantity as to be hardly worth notice. My object in making these experiments was to learn, first, if the precipitate ordinarily occurring in tincture of quinine was a compound of that alkaloid; and, second, if the tincture could be better prepared from freshly precipitated quinine. As to the first, we may conclude from the evidence already produced that it is little more than sulphate of lime; and as to the second, I think there is nothing gained. In the one case we get rid of the lime salts by filtration; and in the other, prevent their formation by a process requiring more time and labour, the result in the end being just the same. As regards the best method of preparing the tincture, my idea is to dissolve the quinine in as large a portion of the tincture of orange-peel as possible, say, not less than one-half, using a minimum of heat, and, of course, no acid, as I believe that addition besides being unnecessary is one cause of the deposition of quinine instead of preventing it; and I am quite of opinion that a fair trial of the B. P. formula and close adherence to its direction will lead to a satisfactory result.

COSTUS ROOT.

Aplotaxis Lappa, Dcne.

BY JOHN R. JACKSON, A.L.S.

Curator of the Museums, Kew.

Under the name of *Aucklandia Costus*, Dr. Falconer described a composite plant, growing on the mountain slopes of the Cashmere Valley, at an elevation of from 8000 to 9000 feet; and the aromatic root of the plant was considered to be identical with the costus of the ancients. The plant, which is a gregarious herb, six or seven feet high, with an annual stem and a thick perennial root, is now referred to *Aplotaxis Lappa*, and has some interest attached to it beyond its ancient history, from being at the present time, or at any rate when Dr. Falconer wrote, an extensive article of Oriental trade. It is sent in large quantities to Bombay, and from thence is shipped to the Red Sea, the Persian Gulf and China; also through Hindostan to Calcutta. As many as 200,000 lb. are said to be annually collected and disposed of in this way at a considerable profit to the collectors, for it is estimated that about 2*s*. 4*d*. per cwt. covers the cost of collecting and transport to a mercantile depôt in Cashmere, while in Canton as much as 47*s*. to 48*s*. per cwt. is realized. The article moreover requires no preparation for market, the roots being simply dug up in September and October, and cut into pieces from two to five or six inches long. Its chief use is by the Mohamedans for burning as incense, but the Chinese also use it as an aphrodisiac. In Cashmere its only use is for preserving the celebrated Cashmere shawls from the attacks of moths, pieces of the root being put into the bales in course of packing. When dry the root is of a dark brown colour, very brittle and apparently full of resin, but it does not burn freely. It has a strong but agreeable odour similar to that of orris-root. I am not aware that it is an article of import in this country; but not long since I received a fine sample for the museum from a celebrated London perfumer. It is known in Cashmere as Koot, and in Bengal as Putchuk.

COMPLETE ANALYSIS OF CINCHONA BARKS.*

BY P. CARLES.

The immediate analysis of cinchona barks has already been partly made by Pelletier and Caventou. Those chemists found in each species, among other products, quinine, quinovic and cinchotannic acids, colouring matter, fats, gum, starch, etc. Besides these I have found sugar, or rather glucose, the presence of which did not appear to be normal, but seemed to proceed from the splitting up of the cinchotannic acid, which is rather a glucoside than a true acid. Analysis has in fact shown that glucose is more abundant in the external layers of the bark which have also been found to be more rich in the tannin principle.

There exists yet another element in cinchona, namely, ammonia, which I have carefully investigated, although its presence had been previously announced by Fourcroy, Reichel, Howard and De Vry; for I thought it might furnish a glimpse of the truth as to the genesis of quinine and chinchonine. I also sought whether any relations existed between the proportions of this alkali and those of the vegetable alkalies. I therefore operated upon the three types of pharmaceutical species of bark, of which the proportions of alkaloids were already known, the huanuco, succirubra and calisaya barks. In order to make the results more conclusive, experiments were

* 'Répertoire de Pharmacie,' (N. S.) vol. i. p. 60.

made with the entire bark, and with the various layers of the same bark separated. The ammonia was removed in the cold, and estimated according to Schloesing's method. One hundred parts of bark yielded—

	Entire bark.	External layer.	Intermediate layer.	Internal layer.
Succirubra	traces	traces	traces	traces.
Calisaya	0·016	0·012	0·012	0·016.
Huanuco	0·048	0·049	,,	0·028.
Calisaya leaves	0·061	,,	,,	,,

This table shows that the barks richest in alkaloids are least charged with ammoniacal salts. The relation between the quantities of those salts existing in the external and internal layers is not constant. The only conclusion which can be drawn is that the organs which contain the most ammonia are the richest in tannin and the youngest, provided, however, that the grey cinchonas are the younger branches from the same trees as produce the yellow bark. However this may be, the leaves contain a much more notable proportion of the volatile alkali, whilst they rarely yield any traces of the alkaloids.

Analysis of the Ash.—Another point in the history of cinchonas that appears to have been neglected is the analysis of the ash. This would appear to be important, because most of these mineral principles pass into the greater part of the preparations of cinchona, carrying with them their characteristic action, which is thus added to those of the organic principles, and also because of the part they play in the growth of the cinchona plant. The effects of temperature, altitude, and the action of light upon the growth of the plant have been studied, but the nature of the soil, and the improvements which may be made in it, have hitherto been somewhat neglected.* The study of the ash might enlighten the cultivator upon this point and lead to the collection of a richer product.

Three officinal species of cinchona barks were chosen for experiments: the grey huanuco, the yellow calisaya, and the red succirubra, two specimens of each species being used for greater certainty. The results were obtained in each case with from 4 to 6 grams of ash arising from the combustion of 300 or 400 grams of bark.† The quantities of ash indicated in the following table are the residues of 100 grams of cinchona.

	Huanuco bark.		Calisaya bark.		Succirubra bark.	
Ash	1·831	1·885	1·350	1·361	1·402	1·741.
Insoluble Silica	0·263	0·241	0·023	0·032	0·020	0·031.
Soluble Silica	0·041	0·047	0·024	0·031	0·025	0·018.
Alumina	0·061	0·050	0·030	0·020	0·062	0·052.
Iron	0·061	0·042	0·065	0·049	0·053	0·070.
Manganese	0·048	0·026	0·027	0·032	0·042	0·025.
Lime	0·376	0·383	0·382	0·379	0·546	0·720.
Magnesia	0·034	0·034	0·016	0·031	0·021	0·018.
Potash	0·429	0·540	0·340	0·252	0·215	0·298.
Soda	0·081	0·069	0·041	0·052	0·048	0·034.
Copper	traces	traces	traces	traces	traces	traces.
Carbonic acid	0·309	0·318	0·338	0·345	0·280	0·291.
Sulphuric acid	0·027	0·034	0·036	0·038	0·035	0·034.
Phosporic acid	0·074	0·053	0·048	0·067	0·045	0·042.
Chlorine	0·015	0·009	0·008	0·010	0·014	0·012.

A glance at this table will show that iron, manganese, and lime (united with the phosphoric acid), are present in notable proportions. These various principles are, it should be remarked, found in the infusions, decoctions, extracts and wines of cinchona, where their presence by the side of tannin and the salts of quinine is not a matter of indifference. In order to detect the copper, it is necessary to ignite the carbon as completely as possible, and it is advisable to carry on the operation in the muffle of a cupelle furnace. The proportion of copper is so small that there is no fear of its poisonous effects. M. Sarzeaud estimated that cinchona contained one-five-hundred-thousandth part.

Considering the statement long since made by Fourcroy, that cinchona barks were rich in chlorides, the proportion of chlorine given in the above table might appear small, but probably his experiments were made with specimens which had been injured in their transport.

It has also been said that the barks richest in quinine were generally those which abounded in lime salts. The foregoing figures tend to demonstrate the contrary, for the proportion of lime is the same in huanuco and calisaya barks and higher in the succirubra.

* See, however, an article in the present volume of the Pharmaceutical Journal, p. 521.—Ed. Pharm. Journ.

† When some cinchona barks are burned, especially the yellow cinchona, a rather agreeable odour is given off, which is not met with in the less esteemed species. It is due to the decomposition of quinine and quinovic acids into benzoic acid, salicylic aldehyde, etc, It appears to be more manifest in proportion as the bark is rich in quinine, or rather, quinate of quinine.

ACTION OF VARIOUS SUBSTANCES AS ANTIFERMENTS.*

BY M. A. PETIT.

The importance, in a medical point of view, of the recent communications of M. Dumas and MM. Rabuteau and Papillon relative to the action of borate of soda † and silicate of soda upon ferments has induced M. Petit to repeat the experiments; and as a result he reports that he has not found those substances to be possessed of peculiar properties as antiferments.

The solutions operated upon contained 50 grams of cane sugar per litre, and a sufficiency of ferment (0·50 gram of German yeast per 10 c.c.) to set up regular fermentation in a few minutes. A solution containing one per cent. of silicate of soda was coloured yellow through the alkaline action of the silicate upon the yeast. Fermentation did not commence for an hour; but once commenced it was rapid and regular. One per cent. solution of borate of soda fermented as rapidly as the saccharine liquor itself.

A solution of sulphate of protoxide of iron (1 to 100) fermented slowly, but regularly. A similar solution of sulphate of copper commenced to ferment, but the fermentation afterwards stopped. In experiments made under the same conditions with phosphorus, oil of turpentine (1 to 100), creasote in small proportions, mustard flour (1 to 100), and sulphuric and tartaric acids (1 to 100), fermentation was not hindered.

Arsenious acid in solution (1 to 100) retarded the fermentation, which, however, continued very regular. Oxalic acid (1 to 300) slackened it very considerably. In equal quantities acetic acid seemed to be more antifermentive than the mineral acids.

The bodies which appeared to be the most antifermentive were the bichloride and especially the binoxide of mercury. A solution of one per cent. of sublimate agitated with the yeast, gave no preci-

* 'Journal de Pharmacie et de Chimie,' vol. xvii. p. 119.

† See ante, p. 565.

pitate with sulphuretted hydrogen, the metal being combined with the albumen. The oxide of mercury in smaller proportion exercised a still more energetic action; ½ per cent. of the yellow oxide introduced into a tube in full fermentation immediately arresting the action.

The sulphites did not prevent fermentation; they were transformed into sulphates. A solution containing one per cent. of sulphite of soda, five per cent. of cane sugar, and two per cent. of German yeast gave the following results when tested with solution of iodine in the presence of starch. The fermentation took place in a closely stoppered flask and the delivery-tube plunged in water.

10 c.c. required before fermentation	16·4	c.c. iodine sol.
,, ,, after decomposition of $\frac{1}{7}$ of sugar	6	,, ,,
,, ,, ,, ,, $\frac{2}{3}$,,	2	,, ,,

It would thus appear that the transformation of sulphites into sulphates does not take place before, but during, fermentation, and progressively.

THE GREEN PUTCHUK OF THE CHINESE.*

With some remarks on the antidotal virtues ascribed to Aristolochiæ.

BY H. F. HANCE, PH.D.

Amongst the drugs held in high estimation by the Chinese is one known by the names of *Ch'ing muh hsiang*, or *T'u ch'ing muh hsiang*, *i.e.*, "Green Putchuk," or "Native Green Putchuk," derived from some fancied resemblance to the rhizome of *Aucklandia Costus*, Falc., which latter is largely imported into Southern China, for the purpose of making incense sticks, etc. In the current number of the 'Journal of Botany,' Dr. H. F. Hance gives an interesting and elaborate description of this drug and the plant producing it, from which the following details are taken. The drug consists of pieces of rhizome, of a light brittle texture, varying in thickness from the diameter of the thumb to that of a crow-quill, white internally, and covered with an ash-grey epidermis. When fresh, it has a hot camphoraceous peppery odour, and a powerful camphoraceous and bitter taste. Mr. Hanbury, in his 'Notes on the Chinese Materia Medica,' speaks of it in a dried state as having a slightly aromatic taste, with but little smell. Dr. Hance, however, has found that rhizomes dried by himself have lost their scent almost entirely, but have retained their flavour for the most part. The Chinese 'Illustrated Nomenclature and Description of Plants,' published twenty-five years since, gives an outline of the plant which is reproduced in the 'Journal of Botany,' together with the following translation of the description:—"The *T'u ch'ing muh hsiang* grows on the slopes of hills in Hu peh province. It is a trailing plant, the small branches, leaves and fruit like those of *Ma tao ling* ("Horse-head bells"); the roots are yellow, small and fragrant. In medicine it is employed to cure burns and indigestion. It produces flowers in the form of a tube, at first small, afterwards larger, curved like a buffalo's horn, the sharp end being raised and of a rather deep purple-black hue. The sexual organs are visible within." Dr. Tatarinov appears to have been the first to have referred this product to an *Aristolochia;* and, subsequently, Dr. Porter Smith,—who remarks that "it is a powerful purgative, emetic, and anthelmintic remedy,"—in his 'Contributions to the Materia Medica' of China, erroneously referred it to *A. contorta*, Bunge. Mr. E. C. Bowra, in his Report on the Trade of Ningpo for 1868, states that in the neighbourhood of that port, whence the drug is largely exported, the plant yielding it is a common garden creeper. By the kindness of that gentleman Dr. Hance was supplied with several living plants, one of which flowered lavishly and set a single fruit. Upon a careful examination Dr. Hance came to the conclusion that the plant belonged to an undescribed species, and in his paper he describes it under the name of *Aristolochia recurvilabra*. He says that the immediate allies of the Chinese plant are to be found in those species which inhabit the region of the Mediterranean basin, and amongst those it is nearest to *A. altissima*, Desf., *A. Pistolochia*, Linn., and especially *A. bætica*, Linn., and *A. parvifolia*, Sibth. et Sm. The only East Asiatic species with which it is likely to be confounded are *A. debilis*, Sieb. et Zucc., and *A. Sinarum*, Lindl.

With regard to the antidotal properties ascribed to Aristolochiæ, Dr. Hance remarks that undoubtedly no genus comprising a large number of species, widely diffused over both hemispheres, has been so universally credited with alexiteric properties as *Aristolochia*, and this, too, in all ages, and in every condition of society, alike by the wandering savage and the polished citizen or learned physician of a highly civilized commonwealth. In the forcible language of Endlicher, "Species plurimæ vasorum, imprimis secernentium, nervorum et cutis vitam sollicitantes, in eliminandis e corpore potentiis morbificis, veneno potissimum animali, efficaces, adversus serpentum morsus *unanimi gentium præconio* celebrantur." As regards those species which are natives of the Mediterranean basin, Theophrastus praises *A. pallida*, Willd., as a remedy for the bites of snakes, when infused in wine and drunk, and used also as a topical application;* and this or other species, probably *A. bætica*, Linn.. *A. parvifolia*, Sibth. et Sm., and *A. Pistolochia*, Linn., entered as ingredients into the wonderfully complex *alexipharmaca* of the Greek physicians. Cicero alludes to the virtues of *Aristolochia* in cases of snake-bites as a universally recognized fact, and Pliny notes the employment of *A. pallida* in such cases. The pseudonymous Macer, in his poem 'De viribus herbarum,' written during the tenth century, and which for more than five hundred years was the recognized authority on vegetable materia medica, holding in this respect an equal rank to that conceded to the renowned 'Regimen Salernitanum' in all cases of diet, exercise, and the daily conduct of life, thus refers to *A. rotunda*, Linn:—

> "Pestiferos morsus, cum vino sumpta, rotunda
> Curat, et assumptis prodest sic hausta venenis."

And this belief was universal during the middle ages. Nor can the dull green foliage, twining habit, lurid tubular flowers, and heavy scent of these plants have led to such a belief,† founded on an attachment to the "doctrine of signatures;" not only because it seems clear that it was inherited from antiquity, but also because, remarkably enough, one of the most curious works devoted to the exposition of this fanciful theory, the 'Phytognomonica' of Giambatista Porta—a contemporary of our Gerarde—first published at Naples in 1588, though several times alluding to the presumed virtues of *Aristolochiæ*, never once attributes to them antidotal power. The Arabs are reported to use the leaves of *A. sempervirens*, Linn., when bitten by poisonous snakes, and *A.*

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* Abstract from a paper in the 'Journal of Botany,' March, 1873, p. 72.

* Hist. Plant. ix. 13, 3; ix. 20, 4 ed. Wimmer. One hundred and forty years later, Nicander extols the same specific in verse, thus:—

> "Τὴν ἤτοι ἔχιος τε καὶ αἰνοπλῆγος ἐχίδνης
> ἀγρήσεις ὄφελος περιώσιον. ἔνθεν ἀποῤῥὼξ
> δραχμαίη μίσγοιτο ποτῷ ἐνὶ κιῤῥάδος οἴνης."
> —Theriac. 517—19.

† Dr. Alexander Prior, however, asserts (Popular Names of Bri. Pl., ed. 2, p. 22) that the fancied virtues of *Aristolochia Clematis*, Linn., in assisting difficult parturition were ascribed to it ob formam oris perigonii adhuc inexpansi feminali haud absimilem; and it is noteworthy that the Jamaica negroes have given a coarse popular name to *A. grandiflora*, Sw., from a similar resemblance.

indica, Linn., is similarly employed in India. The early settlers on the Atlantic sea-board of North America found *A. serpentaria*, Linn., held in high esteem by the Indians as a remedy for wounds inflicted by the rattle-snake and other venomous reptiles, a reputation perpetuated both by the trivial name and the popular designation "Snake-root." A very large number of species enjoy an equal fame in the Caribbean Islands and throughout the entire South American continent, amongst which may be mentioned *A. trilobata*, Linn., *A. pandurata*, Linn. (the "Raiz de Mato" of the Venezuelans), *A. odoratissima*, Linn., *A. cordiflora*, Mutis, *A. anguicida*, Linn., *A. fragrantissima*, Ruiz (the celebrated "Bejuco de la Estrella" of the Peruvians), *A. macroura*, Gomez, *A. cymbifera*, Mart. et Zucc., *A. ringens*, Vahl., *A. Galeata*, Mart. et Zucc., etc. Dr. Weddell was assured by the Bolivians in the province of Yungas that the crushed leaves of the "Vejuco," *A. brasiliensis*, Mart. et Zucc., used topically, are an infallible cure for snake-bites, and Señor Triana, the accomplished investigator of the flora of New Granada, found *A. tenera*, Pohl, in daily use in similar cases, as a never-failing remedy, under the name of "Matos."

Modern physicians seem with one accord to regard these plants as diaphoretics, stimulant tonics, and emmenagogues only; but the array of testimony from all quarters of the globe, and extending over a period of more than two thousand years, in favour of their alexiteric properties, is so overwhelming, that it is in my judgment incredible that these virtues should be imaginary. In the words of Cicero, "Utililate et ars est et inventor probatus," and the subject seems to me to demand a very careful and dispassionate investigation.

In a note appended to the article Mr. D. Hanbury remarks, "To the very interesting article of my friend Dr. Hance on *Green Putchuk* may be added a few lines showing how large a trade there is in this drug. Mr. Bowra, in the report referred to by Dr. Hance, estimates the total value of the export trade of Ningpo in 1868 at 6,073,709 taels, or about £2,026,903, of which amount 239,559 taels (£80,274), represent drugs; and of these latter fully *one-third* (or to the value of, say, £26,700), is *Green Putchuk*. The drug, he says, is worth from 10 dols. to 15 dols. per picul, equal to, say, 4*d.* to 6*d.* per lb. But the Chinese have several qualities, some of which are far dearer. The supplies are chiefly derived from the plant which is cultivated, but the root of the wild plant is also collected, though to a very small extent.

CHINESE BLISTERING BUGS.*

BY JOHN M. MAISCH.

At the meeting of the American Pharmaceutical Association in 1871, it was stated in the report on the drug market that twenty cases of blistering flies had been imported from China, and, although of a brown colour and not as good-looking as the European flies, proved to possess equal vesicating powers and went into consumption. It was interesting to ascertain of what species these bugs consist; and soon after the meeting adjourned, the writer endeavoured to procure some of the commercial article, but was unable to obtain any; the whole amount that had been imported having apparently been consumed. Subsequently Dr. Squibb kindly sent me a specimen from his private collection, which proved to be the *Mylabris cichorii* of Fabricius. My thanks are especially due to Messrs. McKesson and Robins, who were kind enough to import a pound for me from London, to enable me to make the necessary experiments, with the view to ascertain the amount of cantharadin contained therein.

The genus Mylabris comprises a large number of species, many of which were described in a monograph by M. C. Cooke. M.A., on 'Vesicating Insects,' which was published in vol. II. third series of PHARMACEUTICAL JOURNAL AND TRANSACTIONS.

In addition to the above, the following, taken from the Pharmacopœia of India, may well deserve a place.

MYLABRIS CICHORII, *Fabr.*, Telini fly.

Habitat.—Southern Europe, extending from Italy through Greece and Egypt to China. It is of common occurrence throughout India.

Officinal Part.—The dried insect (*Mylabris, Telini fly*). It has the following characters: About an inch in length and a third of an inch broad; the elytra of an obscure yellow, with three large somewhat zigzag transverse bands. The first band is interrupted and sometimes reduced to three or four spots. Active principle, *cantharidin.*

Medical Properties and Uses.—The same as *Cantharis vesicatoria*, for which it affords a complete substitute as a vesicant. As an internal remedy it should not be substituted for the tincture of cantharides, as the strength and operation of the latter is well ascertained, which is not the case with our present article. It is regarded as more powerful than the European article.

The same authority also mentions a number of other East India blistering bugs of the genera *Meloe*, *Lytta*, *Mylabris*, and *Epicauta;* but, it continues, with *M. cichorii* existing plentifully in most part of India, the necessity of increasing the number of these vesicating agents is lessened.

The Chinese bugs, which I received from Messrs. McKesson and Robbins, consist mainly of the *M. cichorii*, intermixed, however, with a considerable portion of *M. phalerata*, the latter perhaps not exceeding one-sixth of the whole weight, and readily distinguished by their much larger size, notwithstanding the similarity in the banded appearance of the elytra of both species. If ochraceous-yellow is taken to be the ground colour of the elytra of *M. cichorii*, the relative width of the three black bands is as follows: the one at the apex is the broadest, next in width is the one just above the middle, leaving the one above the base as the narrowest. This latter band in some specimens is sometimes interrupted, leaving on each side of the suture an undulated semilunar figure, and occasionally merely a spot. In other specimens which appear to me to belong to the same species, the second band is removed to the centre, and the third one quite to the base, so that there are but two broad yellow bands left, against three of the same colour in the typical form. In the cabinet of the Philadelphia College of Pharmacy is a specimen marked *Mylabris cichorii*, *female*, in which the number of black bands is reduced to two, an apical and a basal one, the latter usually with two small yellow spots, and the yellow portion of the elytra occasionally with quite a small black dot on each side of the suture.

In *M. Phalerata* the black colour predominates on the elytra, which are marked by two undulated bands, one just above, the other below the middle, both being of a brownish-yellow colour, of a deeper shade than in *M. cichorii;* at the base and near the suture are two nearly circular spots of the same brownish-yellow, and two smaller ones on the lateral edges near the base, the basal spots rarely becoming larger and confluent at the suture with the lower band. The transverse impression on the thorax is pretty large, and the scutellum is punctate, but not hairy. In *M. cichorii* the impression on the thorax is smaller, and has scarcely a transverse direction, and the scutellum is often covered with hairs.

The commercial article appears to be always a mixture of these two species (with occasionally a few individuals of other species), as has been pointed out by Mr. Cooke; the relative proportion of the two species must, therefore, considerably influence the appearance of the commercial Chinese blistering flies.

Cantharidin was discovered in 1810 by Robiquet* in

* Reprinted from the 'Proceedings of the American Pharmaceutical Association.'

* 'Annales de Chimie,' xlviii. 230.

Spanish flies (*Lytta vesicatoria*, Fabr.). Bretonneau* isolated the same principle from the Chinese blistering flies about the year 1828. The process used for many years for the preparation of this principle was the one suggested by Robiquet, in which the aqueous extract of the powdered bug is exhausted by hot alcohol, the solution evaporated to dryness, the residue treated with warm ether, the ethereal solution evaporated spontaneously, and some yellow matter removed by washing the crystals with cold alcohol. This process is based upon the observation made by Robiquet and other investigators, that cantharidin, when pure, is insoluble in cold and hot water, but taken up by this menstruum directly from cantharides in consequence of the presence therein of a yellow matter which renders this principle soluble in water. Ed. Rennard† has recently denied the correctness of this statement, he finding that cold water dissolves 0·02, and boiling water between 0·290 and 0·297 per cent. of pure cantharidin; the same author also found that this principle volatilizes with the vapours of boiling water, alcohol, and even chloroform.

Thierry‡ used ether or alcohol of specific gravity ·85 for exhausting the cantharides, distilled the ether and the alcohol, removed the oil, and obtained the cantharidin from the aqueous residue by crystallization and subsequent purification.

In 1851 Professor Procter observing that chloroform is a good solvent for cantharidin, proved§ the practicability of obtaining it by this menstruum directly from different blistering bugs. This process was improved by Mortreux‖ in 1864, by treating the residue left after the evaporation of chloroform (or if ether had been used, after the evaporation of this solvent) with bisulphide of carbon to dissolve the fat, and recrystallizing from hot alcohol. A. Fumouze** corroborates this statement, using for the recrystallization of the cantharidin, chloroform.

Bluhm and Dragendorff†† state that a portion of the cantharidin is contained in cantharides in a combination in which it is not dissolved by alcohol, ether or chloroform; in order to obtain the whole amount of this principle, they recommend to mix the powdered cantharides with water and calcined magnesia, exsiccate the mixture, and treat the dry mass with dilute sulphuric acid in slight excess, when the cantharidin may be extracted by solvents; or the acidulated mass is again exsiccated and then exhausted with ether or chloroform. Rennard‡‡ improves on this by saturating the mixture obtained after exsiccation with magnesia, with chloroform, and then supersaturating with sulphuric acid; the chloroform prevents the crystallization of the liberated cantharidin, which is for this reason dissolved by a much smaller quantity of ether.

The above contains nearly all the scientific literature on the preparation of cantharidin, and all the processes which may lay claim to at least approximate accuracy in their results. In experimenting with the Chinese flies, various questions that presented themselves could not be solved in time for the present meeting; among them an inquiry into the usefulness of petroleum-benzine in the preparation of cantharidin, and also the estimation of that portion of this principle, which according to Bluhm and Dragendorff is not taken up from the blistering bugs by the usual solvents.

In regard to the quantity of cantharidin obtainable, I can find no earlier researches than those made by William R. Warner,* who employed Robiquet's process mentioned above for determining its quantity, and obtained from *Lytta vesicatoria* 0·41, from *Lytta vittata* 0·40, and from *Mylabris cichorii* 0·43 per cent. of cantharidin. Mortreux† gives the average percentage of cantharidin in good cantharides as 0·5 per cent., estimated by his process. According to Fumouze's experiments, cantharides collected in 1866 in different parts of Europe, yielded 0·275, 0·435, 0·48, 0·48, and 0·50 per cent. of this principle, while three samples one year old yielded but 0·17, 0·215, 0·375 per cent., and the worm-dust separated from the next to the last sample 0·425 per cent., or double the quantity obtained from the cantharides from which the dust had been sifted.

Bluhm and Dragendorff found in commercial cantharides only 0·264 per cent. of cantharidin isolated by their process mentioned above; in *Mylabris quatuordecim-pustulata*, however, 0·486 per cent. Rennard separated from cantharides of unknown age, 0·38 and 0·431 per cent.; from cantharides one year old, collected near Heidelberg, 0·489 per cent., and from a sample eight months old, collected near Pultawa, 0·57 per cent. of cantharidin.

Fumouze's estimation of the value of the hard and soft parts of cantharides deserve mention yet; he found in the former 0·118, in the latter 0·778 per cent., and in the whole bugs 0·415 of cantharidin.

It appears from these essays that the amount of cantharidin which should be contained in the cantharides, ought not to be less than two-fifths of one per cent., and might probably be placed at a somewhat higher figure. It also appears probable that the cantharides lose in strength by age; but it seems likely that in all cases cited above, the bugs were freed as much as possible from the worm-dust which Fumouze has shown to be rich in cantharidin, and since the mites destroy only the soft parts which contain a large amount of the active principle, its decrease in the remaining portions of the bugs is easily accounted for.

Regarding the comparative strength of the Chinese blistering bugs, which by O'Shaughnessy is placed at one-third, by Warner only at one-twentieth above the officinal cantharides, these discrepancies are easily accounted for, since the statement of the former doubtless refers to the recently collected Mylabris, while the experiments of the latter were made with commercial bugs of uncertain age, and probably separated from the worm-dust. I find, however, no notice of any analysis made by O'Shaughnessy, and it is possible that his statement is based upon the epispastic properties of the bugs in question.

In estimating the amount of cantharidin in the commercial Chinese bugs, I determined for reasons stated before, not to separate the worm-dust. Fumouze's process was used for this purpose in the following manner: 600 grains of the powdered mylabris were introduced into a wide mouth glass-stoppered bottle, which was then filled with chloroform; after macerating for three days the liquid portion was poured off and filtered through a little cotton. The maceration with chloroform was repeated several times, until a drachm of the filtered portion left on evaporation merely a faint yellowish spot. Twelve ounces of chloroform were consumed in this operation. To avoid any loss of the active principle by transferring the chloroformic tincture into other vessels, the liquid was at once collected in a porcelain capsule, and the chloroform allowed to evaporate spontaneously. The residue, which was of a brown colour, was then treated with bisulphide of carbon, and the solution, including the undissolved cantharidin, transferred to a small filter, which was subsequently well washed with bisulphide of carbon. After the odour of this liquid had disappeared from the funnel, chloroform was poured

* 'Journal de Pharmacie et de Chimie,' 1828, 67.
† 'Das wirksame Princip des wässrigen Destillates der Canthariden.' N. Jahrbuch für Pharmacie, 1872, July 22.
‡ 'Journal de Pharmacie et de Chimie,' xxi. 41.
§ 'American Journal of Pharmacy,' 1851, p. 124.
‖ 'Journal de Pharmacie et de Chimie,' 1864, p. 33. Will's Jahresbericht,' 1864, p. 646.
** Journ. de Pharm. et de Chim., 1867, 161. Thèse de Pharmacie: De la cantharide officinale.
†† 'Pharmaceutische Zeitschrift für Russland,' 1865, 160.
‡‡ Loc. cit.

* 'American Journal of Pharmacy, 1856, p. 193.
† Loc. cit.

upon the filter in small quantities, and after all the crystals had dissolved, the filter was filled with chloroform twice to extract any cantharidin which might have been absorbed by the paper. The chloroformic filtrate was collected in a tared capsule, evaporated spontaneously, and the residue weighed.

In this way 6·097 grains of pure cantharidin of merely a pale yellow colour were obtained, which is equal to 1·016 per cent. If two-fifths per cent. of cantharidin is regarded as the yield of fair medicinal cantharides, it will be seen that the Mylabris is two and one-half times stronger; it is fully twice the strength of the best commercial cantharides, and it yields 1·78 times more cantharidin than the best yield recorded.

PROFESSOR TYNDALL ON LIGHT.*

(*Continued from p.* 688.)

We might vary and extend our experiments on light indefinitely, and they certainly would prove us to possess a wonderful mastery over the phenomena. But the vesture of the agent only would thus be seen, not the agent itself. The human mind, however, is so constituted and so educated as regards natural things, that it can never rest satisfied with this outward view of them.

Let us, then, inquire what this thing is that we have been generating, reflecting, refracting, and analysing. In doing this we shall learn that the life of the experimental philosopher is two-fold. He lives, in his vocation, a life of the senses, using his hands, eyes, and ears, in his experiments; but such a question as that now before us carries him beyond the margin of the senses. He cannot consider, much less answer, the question, "What is light?" without transporting himself to a world which underlies the sensible one, and out of which, in accordance with rigid law, all optical phenomena spring. To realize this subsensible world, if I may use the term, the mind must possess a certain pictorial power. It has to visualize the invisible. It must be able to form definite images of the things which that subsensible world contains; and to say that, if such or such a state of things exist in that world, then the phenomena which appear in ours must, of necessity, grow out of this state of things. If the picture be correct, the phenomena are accounted for; a physical theory has been enunciated which unites and explains them all.

This conception of physical theory implies, as you perceive, the exercise of the imagination. If we are to get anything done in physical science, we must invoke this faculty of imagination. Without it we cannot take a step beyond the bourne of the mere animal world, perhaps not even to the edge of this. But, in speaking of imagination, I do not mean that riotous power which those good and timid people appear to be alone acquainted with, but a well-ordered and disciplined power whose sole function is to form the conceptions which the intellect imperatively demands. Imagination thus exercised never really severs itself from the world of fact. This is the storehouse from which all its pictures are drawn; and the magic of its art consists, not in creating things anew, but in so changing the magnitude, position, and other relation of sensible things, as to render them fit for the requirements of the intellect in the subsensible world.

One of my objects in these lectures is to show you by what processes, or in what way, the scientific mind attains the deepest knowledge it is capable of attaining, which is a knowledge of the invisible sources of phenomena. I will take, as an illustration of this subject, the case of Newton. Before he began to deal with light, he was intimately acquainted with the laws of elastic collision, which all of you have seen more or less perfectly illustrated on a billiard-table. As regards the collision of sensible masses, Newton knew the angle of incidence to be equal to the angle of reflection, and he also knew that experiment had established the same law with regard to light. He thus found in his previous knowledge the material for theoretic images. He had only to change the magnitude of conceptions already in his mind to arrive at the Emission Theory of Light. He supposed light to consist of elastic particles of inconceivable minuteness shot out with inconceivable rapidity by luminous bodies. Such particles impinging upon smooth surfaces were reflected in accordance with the ordinary law of elastic collision. The fact of optical reflection certainly occurred as if light consisted of elastic particles, and this was Newton's sole justification for introducing them.

But this is not all. In another important particular, also, Newton's conceptions regarding the nature of light were influenced by his previous knowledge. He had been working at the phenomena of gravitation, and had made his mind at home amid the operations of this universal power. Perhaps that mighty mind at this time was too freshly and too deeply imbued with these notions to enable it to form an unfettered judgment regarding the nature of light. Be that as it may, Newton saw in refraction the action of an attractive force exerted on the particles of light. He carried his conception out with the most severe consistency. Dropping vertically downward toward the earth's surface, the motion of a body is accelerated as it approaches the earth. Dropping in the same manner downward on a horizontal surface, say of glass or water, the velocity of the light particles, when they came close to the surface, was, according to Newton, also accelerated. Approaching such a surface obliquely, he supposed the particles, when close to it, to be drawn down upon it, exactly as a projectile is drawn by gravity to the surface of the earth. This deflection by an attractive force exerted upon the particles of light, was, according to Newton, refraction. Finally, it was supposed that differences of colour might be due to differences in the sizes of the particles; a big particle, by its impact against the retina, producing one colour, and a small particle a different one. This was the physical theory of light enunciated and defended by Newton; and you will observe that it simply consists in the transference of conceptions born in the world of the senses to a subsensible world.

But though the region of physical theory lies thus behind the world of senses, the verifications of theory occur in that world. Laying the theoretic conception at the root of matters, we determine by rigid deduction what are the phenomena which must of necessity grow out of this root. If the phenomena thus deduced agree with those of the actual world, it is a presumption in favour of the theory. If as new classes of phenomena arise they also are found to harmonize with theoretic deduction, the presumption becomes still stronger. If, finally, the theory confers prophetic vision upon the investigator, enabling him to predict the existence of phenomena which have never yet been seen, and if those predictions be found on trial to be rigidly correct, the persuasion of the truth of the theory becomes overpowering. Thus working backward from a limited number of phenomena, genius, by its own expansive force, reaches a conception which covers all the phenomena. There is no more wonderful performance of the intellect than this. And we can render no account of it. Like the scriptural gift of the Spirit, no man can tell whence it cometh. The passage from fact to principle is sometimes slow, sometimes rapid, and at all times a source of intellectual joy. When rapid, the pleasure is concentrated, and becomes a kind of ecstasy or intoxication. To any one who has experienced this pleasure, even in a moderate degree, the action of Archimedes when he quitted the bath, and ran naked, crying "Eureka!" through the streets of Syracuse, becomes perfectly intelligible.

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* Abstract of a series of lectures delivered in the Cooper Institute, New York, and reported in the *New York Tribune.*

How, then, did it fare with the theory of Newton' when the deductions from it were brought face to face with natural phenomena? To the mind's eye, Newton's elastic particles present themselves like particles of sensible magnitude. The same reasoning applies to both; the same experimental checks exist for both. Tested by experiment, then, Newton's theory was found competent to explain many facts, and with transcendent ingenuity its author sought to make it account for all. He so far succeeded that men so celebrated as Laplace and Malus, who lived till 1812, and Biot and Brewster, who lived till our own time, were found among his disciples.

Still, even at an early period of the existence of the Emission Theory, one or two great names were found recording a protest against it; and they furnish another illustration of the law that, in forming theories, the scientific imagination must draw its materials from the world of fact and experience. It was known long ago that sound is conveyed in waves and pulses through the air; and this truth once well-housed in the mind, was transformed into a theoretic conception. It was supposed that light, like sound, might also be the product of wave-motion. But what, in this case, could be the material forming the waves? For the waves of sound we have the air of our atmosphere; but the stretch of imagination which filled all space with a medium trembling with the waves of light was so bold as to shock cautious minds. In one of my latest conversations with Sir David Brewster he said to me that his chief objection to the undulatory theory of light was that he could not think the Creator guilty of so clumsy a contrivance as the filling of space with ether in order to produce light. This, I may say, is very dangerous ground, and the quarrel of science with Sir David, as with many other persons, is that they profess to know too much about the mind of the Creator.

This conception of an ether was advocated by the celebrated astronomer, Huyghens, and by the celebrated mathematician, Euler. They were, however, opposed by Newton, whose authority at the time bore them down. Or shall I say it was authority merely? Not quite so. Newton's preponderance was in some degree due to the fact that, though Huyghens and Euler were right in the main, they did not possess sufficient data to prove themselves right. No human authority, however high can maintain itself against the voice of Nature, speaking through experiment. But the voice of Nature may be an uncertain voice, through the scantiness of data. This was the case at the period now referred to, and at such a period by the authority of Newton all antagonists were naturally overborne.

Still, this great Emission Theory, which held its ground so long, resembled one of those circles which, according to Emerson, the force of genius periodically draws round the operations of the intellect, but which are eventually broken through by pressure from behind. In the year 1773 was born, at Milverton, in Somersetshire, one of the most remarkable men that England ever produced. He was educated for the profession of a physician, but was too strong to be tied down to professional routine. He devoted himself to the study of natural philosophy, and became in all its departments a master. He was also a master of letters. Languages, ancient and modern, were housed within his brain, and to use the words of his epitaph, "he first penetrated the obscurity which had veiled for ages the hieroglyphics of Egypt." It fell to the lot of this man to discover facts in optics which Newton's theory was incompetent to explain, and his mind roamed in search of a sufficient theory. He had made himself acquainted with all the phenomena of wave-motion; with all the phenomena of sound; working successfully in this domain as an original discoverer. Thus informed and disciplined, he was prepared to detect any resemblance which might reveal itself between the phenomena of light and those of wave-motion. Such resemblances he did detect; and spurred on by the discovery, he pursued his speculations and his experiments, until he finally succeeded in placing on an immovable basis the Undulatory Theory of Light.

The founder of this great theory was Thomas Young. Permit me, by a kind of geometrical construction to give you a notion of the magnitude of this man. Let Newton stand erect in his age, and Young in his. Draw a straight line from Newton to Young, which shall form a tangent to the heads of both. This line would slope downward from Newton to Young, because Newton was certainly the taller man of the two. But the slope would not be steep, for the difference of stature was not excessive. The line would form what engineers call a gentle gradient from Newton to Young. Place underneath this line the biggest man born in the interval between both. He would not, in my opinion, reach the line; for if he did he would be taller intellectually than Young, and there was, I believe, none taller. But I do not want you to rest on English estimates of Young; the German Helmholtz, a kindred genius, thus speaks of him: "His was one of the most profound minds that the world has ever seen; but he had the misfortune to be too much in advance of his age. He excited the wonder of his contemporaries, who, however, were unable to follow him to the heights at which his daring intellect was accustomed to soar. His most important ideas lay, therefore, buried and forgotten in the folios of the Royal Society, until a new generation gradually and painfully made the same discoveries, and proved the exactness of his assertions and the truth of his demonstrations."

It is quite true, as Helmholtz says, that Young was in advance of his age; but something is to be added which illustrates the responsibility of our public writers. For twenty years this man of genius was quenched—hidden from the appreciative intellect of his countrymen—deemed in fact a dreamer, through the vigorous audacity of a writer who had then possession of the public ear, and who in *The Edinburgh Review* poured ridicule upon Young and his speculations. To the celebrated Frenchmen Fresnel and Arago, he was first indebted for the restitution of his rights, for they, especially Fresnel, remade independently, as Helmholtz says, and vastly extended his discoveries. To the students of his works Young has long since appeared in his true light, but these twenty blank years pushed him from the public mind, which became in turn filled with the fame of Young's colleague at the Royal Institution, Davy, and afterwards with the fame of Faraday. Carlyle refers to a remark of Nevalis, that a man's self-trust is enormously increased the moment he finds that others believe in him. If the opposite remark be true—if it be a fact that public disbelief weakens a man's force, there is no calculating the amount of damage these twenty years of neglect may have done to Young's productiveness as an investigator. It remains to be stated that his assailant was Mr. Henry Brougham, afterward Lord Chancellor of England.

Our hardest work is now before us. And as I have often had occasion to notice that capacity for hard work depends in a great measure in the antecedent winding up of the will and determination, I would call upon you to gird up your loins for the labours now before us. If we succeed in climbing the hill which faces us to-night, our future labours will be comparatively light. In the earliest writings of the ancients we find the notion that sound is conveyed by the air. Aristotle gives expression to this notion, and the great architect Vitruvius compares the waves of sound to waves of water. But the real mechanism of wave-motion was hidden from the ancients, and indeed was not made clear until the time of Newton. The central difficulty of the subject was to distinguish between the motion of the wave itself, and the motion of the particles which at any moment constitute the wave.

Stand upon the sea-shore and observe the advancing rollers before they are distorted by the friction of the bottom. Every wave has a back and a front, and if you clearly seize the image of the moving wave you will see that every particle of water along the front of the wave is in the act of rising, while every particle along its back is in the act of sinking. The particles in front reach in succession the crest of the wave, and as soon as the crest is passed they begin to fall. They then reach the furrow or *sinus* of the wave and can sink no farther. Immediately afterwards they become the front of the succeeding wave, rise again until they reach the crest, and then sink as before. Thus while the waves pass onward horizontally, the individual particles are simply lifted up and down vertically. Observe a sea-fowl, or, if you are a swimmer, abandon yourself to the action of the waves; you are not carried forward, but simply rocked up and down. The propagation of a wave is the propagation of a form, and not the transference of the substance which constitutes the wave.

The length of the wave is the distance from crest to crest, while the distance through which the individual particles oscillate is called the amplitude of the oscillation. You will notice that in this description the particles of water are made to vibrate across the line of propagation.

And now we have to take a step forward, and it is the most important step of all. You can picture two series of waves proceeding from different origins through the same water. When, for example, you throw two stones into still water, the ring-waves proceeding from the two centres of disturbance intersect each other. Now, no matter how numerous these waves may be, the law holds good that the motion of every particle of the water is the algebraic sum of all the motions imparted to it. If crest coincide with crest, the wave is lifted to a double height; if furrow coincide with crest, the motions are in opposition, and their sum is zero. We have then still water, which we shall learn presently corresponds to what we call darkness in reference to our present subject. This action of wave upon wave is technically called interference, a term to be remembered.

Thomas Young's fundamental discovery in optics was that the principle of Interference applied to light. Long prior to his time an Italian philosopher, Grimaldi, had stated that, under certain circumstances, two thin beams of light, each of which, acting singly, produced a luminous spot upon a white wall, when caused to act together partially quenched each other and darkened the spot. This was a statement of fundamental significance, but it required the discoveries and the genius of Young to give it meaning. How he did so I will now try to make clear to you. You know that air is compressible; that by pressure it can be rendered more dense, and that by dilatation it can be rendered more rare. Properly agitated a tuning-fork now sounds in a manner audible to you all, and most of you know that the air through which the sound is passing is parcelled out into spaces in which the air is condensed, followed by other spaces in which the air is rarefied. These condensations and rarefactions constitute what we call waves of sound. You can imagine the air of a room traversed by a series of such waves, and you can imagine a second series sent through the same air, and so related to the first that condensation coincides with condensation and rarefaction with rarefaction. The consequence of this coincidence would be a louder sound than that produced by either system of waves taken singly. But you can also imagine a state of things where the condensations of the one system fall upon the rarefactions of the other. In this case the two systems would completely neutralize each other. Each of them taken singly produces sound; both of them taken together produce no sound. Thus, by adding sound to sound we produce silence, as Grimaldi in his experiment produced darkness by adding light to light.

The possible analogy between sound and light here at once flashes upon the mind. Young generalized this observation. He discovered a multitude of similar cases, and determined their precise conditions. On the assumption that light was wave-motion, all his experiments on interference were explained; on the assumption that light was flying particles, nothing was explained. In the time of Huyghens and Euler a medium had been assumed for the transmission of the waves of light; but Newton raised the objection that, if light consisted of the waves of such a medium, shadows could not exist. The waves, he contended, would bend round opaque bodies and produce the motion of light behind them, as sound turns a corner, or as waves of water wash round a rock. It was proved that the bending round referred to by Newton actually occurs, but that the inflected waves abolish each other by their mutual interference. Young also established a fundamental difference between the waves of light and those of sound. Could you see the air through which sound-waves are passing, you would observe every individual particle of air oscillating to and fro in the direction of propagation. Could you see the ether, you would also find every individual particle making a small excursion to and fro; but here the motion, like that of the water-particles above referred to, would be across the line of propagation. The vibrations of the air are longitudinal, the vibrations of the ether are transversal.

It is my desire that you should realize with the utmost possible clearness the propagation of waves, both in ether and in air. And with this view, I bring before you an experiment wherein the air particles are represented by small spots of light. These spots are parts of spirals drawn upon a circle of blackened glass, and when the circle is caused to rotate, the spots move in successive pulses over the screen. You have here clearly set before you how the pulses travel incessantly forward, while the particles that compose them perform any oscillation to and fro. We have in this case the picture of a sound wave, in which the vibrations are longitudinal. By another arrangement of our glass wheel, we produce an image of a transverse wave, and here we observe the waves travelling in succession over the screen, while each individual spot of light performs an excursion to and fro across the line of propagation.

(To be continued.)

THE BROUGH FUND.

Concluding List of Subscriptions.

	£.	s.	d.
Batie, John, Dumbarton	0	5	0
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Bowler, Wm. Samuel, Belper	0	5	0
Braithwaite, J. C., 54, Kentish Town Road, N.W.	1	1	0
Chemist and Druggist, Proprietors of	52	10	0
Commans, R. D., Bath	2	2	0
Cooke, Wm., Norwich	0	5	0
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Dyson, W. B., Gloucester Road, South Kensington	0	10	6
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Duncanson, William, Stirling	0	10	6
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Subscribers will be informed in the columns of this Journal and the *Chemist and Druggist* of the arrangements to be shortly made by the committee for utilizing all the funds collected.

The Pharmaceutical Journal.

SATURDAY, MARCH 15, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

EDUCATION AND EXAMINATION.

If the Board of Examiners or the Council of the Pharmaceutical Society required any extra-pharmaceutical support for their proposition that after a stated date candidates must present a certain amount of evidence of education in pharmacy before entering for examination, that support would be found in the arguments by which the portion of the Irish University Education Bill relating to uncontrolled examination has been assailed during the recent Parliamentary debates. In a speech on the Address to the Throne on the opening night of the Session, and therefore before the Bill was presented to the House of Commons, the eminent leader of the Opposition, touching on the forthcoming measure, and the conflicting interests of "the advancement of learning" and the "rights of conscience," hoped that the solution of the problem might not turn out to be the sacrifice of a famous and learned University in order to substitute for it the mere mechanical mediocrity of an examining board. Abundant justification for this remark was apparent when the Bill was read a first time. A new university was to be established which should absorb that of Dublin as well as the Queen's, Trinity and other colleges, and which should examine all comers, no matter where educated or where "*prepared.*" It is true a professoriate was to be organized, but attendance at the classes was to be incumbent on no one. This portion of the Bill has met with opposition in all directions. Even the CHIEF SECRETARY for IRELAND, who, as a prominent member of the Government, was bound to defend the Bill, admitted that a teaching and examining university was a very superior thing to a merely examining university; that the character of a university was greatly influenced by its teaching as well as by its examinations; and that the Government in bringing forward the measure had fully recognized that fact by endeavouring to make the University of Dublin a teaching as well as an examining body. Here, by the way, is encouragement for those who maintain that our own Society should continue its educating as well as its examining functions as hitherto, or at least adopt some means of preventing the substitution of "cram" for education. Such a course seems more than ever necessary at the present time, when the successful *preparation*, a different thing from the *education*, of candidates for our examinations is becoming quite a popular calling. The Member for Dublin, in giving a qualified support to the Bill, recapitulated the old reasons for admitting all persons, wherever educated, to degrees if they possessed the requisite qualifications, but he threw no light on the question as to how qualification could be thoroughly tested; alluded to former immoral means of obtaining certificates of attendance at college, a practice which has since been checked, and went over the well-worn argument that a teaching as well as an educating body would be open to the suspicion that its examinations might be characterized by partiality. The Member for Galway, who spoke immediately afterwards, considered, however, that this portion of the Bill would lead to cramming; and in answer to the remark that University men had recourse to private tuition, said there was a vast difference between a careful course of academic study, supplemented by the occasional assistance of private tuition, and that unmitigated and desultory cramming which the Bill would encourage. The *Times*, also, which unquestionably reflects current opinions on public matters of importance, treated that part of the Bill enacting that a student may matriculate and graduate without attending any lectures or pursuing any academical course anywhere, as one which would discourage teaching and encourage "cram," and considered that the excision of this provision from the Bill was essential to the maintenance of higher education in Ireland. "Every academic body, in Ireland, in a word, condemns the proposal, and any pretence to treat it as essential would justify an instant rejection of the Bill. . . . The true course of academic reform in Ireland is to maintain and improve its two existing Universities as teaching bodies, differing in their apparatus and form of teaching just as Oxford and Cambridge differ, but agreeing in this—that education, and not mere cramming, shall be the necessary condition of entering for an examination."

The second reading of the Bill has been negatived, as our readers already know, but there can be no question that had it gone to committee, its embodiment of the free-trade principle in education would have been rejected by an overwhelming majority. That a candidate for our own examinations shall be twenty-one years of age, and shall give trustworthy evidence of having been engaged in practically acquiring knowledge in pharmacy for a space of three years, are recommendations that come from our Board of Examiners with all the force of reason and common-sense. The mere testing of a youth's power of memory, even though a considerable amount of time be spent over a candidate by an examiner, is a system imported from China, where it has been in-existence a thousand years, and where intellect is a thousand years behind the times. Something better than the mere testing of, it may be, a too rapidly charged memory, or, rather, something in addition thereto, such as is found in the conducting of actual experiments in the pharmaceutical examinations and in the proposed preliminary qualifications for examination, is now generally recognized as necessary before titles of any value can be worthily conferred.

REGISTRATION OF FIRMS BILL.

In legislation as well as in all other things there is a *juste milieu*, to attain which, without passing beyond into mischievous meddling or improper inquisitiveness, is a fair test of true statesmanship. As an illustration of this view we may refer to a Bill lately introduced into the House of Commons, and of which an abstract is given at p. 735. The object of this Bill is to provide for the discovery and registration of the names of partners in firms trading under a designation that does not disclose them. This may appear to some to trench upon dangerous ground, and to have an offensively inquisitorial character. Doubtless, on the other hand, in these days when "and Co." and other sounding titles are so freely used, the Bill will find admirers among those who have suffered from not knowing exactly with whom they were doing business. Putting aside, however, these *pro* and *con.* opinions, there is one respect in which the Bill is specially interesting to registered chemists and druggists. A recent prosecution in the north illustrated how the name of a medical man may be used as a cloak for illegally carrying on the business of a chemist and druggist; and it is not improbable that the name of a registered chemist and druggist is frequently used in a similar way. Such a law as that now proposed, if efficiently carried out, would at least put within the reach of the Registrar the means of ascertaining whether such alleged partnerships were fictions, and thus greatly assist him in carrying out the provisions of the Pharmacy Act.

ADULTERATION OF DRUGS IN THE FOURTEENTH CENTURY.

England in the "good old times" appears to have suffered from evils very similar in their nature to some that at present exist, although the measures by which our ancestors tried to remedy them evinced a spice of originality altogether wanting in the uniformity of the fines and imprisonments of the present day. In the 'Memorials of London and London Life in the 13th, 14th and 15th Centuries,' compiled by Mr. Riley, and published by order of the Corporation, we read that in 1394 an Inquisition was taken before the Mayor and Aldermen, at the Guildhall, to inquire whether or not William Whitman, "citizen and felmongere," did on a certain day "falsely and deceitfully deliver to one "Thomas Keys, merchant, of Stowe St. Edward, in the "county of Gloucester, divers small bags filled with "various powders, made of rape, roots of radiche, "and old setuwale [zedoary], rotten, and unwhole- "some for mankind, as being good powdered ginger; "and other like bags filled with tansy seed, of no "value whatever, for genuine seed called 'worm "seed'; and also divers barrels of rosyn for frank "ensense." The jury declared upon their oath the said William Whitman to be "guilty of the deceit and falsehood aforesaid," and it was adjudged, "in order that others might in future beware of "doing the like," he should "on the same day, be- "tween the hours of 10 and 11 of the clock "before noon, be put upon the pillory, there to remain "for one hour of the day, the said false powders "being then burnt beneath the same." On the Saturday and Monday after he was again to be put upon the pillory for one hour each day, and on each occasion the reason for such punishment was to be proclaimed.

We have much gratification in being able to state that Dr. Redwood, the Professor of Chemistry in the Society's School of Pharmacy, has been appointed to the office of Analyst to discharge the duties required by the Adulteration of Food Act, 1872, for the Parish of Clerkenwell and the Districts of St. Giles's and Holborn. We understand that there was a brisk competition for the appointment, and that especial care was taken by the electing bodies to ascertain the extent to which the several candidates possessed the various forms of qualification required by the Act. We heartily congratulate the inhabitants of the important districts to which this appointment applies upon the result of the election, and on their having secured the services of a gentleman who possesses so extended an experience of the kind of questions that are likely to be raised in the working of the Adulteration Act.

In a letter just received from Dr. F. A. Flückiger, he informs us that he has relinquished his appointments in Switzerland in favour of the post of Professor Ordinarius of Pharmacy in the new University of Strassburg. Dr. Flückiger was until now Professor Extraordinarius of Pharmacy and Pharmacognosy in the University of Bern and Director of the Staats-apotheke of that town; he is also an Honorary and Corresponding Member of the Pharmaceutical Society of Great Britain, and has published several valuable papers in our pages. His familiarity with the German and French languages, no less than his distinguished scientific acquirements, render him eminently qualified to fill with advantage his new position, which we are glad to learn will probably also enable him to become a more frequent contributor to this Journal than hitherto.

Dr. Hooker, of Kew Gardens, is to be proposed by the Council of the Royal Society to succeed Sir George Airey as President.

Provincial Transactions.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The annual festival of the chemists and druggists, under the auspices of the Glasgow Chemists and Druggists' Association, was held in the Albert Hall, on the 27th Feb. 1873. Thomas Davison, Esq., President, in the Chair. On the platform were Messrs. Kinninmont, J. Hatrick, Currie, Walker, McDonald (Glasgow Apoth. Co.), J. A. Clarke (Sec.), McAdam, Galbraith, Fairlie, Drs. Robertson and Clark, etc.

Tea being over, the chairman apologized for the absence of several gentlemen, who from illness or other causes were unable to be present. He then delivered the following address:—

Three years ago when I was honoured by being elected president, and on my first taking the chair at our opening meeting, I had to address you as "Ladies and Gentlemen." Now, almost my last meeting as president, I have again to address you as "Ladies and Gentlemen." As the question of ladies being admitted to our Society is now being agitated, I will, with the permission of the gentlemen, address myself to the ladies first.

I am not going to advocate what is popularly termed "women's rights." I think that expression wrong; for women have had their "rights" ever since the creation, when she was made a helpmeet for man—the only true place a woman should occupy. Many will say that to be a helpmeet women can assist in the shops, and occupy a place on the School Board, Parochial Board, etc. But to soothe the cares of the sterner sex, and when troubled and perplexed to give a word of comfort and encouragement, and in a thousand little ways make our lives sweeter and happier, is, I think, the true meaning of helpmeet. But, let women have their say in the turmoil of contested elections, enter universities, and become professional women, legal as well as medical—and pharmaceutists if they please—I would not oppose them, for they soon would become weary of the hard rough work we of the sterner sex have to undergo. The example of the London University is sufficient to show how soon they wearied; do not oppose their becoming pharmaceutists, which they can without becoming members of the Pharmaceutical Society.

But let the ladies pass their Preliminary and Minor examinations, and the Major if their ambition is great. Still just hear what Professor Blackie said the other day on this point:—"He sometimes did not know what the women wanted; but he promised that if they stated distinctly what they wanted, he would not stand in the way. If they had strength to snuff the foetid horrors of the dissecting-room, or withstand the heartless wrangling of the bar—if they thought it would be a dignity to their sex to wear a wig, in the name of all the wrangling angels, let them go in and do it. He would not oppose them. But he would not stand up for them in reference to these matters; because they ought to thank God for being free from some of that hard, harsh, angular, gritty work which took the hearts out of us, if we had any to take out at all. Therefore, ladies, do not give up your true, dignified, and exalted position *at home*. You can achieve more there, than becoming—

> "A short-haired woman, frizzy, curled,
> Her flag for woman's rights unfurled,
> Her middle finger black with ink,
> Her staring eyes that will not wink,
> Her spectacles—a double-barrelled terror to men that think."

The application of ladies for admission to the Pharmaceutical Society ought to be a stimulus to young men who have for some years been at the trade. Surely they will not sit still and let young ladies pass them in the race for the title of chemist and druggist, or pharmaceutical chemist. I fear there is very much indifference in this matter; too much of the spirit of Micawber—hoping and expecting "something to turn up." Now, gentlemen, don't give way to any such spirit as that; it is day-dreaming, a pernicious way of wasting time—

> "The child may dream; the man must act
> With reverence for the world's great fact;
> And look to toil, and sweat, and bleed,
> And gather his energies, all compact."

Those young men who will be the future chemists and druggists of this great city, I would urge at once, and without any delay, to get through their minor examination; every year it will become more difficult and more expensive. The original intention of the founders of the Pharmaceutical Society was that the Preliminary examination should be for apprentices, Minor for assistants, and Major for those entering into business. But as the law says that those who can pass the Minor and Modified may "keep open shop," the Council of the Pharmaceutical Society think, as the Minor is to be the entrance into business, it must be made more stringent; and the fee for it should be £5. 5*s*. with the title, Chemist and Druggist. The Major with the title of Pharmaceutical Chemist will then become more an honorary title, not one of qualification. This surely ought to be a stimulus to every young man here to be up and doing; and not sit grumbling about want of opportunity, and little remuneration to be had after he does pass. You have the future as it were in your own hands; the proper remuneration will come if you show yourselves worthy of it. Remember the fable of Jupiter and the waggoner, and the lesson taught by it. "The gods help them who help themselves." To those who have to pass the "Modified Examination"—and I regret to say there are yet many who have to do so—according to a statement by the Registrar, 2900 registered themselves for the Modified, and only 1430 have passed,—to them, I hardly know what to say. They got the privilege of passing it by making a declaration that they had been three years previous to the passing of the Act, engaged in dispensing, and practical pharmacy. It is now more than four years since the passing of that Act, making as it were an apprenticeship of seven years. All that is required of you in that examination, is to show you are practically acquainted with those things you are daily handling.

Now, gentlemen, I would make an effort, and don't let it be said of Glasgow that there are so many here who have not passed the Modified examination. Delays are dangerous. A sad instance occurred very lately—a gentleman who had for twenty-five years held a first position in a London house, died suddenly, leaving a wife and family. Application was made a few weeks ago for a grant from the Benevolent Fund, but it could not be granted. Her husband was not a registered chemist and druggist; he not having passed the Modified examination, which privilege I suppose he had claimed.

Now, just a word or two for our association. Some blame, I know, is attached to those in office for not more particularly attending to the special wants of the assistants; but you must remember it has been a summer and winter of work with a price list—a work of which we may be proud, even with all its faults. Then, again, a class was begun this winter by Mr. Currie, of which the assistants might have taken advantage in greater numbers, and it has been a very interesting one. To those who have regularly attended that class, it has been great gain. But to those who have not, it has been a positive loss. Mr. Currie deserves great praise for giving up so much of his valuable time for the benefit of assistants. I must say you have advantages here above any city in the kingdom. I might just say here that there is a small pamphlet, published by the Council of the Pharmaceutical Society, called 'Hints to Students,' which you would find very useful, and which can be got by applying to the secretary here, Mr. Kinninmont. By way of encouragement to those who are in business, I might mention that two druggists have been fined for want of qualification, and others are being looked after.

Many faces here to-night we would like to see at our monthly meetings; their presence would cheer those who have the work to do. The association is much indebted for the interest taken in all our work, and for the aid which frequently comes to us, to the noble chief at the head of the firm to which I have the honour to belong—a right noble one he is of the clan McDonald. I wish all the employés under that chieftain would follow his example by giving us their countenance; then we might be able to make a pull, a strong pull, a pull alltogether. The last festival we had, Mr. McDonald said the time would soon come when all druggists would close at eight o'clock; that has now almost been accomplished, a very few keep open after that hour. Before I sit down, allow me to say that two prizes will be presented this evening to two members of Mr. Currie's class.

At the close of the meeting the President presented to Mr. Wm. Cleghorn, Bentley's 'Manual of Botany,' for excelling in exercises on B.P.; and to Mr. Rob. Wallace Squire's 'Companion to the British Pharmacopœia,' for excelling in exercises in Latin.

The concert was effectively carried out by a lady (professional) and several gentlemen (amateurs); the latter, with one exception, being chemists.

An assembly followed the concert.

The fifth general meeting of the Glasgow Chemists and Druggists' Association was held in Anderson's University on 5th March, 1873.

Owing to the absence of the President (through illness) and Vice-President, Mr. Arch. Paterson was called to the chair.

The Secretary was then called upon to read the minutes of last meeting, also minutes of meeting held on 19th February, for the purpose of forming an assistants' branch of the association. He afterwards read a brief report of the "Annual Festival," held on 27th February, 1873, and stated that a full statement of income and expenditure had not yet been made out, but he felt warranted in saying that there appeared every probability of a fair surplus being left after paying all expenses.

A vote of thanks was then accorded to the committee for their labours in connection with the festival.

Mr. James M. Fairlie read a paper on "Artificial Silicates," in which he gave an interesting account of the history and manufacture of glass. In passing he briefly alluded to the process of etching upon glass, and said he thought that the names on pharmacists' bottles and drawers might be etched instead of painted as at present, which, although likely to cost more at first, would in the end be found to be the more economical method.

On Mr. Fairlie resuming his seat, a little discussion on the paper, by Messrs. Brodie, Fenwick and Paterson, took place.

Mr. Fairlie was awarded a cordial vote of thanks for his paper.

Mr. Cassels was then elected a member.

A vote of thanks to the chairman brought the meeting to a close.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION AND SCHOOL OF PHARMACY.

The last ordinary monthly meeting of the session was held in the rooms of the association, 37, Blackfriars Street, on Friday evening, March 7th; Mr. W. Scott Brown, president, in the chair.

Mr. F. B. Benger delivered a lecture on "Telegraphs," treating the subject under the following heads:—

Early Modes of Transmitting Intelligence—Static or Frictional Electricity—Various more or less unsuccessful Attempts to use it as a means of Communication—Current or Voltaic Electricity—Batteries—Conductors—Three effects produced by the Electrical Current taken advantage of in instruments now used:—1. Its power to decompose chemical salts. 2. To deflect the magnetic needle. 3. To convert a bar of soft iron into a temporary magnet. These effects were shown, and working models of the following instruments used to illustrate the subject:—Bain's chemical telegraph; single needle do. mirror or reflecting do.; alphabetical do.; type printing, do. Electrical fire- frost- and thief-alarms were also shown in action and their construction explained.

The Chairman announced that it was the intention of the association to make considerable additions to the museum, and urged those present to use their influence to obtain new members, as it was the desire of the association to remain entirely self-supporting.

It was also stated that the examination for prizes in the chemistry class would be held on the following Thursday evening, at eight o'clock, and that in the materia medica and botany classes on Thursday, March 20th, at the same hour.

MANCHESTER CHEMISTS' ASSISTANTS' ASSOCIATION.

The tenth ordinary meeting of the session was held on Monday evening, March 10th, in the class room, 37, Blackfriars Street.

Mr. Broughton read a very instructive paper on "Spectrum Analysis," illustrated with numerous experiments, diagrams, etc.

A hearty vote of thanks was awarded to Messrs. J. Woolley, Sons and Co., for their kindness in providing the apparatus used on the reading of Mr. Broughton's paper, also in replenishing about fifty new specimens for the materia medica cabinet.

Proceedings of Scientific Societies.

PHILADELPHIA COLLEGE OF PHARMACY.

At a pharmaceutical meeting, held January 21st, 1873, William McIntyre in the chair, Mr. Remington presented samples of some of the fluid extracts made according to the new U.S. Pharmacopœia. He said that he had found in several cases that the quantity of menstruum reserved for moistening the powder was insufficient for this purpose. The extract of rhubarb left nothing to be desired, having the characteristic features of the root. Buchu was also of very superior quality. Calumba, so very difficult to obtain clear, was spoken of as being almost always cloudy when diluted. Professor Maisch suggested that the precipitate contains a considerable amount of berberina, and that the glycerine recommended in this fluid extract tends to prevent the precipitation.

In the case of colchicum seed, Mr. Remington did not think the menstruum strong enough to dissolve the essential oil which floats upon the preparation, and prefers the use of strong alcohol to take up the oil.

As a class the preparations containing alcohol without glycerine were considered beautiful preparations and representing fully the medical properties of the drugs used.

The preparation of ergot was exhibited, and presented the characteristics fully, having the odour of the fresh ergot. Mr. Remington's experiments with ipecac were not successful; there remained a considerable amount of undissolved resin which glycerine will not dissolve; the alcohol seems too weak to dissolve the resin, and the finished preparation contains one half glycerine. Professor Maisch had four or five samples perfectly clear, made substantially by the officinal process. These were made by himself, the heat carefully regulated, not above 140°; the powder should not be finer than 60. In this preparation the temperature is of great importance.

Mr. Remington said that the ipecac used by him was the strongest he had ever seen. The fluid extract of wild cherry was next discussed, as being made so entirely different from the process directed in the last U.S. Pharmacopœia, being percolated with water and stronger alcohol.

Professor Maisch made some general remarks about the fluid extracts in the U.S. Pharmacopœia, stating that the Committee endeavoured to make these formulæ as simple as possible, that they might be understood by the student and those of little experience in the business. The processes were general ones, and were found to meet the requirements of the profession, based on the experience of those best acquainted with the subject. After moistening the drug with the amount of menstruum directed and adding the remainder, the soluble portion of the drug would be dissolved in a very concentrated form after the required time for maceration, and could then be driven out by the addition of an additional quantity of liquid. The fluid extract of wild cherry was in nowise intended to take the place of the syrup.

Mr. Remington recommended particularly keeping the percolator closely covered, otherwise during the four days' maceration fissures would be formed in the drug, and the extract be an imperfect one.

Mr. Boring exhibited samples of cinnamon and cassia water, made from the oils by distillation, and by the ordinary process of dissolving the oil by the aid of carbonate of magnesia. The water prepared from Ceylon cinnamon by distillation seemed to be the most fragrant and most characteristic.

Professor Maisch exhibited a sample of what was offered as cultivated dandelion root, which upon examination, proved to be chicory.

Mr. A. P. Brown, of Camden, N.J., gave a formula, as follows, for preparing Goulard's cerate:—

Benzoated lard	℥ viiiss.
Yellow wax	℥ iiiss.
Solution of subacetate lead	f℥ iiss.
Camphor	℥ ss.

Melt the wax and lard in a water-bath, add the solution of subacetate of lead gradually, digest for fifteen minutes, stirring it constantly, remove the mixture from the bath, stir it till cool; lastly add the camphor. This preparation keeps for months, retaining its properties.

Professor Maisch read a paper upon spiritus æther. nit. as a supposed test for some of the alkaloids, which was ordered for publication.

Professor Maisch exhibited several varieties of fig plants grown in the neighbourhood of Norfolk, Va., which embraced the white, brown, black and celestial fig. It is not known whether figs may be profitably raised in the Southern States on a large scale.

Several varieties of rhubarb were presented, and it was stated that in all varieties raised in Europe the red medullary rays ran from centre to circumference, while in the true rhubarb the rays are dispersed irregularly over the fractured surface. A specimen of true Russian root was exhibited, which came directly from St. Petersburg about three years ago.

The Professor also exhibited models for the illustration of botany. These were manufactured by R. Brendel, Breslau, Germany, and were beautiful in appearance, resembling as near as possible in colour the natural objects. The models are made large enough to be seen by a class of students, and by coming apart exhibit the internal arrangements of portions of the plants, and the process of germination in the mono- and dicotyledonous plants. A section of rye was shown, and the manner of growth explained. A beautiful flax-plant was shown, showing the structure of the flower, with the stamens and pistils distinctly visible; also models of various fruits, showing the seeds attached, and displaying the embryo. These specimens were made of materials of various kinds most resembling the parts of the plant.

CHEMICAL SOCIETY.

Thursday, 6th March, 1873; Dr. Gladstone, F.R.S., Vice-President, in the chair.

After the minutes of the previous meeting had been read and the other ordinary business of the society transacted, the following communications were read:—"On the action of Hydrochloric Acid on Codeine," by Dr. C. R. A. Wright, being a continuation in the codeine series of the author's former researches on morphine. 2. "On new processes for Mercury estimation, with some observations on Mercury Salts," by J. B. Hannay. 3. "On a method of estimating Nitric Acid," by T. E. Thorpe, F.R.S.E., the process depending on the ease with which nitric acid is converted into ammonia by the copper-zinc couple of Messrs. Gladstone and Tribe. 4. "Note on a reaction of the Acetates upon Lead Salts, with remarks on the solubility of Lead Chloride," by F. Field, F.R.S. 5. "Observations on the nature of the black deposit in the Copper-zinc Couple," by J. H. Gladstone, F.R.S., and A. Tribe, F.C.S. 6. On "An air-bath of constant temperature between 100° and 200° C.," by Dr. H. Sprengel. This consists of a bath similar to the ordinary chemical hot water oven, but made of sheet lead, and filled with dilute sulphuric acid of such a strength as to boil at the desired temperature.

The meeting was finally adjourned until Thursday, 20th March, when a lecture "On Iron and Steel" will be delivered by C. W. Siemens, Esq., F.R.S., etc.

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

The Juries Bill.

On Monday, March 10, the consideration in committee of the Juries Bill was again postponed until Friday, March 14.

Colonel Barttelot has given notice that he will propose to insert the words, "also members of the Royal College of Veterinary Surgeons actually in practice," in the paragraph relating to "exemptions." (See before, p. 673.)

The Metric System.

On Wednesday, March 5, Mr. J. B. Smith moved for leave to bring in a Weights and Measures (Metric System) Bill, "to establish the metric system of weights and measures after a fixed period." Leave was granted, and the Bill was brought in and read a first time the same evening. Mr. Stevenson has given notice that on the motion for the second reading, which is set down for Tuesday, April 1, he will move an amendment that it be read that day six months.

Registration of Firms Bill.

This Bill, which bears the names of Mr. Norwood, Mr. Charles Turner, Mr. Whitwell, and Mr. Barnett, was brought in and read a first time on the 13th February. In the preamble it states that "it is expedient that the real constitution of all private firms carrying on any trade or profession should be known," and this object it proposes to accomplish in the following manner:—

Clauses 1 and 2 refer to the title of the Bill and the time when it should come in force. Clause 3 deals with the interpretation of terms. It defines that "partnership" shall mean two or more persons lawfully associated for the purpose of carrying on any trade or profession, and not incorporated by or in pursuance of any Act of Parliament or by Royal Charter; and "firm" shall mean any person singly or any partnership who shall adopt for the purpose and in the course of carrying on any trade or profession as the name, title, or designation by which such person or partnership shall be known or designated any name, title, or designation other than or in addition to the full name by which such person is ordinarily known and designated, or the full names of all the persons forming such partnership.

Clause 4 provides that every "firm" which at the commencement of this Act shall carry on business in the United Kingdom shall, within one calendar month from the commencement of this Act, and every firm thereafter commencing to carry on business shall, within one calendar month from the time of commencing such business, transmit by post or deliver to the registrar appointed, a statement containing the following particulars:—The name of the firm; the nature of the business carried on; the part of the United Kingdom in which the registered office of the firm is intended to be situated; the full name, usual residence, and other occupation, if any, of the person or persons constituting the firm.

According to clauses 5 and 6 every registered firm is to have a registered office which shall be the chief or a principal place of business of such firm under a penalty, and notice of the situation of such registered office, and of any change therein, must be given to the registrar, and recorded by him.

Clause 7 provides that a firm removing its registered office to another part of the United Kingdom must re-register.

By clause 8 a registered firm which shall use or adopt, in relation to or in course or for the purpose of the business of the firm, any fictitious name or style other than the registered name of the firm, shall incur a penalty not exceeding *fifty pounds* for every occasion on which such fictitious name is so used or adopted; provided that nothing in this Act contained shall prevent any registered firm from transacting business in the name of the person, or of one or more of the persons constituting the firm.

Clauses 9 and 10 provide that every change in the constitution of any registered firm shall be notified to the registrar within one calendar month after such change; and that any registered firm changing its name, title, or designation, shall be registered under its new name in all respects as if it were a new firm.

By the succeeding clauses penalties are imposed upon persons making false declarations or omitting to comply with the requirements of the Bill, but a discretionary power is given to the Registrar in cases where it has not been possible to register within the time prescribed. A register is to be kept, to be open to inspection for a small fee, and certified extracts from this register are to be *primâ facie* evidence in a court of justice. The Bill also proposes that the registrar and assistant registrar of joint-stock companies shall be the registrar and assistant registrar under its provisions.

The West Auckland Poisoning Case.

At the Durham Spring Assizes Mary Cotton has been put on trial charged with the wilful murder, by poisoning with arsenic of her stepson, aged eight years, under circumstances which have now for some time been before the public. The following are the chief points of the evidence having medical and chemical interest.

Mr. Kilburn, a surgeon, who had attended the child, and certified that it died from gastric fever, said that not being quite satisfied in his own mind, he experimented on some of the contents of the stomach, found traces of arsenic, and gave information to the police. In consequence, the body was exhumed, and parts of the viscera and contents of the stomach were sent to Mr. Scattergood, surgeon and analytical chemist, of Leeds.

He had prescribed morphia, prussic acid, and bismuth to the child. The child had had fits and convulsions before it died, and morphia had been known to produce convulsions, but not, it was said, when it was administered in the doses which he prescribed. Prussic acid was a dangerous poison, but not taken in the doses he prescribed; and bismuth was an irritant poison which, taken in large doses, might inflame the stomach and bowels, but he had only prescribed it in small quantities. He had sent 12 doses to the child. The preparations of bismuth, the trisnitrate, and sub-carbonate, were frequently impure and contaminated with arsenic, but only in minute quantities. He kept his poisons on a nest of five or six shelves. Arsenic was on the second shelf in a bottle, about No. 5; prussic acid was in a bottle next or next but one to it, about No. 6, and the sub-carbonate of bismuth was in a bottle at the other side, about No. 2 or 3. His assistant, Mr. Chalmers, proved that he made up the preparation for the deceased. There was a liquid preparation of bismuth at the other side of the shop, which he believed he used. Mr. Kilburn was the parish doctor, and at two o'clock on the day when he made up the prescription there were half-a-dozen people in the surgery waiting for their medicines, and he spoke to them and asked them what they came for, as he was making up his prescriptions. It was proved by a charwoman that about six weeks before the death of the child, she was sent by the prisoner to a chemist's for two-pennyworth of soft soap and arsenic, which were supplied to her mixed together. The chemist proved that he put in the soft soap from four to six drams of arsenic and mixed them. This mixture the charwoman rubbed into the joints and crevices of an iron bedstead to kill bugs, and also twice rubbed it over and between the iron cross-belts under the bed. A 4-in. mattress was placed on this, and was sometimes turned, to prevent its wearing all on one side against the iron cross-bars. Some of the soap was also used for the skirting-boards and near the fire-place on the floor. Nearly all was used, and the remainder was placed in a small jar in a lumber-room. On a search being made at the house this jar was not found, and nothing containing arsenic. The paper of the room had a bright green fluffy flower on a stone-coloured ground. Mr. Kilburn stated he was aware that chronic poisoning by arsenic had been caused by the use of arsenical or green papers to walls. He did not think that the fumes of arsenic could arise from the arsenic used in the room, as fumes were only thrown off at a high temperature, about 280 degrees.

Mr. Scattergood proved having received the jars containing the viscera and the contents of the stomach, and also some articles found in the house of the prisoner. None of these latter contained poison of any kind. He found traces of arsenic in the contents of the stomach, in the substance of the stomach, in the contents of the bowels, and in the substance of the bowels, in the liver, and in the kidneys—none in the spleen. He estimated the total quantity at 2·60 grains. In his judgment on these facts he thought repeated doses of arsenic had been administered, and that arsenic had been given shortly before death, because it was found in the stomach. Two or three grains were sufficient to cause death, and half that quantity for a child. In his judgment the deceased had died from poisoning by arsenic.

In the course of his cross-examination in the case, Mr. Scattergood admitted that soft soap and arsenic would dry from exposure to air, that a heated room would assist to dry it, and that a mattress on any portion of it would absorb moisture from the soap. If dry the attrition of the cross-bars of the bed over one another from getting in and out of bed would be likely to cast dry particles on the floor. If nearly all the soft soap and arsenic had been used by Mrs. Dodds on the bedstead, about 300 grains of arsenic must be there. This, by trampling on the floor and on the carpet, might be raised as dust floating in the air, and, like Scheele's green wall-papers, might cause irritation and dryness in the throat and eyes, and, by means of the lungs, become absorbed into the system, but could not get into the contents of the stomach. No doubt the quantity of arsenic was much greater than could be rubbed off any wall-paper.

In his speech for the defence, Mr. Campbell Forster urged among other things the quantity of arsenically poisoned dust there would be floating about the room arising from the attrition of the large quantity of arsenic and soap put upon the bedstead. Every time the child ran about the room, played with his toys, or jumped into bed a cloud of these poisonous atoms must have arisen and been inhaled by him, as proved to be, a delicate, susceptible boy. These atoms, inhaled into the lungs, would enter the circulation of the blood, and every part of the substance of the viscera would become tainted by arsenical poisoning. Much of that inhaled would adhere to the tongue and moist parts of the mouth and the throat, and be swallowed with the saliva into the stomach, and after five days and nights, while ill in bed, of such constant influences, was it surprising that as much as 26 grains of arsenic had been found in the child's stomach after death? The child might accidentally have drunk water or milk from the poisonous jug, and thus have become poisoned. It was also proved that when ill a prescription had been made up for him by Dr. Kilburn, and also by Mr. Chalmers's assistant, consisting of bismuth and prussic acid, and these poisons were on the same shelf with the arsenic bottle, and closely adjacent, and it was possible that some unfortunate mistake had been made in the bottle and that this arsenic might have been administered as medicine.

The jury returned a verdict of guilty and the prisoner was sentenced to death.

Reviews.

The Useful Plants of India: with Notices of their Chief Value in Commerce, Medicine, and the Arts. By Col. Heber Drury. Second edition; with additions and corrections. London: W. H. Allen and Co. 1873.

Nearly fifteen years having elapsed since the publication of the first edition of this useful book, much has, during that time, been added to our knowledge of the vegetable wealth of our Indian possessions. The attention of the local governments has been called to the subject, and much has been and is being done, not only in preserving the forests, which are of great value in both a climatological and an economical point of view, but also in introducing foreign trees and herbaceous plants suited to the climate. The prodigious fecundity of the country may be inferred from the fact that we have in this volume an enumeration of 600 trees, shrubs, and herbs possessed of more or less useful properties. They are arranged in alphabetical order, the natural order of each species being given, followed by its English and native names; then a sufficiently full description, with reference to previously published diagnoses and plates; and, finally, an account of its medical and economic uses. In the case of the more important species, native or introduced, these latter items are given at considerable length. Among officinal plants omitted in the first, but included in the second edition, the culture of which is rapidly increasing in commercial importance, may be mentioned the cinchona, tea, cacao, tobacco, and the Australian eucalyptus. We do not however, find any reference to the introduction and cultivation in India of the ipecacuanha, which seems likely to rival even that of cinchona in importance. An illustration of the amount of useful information contained in the book is afforded by Col. Drury's account of the different kinds of Indian ebony. Under the head of "Diospyros melanoxylon," he says, "The bark is astringent, and, reduced to an impalpable powder, is applied to ulcerations, and, mixed with black pepper, is administered in dysentery. The true ebony of commerce is obtained from the *D. ebenum* (Linn.), a native of Ceylon; but in fact other species scarcely differing from one another yield this timber. This species yields a fine kind of ebony; it is only the centre of the larger trees that is black and valuable, and the older the trees the better the quality. The outside wood is white and spongy, which, decaying or destroyed by insects, displays the central ebony. Sir E. Tennent has some valuable remarks upon the different species of ebony growing in Ceylon. The true ebony, *D. ebenum*, grows in great abundance throughout all the flat country west of Trincomalee. It is a different species from the ebony of the Mauritius, *D. reticulata*, and excels it and all others in the evenness and intensity of its colour. There is another cabinet-wood of extreme beauty, the *D. ebenaster*, in which the prevailing black is stained with stripes of rich brown, approaching to yellow and pink. The most valuable cabinet-wood of the island, resembling rosewood, but much surpassing it in beauty and durability, and which has at all times been in the greatest repute in Ceylon, is the *D. hirsuta*. The *D. montana* (Roxb.) is a timber variegated with dark and white veins; it is very hard and durable. The *D. tomentosa* (Roxb.) is a native of the northern parts of Bengal; the wood is black, hard, and heavy. Roxburgh compares this latter tree to a cypress, from its tall and elegant form. The leaves all fall off in the cold season. The *D. calycina* (Bedd.) has been found in the Tinnevelly district and southern provinces of Madura, being very abundant up to 3000 feet of elevation. It is called in those districts 'Vellay Toveray,' and yields a valuable light-coloured wood much used in those parts." The appendices to the volume embrace reports on the culture of the bamboo, cinchona, indigo, and other vegetable products, a table of exports and their value, and index of Hindostanee, Bengalee, Tamil, Teloogoo, and Malayalim synonyms. The volume is altogether indispensable to any one interested in the natural history of our vast Indian Empire.

Change of Air and Scene: A Physician's Hints, with Notes of Excursions for Health amongst the Watering-places of the Pyrenees, France, Switzerland, Corsica, and the Mediterranean. By Alphonse Donné, M.D., Rector of the Academy of Montpellier. London: Henry S. King. 1872.

"Running to and fro upon the earth" has increased our knowledge in many ways, but in none more than in the therapeutic virtues of climate and mineral waters. Medical climatology, since the publication some thirty-five years ago of Sir James Clark's well-known work, has become a branch of professional literature, and not a year elapses without the accession to it of one or more volumes.

Dr. Alphonse Donné's treatise is one of the most acceptable of these. Himself an accomplished teacher and practitioner of the physician's art, he has had experience, in his own person as well as in that of his patients, of the curative virtues of the health-resorts of south-western Europe. He can determine with accuracy the mean temperature of the climate as well as the chemical properties of the waters characteristic of those places. He can indicate with skill the peculiar types of malady in which a particular health-resort may prove efficacious; while he can also suggest to the patient the resources available to him for that moral and intellectual recreation which in so many cases is found to be the main element of cure.

His work has a high reputation in France not only for its scientific and professional merits, but for its charm of style, and much credit is due to its English translator for having preserved the latter while faithfully reflecting the former. An introduction supplies the reader with useful hints as to the kind of cases in which benefit may be derived from change of climate and scene; after which comes a lucid exposition of the "hygiene of the seasons" and the best resorts for the maladies peculiar to winter, spring, summer and autumn. Next follows a series of "Excursions and Travels in Quest of Health," in which the practical mind of the author shows itself in the shrewdness of his recommendations, down even to the details of hotel-life and itinerary disbursements. As a specimen of the completeness with which he inspires the health-seeking invalid with all the requisite information, we may cite his chapter on the winter excursions in the mountains of Lozère and the Haute-Loire, which will have a special interest at present when the *Times* and other lay journals are filled with controversial correspondence as to the conflicting claims of "winter sanitaria."

The section on mineral waters constitutes the bulk, as it is certainly the most important part of the book. Dr. Donné takes us through the Pyrenees, through Provence and Dauphiné, through Corsica, Savoy, France and Switzerland, and describes their peculiar virtues and the cases in which they have proved beneficial. Comprehensive and minutely detailed as it is, this section does not pretend to be exhaustive, omitting as it does nearly all reference to the German and particularly to the Austrian watering-places. Such a charming resort as Soolbad Aussee, on the river Traun, for example, it does not even allude to. Is is, as we have said, almost entirely confined to the Latin countries, and even of these the preference is given to France.

Some excellent remarks on special points of hygiène, as that of the lungs, of the teeth, of the stomach, of the eyes, and of the nervous system, will be found at the conclusion of the volume. They combine very happily scientific insight with popular exposition. The reader will also admire the fairness with which Dr. Donné gives the arguments for and against what Dr. T. K. Chambers terms "that ill-assorted union of medicine and innkeeping called hydropathy."

Obituary.

At Liverpool, on the 1st March, 1873, Mr. Edwin Barnes, of Durham. Mr. Barnes studied in the School of Pharmacy, Bloomsbury Square, in 1859, and was honourably distinguished in the Professors' Examinations. In 1860 he passed the Major examination, and was elected a member of the Society in 1870. He lived at Alton, Edinburgh, and Liverpool, and will be remembered by his numerous friends as a man of genial manners and varied attainments. As a student he was enthusiastic, and he carried the same heartiness and thoroughness into all that he afterwards undertook. His death, which was from pneumonia, will be regretted by many readers of these lines.

Notice has also been received of the death of the following:—

On the 7th December, 1872, Mr. Robert Errington, Chemist and Druggist, of Bradford, Yorkshire.

On the 5th February, suddenly, Mr. Robert Procter, Chemist and Druggist, of Castle Gate, Newark.

Correspondence.

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

The Sale of Poisons.

Sir,—After reading the editorial remarks upon the above subject in last week's Journal, I scarcely think it necessary for me to say much in reply to Mr. Tibbs. The sale of "Vermin Killers" is a very troublesome question, and I am sure all will agree with me that the sooner chemists and druggists generally come to some understanding in the matter the better. I am afraid Mr. Tibbs would find his theory, that "Vermin Killers" containing arsenic or strychnine are not preparations of these substances, of little use to him in a court of justice. I hold, that it is the duty of every chemist when he sells a "Vermin Killer," knowing it to contain arsenic or strychnine, to register it in the same way as he would any other preparation of those substances. I think, Sir, Mr. Tibbs has not studied the law with sufficient care, for if he will carefully read over the Pharmacy Act, 1868, and the list of additions to the schedule published in 1869, he will find that he need have no fear he is doing wrong when he sells "lotions" containing cantharides or corrosive sublimate, or "cough remedies" containing tartar emetic, without registration, for he will see that preparations of the above substances, are not named in the first, and only those of cantharides and corrosive sublimate in the second part of the schedule.

Archibald Kitchin.

Whitehaven, March 11th, 1873.

The Examinations.

Sir,—There appearing to be considerable interest shown in regard to the examinations, perhaps you will allow me, as one who has passed all at no very distant date, to say a few words.

I will begin, Sir, with the "Preliminary." Most, I think, will admit that at present this examination is not so hard but that a boy leaving school should be able to pass it without difficulty, providing that Latin was one of the subjects he has been taught there, and that he has taken (and had taken with him) moderate pains to accomplish the object for which he had been sent; but I am certainly of opinion that it ought either to be held entirely in London, or it should be totally separated from the Society and placed under some independent examining board; for not only is the present system liable to abuse, but, to my knowledge, it has been abused and not carried out in the manner intended and ordered by the Council of the Society.

Secondly, the "Minor." I would remind and encourage those who are preparing for this, that a little *method, perseverance* and *industry* are all that is required not only to pass it, but to pass it with honours. It is essentially a practical examination, which an apprentice, having completed his term, should be able to pass. The examiners will be found to give every allowance to those who are at all nervous; for I doubt not that their experience enables them easily to distinguish those who are competent but lack self-reliance, from those who are incompetent and those who show but artificial cramming.

Thirdly, the "Major." Of this I will only say, that those who have passed the two previous examinations have only to continue in the course they have hitherto pursued, and they will find that this one only requires the three requisites already recommended for the "Minor;" and when they have "done it," they will acknowledge that the pleasure of attaining the object is well worth the labour and trouble bestowed on it.

I can from experience assure all who try and wish to succeed that success will undoubtedly attend them if they give their attention to what they profess to be studying, remembering that "Diligence in execution is the mistress of success."

York. W. M. Thompson.

Pharmaceutical Women.

Sir,—I take up my pen in the hope of clearing this subject from some of the fogs which have been thrown around it. The question lately discussed by the Council of the Pharmaceutical Society was not whether women should be allowed to become registered chemists or pharmacists, but whether they should be admitted as members of the Pharmaceutical Society—a body in which, through its Council, are vested certain legislative powers; and the Council has stepped in and wisely refused such an innovation.

Now, at the risk of being called a "benighted obstructive" by your Plymouth correspondent (Mr. Balkwill), I would maintain that it is not desirable to lift woman out of that sphere which she is well qualified to fill as the help-meet of man, and place her in the unlovely position of his rival. I would even question the propriety of admitting her in common with male students into the lecture theatre, as I think the indiscriminate intermixture of the sexes at that age without proper female supervision is fraught with serious moral and social evils. Mr. Balkwill admits that the cases of girls requiring pharmaceutical education would be comparatively few;—might they not be met by the appointment by the Society of a competent lady teacher?

It is surely unnecessary to drag in the names of such men as William Allen and Jacob Bell into such a discussion as this; but as Mr. Balkwill has drawn certain inferences from the fact of their being members of the Society of Friends, I would remind him that that body, whilst recognizing many of woman's gifts, which have been largely ignored by former generations, still studiously denies her any legislative power in the body.

I venture boldly to dispute the correctness of the statement that we are behind the other learned bodies in not granting degrees to women; for whereas a lady of my acquaintance has passed the examination of the University of Cambridge with mathematical honours, but is denied her degree of Bachelor of Arts (possibly from the incompatibility of the title with the sex), there is nothing to prevent any lady with the necessary ability from taking our highest academic degree (such as it is), and announcing herself as "Pharmacist with honours."

I trust that these remarks may tend to place the question of admitting women as members of the Society on its proper footing.

Chas. Fryer.

Scarborough, March 10th, 1873.

Sir,—In your issue of the 22nd February I notice a letter signed "Pharm. Brit." on the subject "Pharmaceutical Women."

Now, Sir, although it might be pertinent to argue that in such a case the sex has a fair title to be considered "persons within the meaning," etc., and that they are the more acceptable sex of advisers in most of the simple cases which come before the druggist, I feel disposed to ask "Pharm. Brit." only for a little stretching of his imagination, which I trust may console him for his fancied "loss of cash."

Let him then picture himself enjoying his future "on his own account," avenging his past in the present, by receiving service from *one* entirely confidential and trustworthy, wholly devoted to his interests, and of qualifications equal to his own; and all this at the cost of not even a low salary for mere "*pin money!*" May he attain it!

Deva.

Mr. Hugh M. Williams writes to say that he would admit the ladies by all means, and that he thinks they would be as harmless to the trade as they used to be prior to the compulsory examination.

Apprentices and Members.

Sir,—I send you a few "notions" from the country upon two matters which are now receiving attention. Imprimis—the apprentice.

This distressing complaint shows a variety of remarkable phases, phases which change as rapidly as those of the moon, and from the extreme absurdity they at times exhibit they might be supposed to be influenced by the lunar body. A short time ago the malady was at its height in representing the poor fellow as being dreadfully imposed upon and compelled to submit to scandalous indignities, even to soiling his fingers by handling a duster. Now we have the other extreme, that the master in the form of a local secretary (in condonation of former cruelties?) is unlawfully assisting or by his absence tacitly acquiescing in the future apprentice illegally passing the Preliminary examination. Were this latter charge a myth, members of the Council would not have spoken so pointedly of it. But Mr. Whitfield, in the intensity of his indignation, boldly puts his heart outside his waistcoat to be pecked at, and invites his *confrères* to follow his example. As a local secretary, I politely decline his invitation, because I, in common with the "insulting" members of the Council, not only believe the statements to be true, but that the facts were stated in much milder terms than the abuses merited. And I also wholly disapprove of the Preliminary examination as at present conducted. Following the example of the College of Surgeons, I should prefer seeing this examination placed under the management of the College of Preceptors. I can see no hardship in adopting this plan, for the fact of going to one of the "centres" where the college holds the examinations, would not prevent a parent or guardian allowing a youth to enter the trade. Moreover, the trifling expenses connected with the journey are scarcely worth notice, and those connected with the Minor or Major examinations might as reasonably be objected to. But would there not be substantial satisfaction to the neophyte in presenting himself before a properly constituted examining body and finding the examination fairly conducted? Would he not conceive a greater respect for the trade and its examinations than the present slovenly system suggests? And would he not also learn that such unworthy aids as "cribs" and "crams" would be of no avail, whilst industry, coupled with straightforward, honest conduct, could not pass unrewarded among a body of examiners who gave to all "a fair field and no favour?" If the Preliminary examination be necessary, as much care should be bestowed over it as over the two subsequent ones.

2nd. The relative positions of chemists and druggists and of members of the Pharmaceutical Society:—

We have read much in the pages of this Journal upon the subjects of "pharmaceutical titles" and of "outsiders." I can only see one satisfactory solution of the difficulty in arranging the former titles, and that is by entirely abolishing the latter class. We members who have passed our examinations must not approach this subject with narrowed views, but endeavour by a bold and generous policy to at once snuff out all these petty misunderstandings and jealousies respecting trade status. Previous to the passing of the Pharmacy Act of 1868, the Pharmaceutical Society governed those only within their fold. Now that they have the sole management of the drug trade throughout Great Britain, they ought to be assisted in that responsibility by every chemist and druggist in the country. Therefore, I would suggest that we should make, not permit to be made, every druggist in Great Britain a member of the Pharmaceutical Society. This membership should be a *sine quâ non* to his being in business. There should be an annual sum payable, which should include registration and membership and also the weekly receipt of the Journal. The annual payment would not be a heavy one, and when accustomed to, would be looked upon as a protection to the trade as much as the payment of licences for other matters. The duties of compiling the Register would be materially lightened, and absolute accuracy might be attained in its compilation if in the keeping open shop it should be made necessary to pay such registration fee before a given day in each year. The circulation of the Journal throughout the whole of the trade would also create a greater interest in the higher branches of pharmacy amongst those who more need that taste encouraging. And the knowledge that we were not only under one pharmaceutical government, but that each and all of us had a voice in the formation of such government would conduce to healthier legislation upon purely trade matters, and lead to the speedy abandonment of sentimental grievances. Being all "Members of the Pharmaceutical Society," the title of "Pharmaceutical Chemist," would remain unchanged, while such pretentious designations as "Fellow," "Licentiate," etc., would be unneeded.

Following the rule observed at our trade gathering, I imagine, though with the greatest respect for the fair sex, that "success to pharmacy" is at our meeting entitled to the precedence of "the ladies." Hence I suggest these subjects, which I consider calculated to advance our improvement and success, as more suitable for ventilation at our ensuing annual meeting than the wasting of the time of the members upon the question of admission of female students to the laboratory at Bloomsbury Square.

A Country Pharmaceutical Chemist.

PHARMACEUTICAL TITLES.

Sir,—Would you kindly insert the following in your widespread Journal.

Having read with great satisfaction the letter of your correspondent, Mr. L. V. Rees, in the Journal of March 1st, on the subject of pharmaceutical titles, we think that his proposal is a step in the right direction. Out of eight apprentices employed in the establishment to which we belong, there are at least five who are not intending to remain in the ranks of pharmacy. And what is the reason of this? They have all had a liberal education, and, finding that it would be as easy to pass the medical examinations as to attain to the Major qualifications of pharmacy, and, coupled with this, the great social difference between a pharmaceutical chemist and a medical man, they would rather expend a considerably larger sum of money, and a greater amount of time, so as to gain to themselves a higher position in society. The remedy for this, we think, will be partly found, if more acceptable titles were accorded to those who pass the examinations of the Pharmaceutical Society. Let us endorse the statements of Mr. Rees, that "an Associate is nothing more than the lowest grade of all scientific societies; therefore why not give this title to those who have passed the 'Preliminary?'"

If "Major" men were called "Fellows of the Pharmaceutical Society," it would be an inducement and stimulus to young men of position to strive to gain that qualification. And why not also let those who pass the "Minor" be called "Licentiates of the Pharmaceutical Society," seeing that they are LICENSED to practise pharmacy? We believe that if this suggestion were carried out, it would give general satisfaction to all connected with the profession,

At present there seems a great lack of young men willing to join and follow up the profession, but we think that were these titles recognised a different state of things would prevail.

TWO APPRENTICES.

Edinburgh, March 4th, 1873.

TINCTURA QUINIÆ.

Sir,—I cannot agree with Mr. Baldock that the official formula for Tinct. Quinine is "perfectly satisfactory." It is beyond dispute that tincture of quinine of the official spirituous strength will deposit copiously of crystallized quinine at such temperatures as are common in English winters; and this must be acknowledged to be objectionable. The inconvenience might, I think, be avoided by increasing the alcoholic strength to the proportion of three parts rectified spirit to one part water; but, although I have experimented in this way, amongst many others, with a view to improving the formula, I failed to make notes of the result in this respect.

I would take the opportunity of referring to another matter connected with quinine, viz., the great waste which characterizes the medicinal employment of cinchona products, a waste for which medical and pharmaceutical prejudice is to a great extent responsible. The demand for quinine appears to increase like the consumpton of coal; and like coal, there seems to have been some apprehension as to the duration of the supply. In the meantime, what becomes of the valuable medicinal alkaloids yielded by the cinchonas other than quinine? I ask the question, but am totally unable to give an answer. Messrs. Howards have recently issued a circular inviting attention to the merits and relative cheapness of cinchonidine, said to be little, if at all, inferior in medicinal efficacy to quinine, yet sold for about one-third its price! Why is it made a matter of conscience to separate this valuable alkaloid from quinine, and to exclude it from all official preparations? I have the strongest belief that a *mélange* of all the cinchona alkaloids would prove a more digestible and therefore a more efficacious tonic than any one of them stark-naked; and I should much like to see tincture of quinine, and, still more, quinine wine (which is admirably suited for a popular tonic) replaced by pharmacopœiai formulæ for tincture and wine containing all the cinchona alkaloids in a state of natural admixture.

Pursuing the same subject I may add that there seems to me room for addition and improvement in the galenical preparations of the bark itself. The only preparation worth naming is the liquid extract (the equivalent of the liquor cinchonæ introduced by Mr. Battley), but although this was a great advance upon any previous formula, it fails to furnish a complete epitome of cinchona bark, so that both in its galenical preparations and its chemical products, this most important medicine is but imperfectly utilized. The subject is worthy of the skilled investigation of Dr. Redwood, and if successfully worked out would prove a most valuable feature in the proposed supplement to the British Pharmacopœia.

RICHARD W. GILES.

Sir,—Referring to Mr. Mumbray's letter in the Journal of March 1, I think it is generally known by practical pharmacists that the addition of an acid even in considerable quantity does not give a satisfactory result.

Why not separate the undissolved quinine and make a solution with dilute sulphuric acid, precipitate with ammonia, wash the nearly pure quinia, and add it to the tincture in which it is readily soluble?

Greater liberties are often taken with Pharmacopœia processes to attain results of less importance.

WALTER WISE.

Sir,—In reply to the letter of Mr. Mumbray in last week's issue, respecting Tr. Quiniæ Co., I beg to say that I have at last succeeded in obtaining a tincture free from any deposit. I make it strictly P. B., using Howard's quinine, *no acid of any kind*, but taking care to make the tr. aurant. with rectified spirit 5 parts, and distilled water 3 parts. Then, after pressing and filtering, dissolving the quinine in it at a very gentle heat. I have some tr. quiniæ thus prepared still in a shop bottle, and it is at least ten months old, and has never thrown down any precipitate whatever.

R. T. CLARKE.

131, *Milton Road, Gravesend.*

"*An Associate.*"—We think it is sufficiently well established that the present mode of conducting the Preliminary examination is unsatisfactory, without particularizing further instances.

Y.—A formula for the preparation of Tinct. Prun Virginianæ was given on p. 477 of the first volume of the present series of the PHARMACEUTICAL JOURNAL.

"*Cornubia.*"—The best and most appropriate way of obtaining the object suggested would be through the College of Preceptors.

"*Inquirer.*"—We have no acquaintance with the practice of medicine, and therefore cannot give you the information for which you ask.

"*Mence.*"—Three molecules of iodine are taken because that is the proper proportion for the quantity of hydrate of potash. If you read the sentences preceding the equation you will there see described what change takes place.

"*Hanging Ditch.*"—See PHARM. JOURN., 2nd ser. vol. VIII. p. 467. The subject has been referred to in the present volume also, at p. 384.

J. Hickling.—The number of British insects is some 12,000 to 15,000, so you will easily understand that a manual of entomology such as Babington's or Hooker's is an impossibility. The only manuals in existence that we know of are Stephens' 'Manual of British Beetles,' which is now quite out of date, and Stainton's 'Manual of British Butterflies and Moths,' which is more modern and reliable. On the Lepidoptera there is also a popular book (illustrated with woodcuts) by Newman, and published by Tweedie in the Strand. Stainton is published by Van Vorst, and Stephens by Longmans. Maclachlan has published some monographic treatises on British Neuroptera in the 'Entomological Transactions,' and Smith has published descriptive catalogues of 'British Bees and British Fusorial Hymenoptera' in the series of British Museum catalogues. These, so far as we know, complete the set of systematic treatises on British Entomology. If our correspondent wants a general guide to entomology and can read German, he cannot do better than get the second volume of Carus, Peters and Gerstäcker's 'Handbuch der Zoologie;' but the number of foreign books on the subject is enormous.

"*Camphora.*" — The lotion would not be clear if the quantity of camphor ordered were used, probably the excess over and above what was dissolved was filtered out on the previous occasions; this would not be justifiable, but would make a more sightly preparation. A few drops of spirit should of course be used to powder it in the first instance before adding the borax.

COMMUNICATIONS, LETTERS, etc., have been received from, Messrs. J. Kirkup, A. W. Gerrard, J. Barker Smith, C Ford, H. Pocklington, E. A. Webb, W. Tearle, Mumbray. H. L., J. B. B.

AFRICAN AMMONIACUM.

BY DANIEL HANBURY, F.R.S.

The first writer to mention Ammoniacum is said to be Dioscorides,* who flourished in the first century, and who relates that the drug is the juice of a species of *Ferula* growing about Cyrene in Libya, and that it is produced near the temple of Ammon. Whether the drug received its designation from the deity or the deity from the drug, or whether both took their names from the Greek word Ἄμμος, *sand*, in allusion to the parched and sandy desert where both were found, were open questions in the time of Pliny. The story however of the Libyan origin of ammoniacum remained current for centuries among writers on materia medica, and considering that the drug was not unfrequently brought from Alexandria, it had about it nothing improbable.

Chardin, who passed many years in Persia (1666–1677), is probably one of the first to point out that ammoniacum is a production of that country.† He says that the Persians call the plant *Ouchag*, and that it grows in abundance on the southern confines of Parthia,—that is to say south of Ispahan, which is exactly where it has been found by many travellers in modern times.

Jackson, an English merchant who resided for sixteen years in Morocco and wrote an instructive account of that country,‡ described a sort of ammoniacum produced there by a giant fennel called in Arabic *Feshook*. This plant, he says, grows on most of the plains of the interior, but especially about El Araiche and M'Sharrah Rummellah. The gum exudes from the stem in consequence of the puncture of a beetle, and falling to the ground becomes contaminated with earth, for which reason it does not suit the London market; but it is used in all parts of the country for cataplasms and fumigations.

Lindley, from the examination of specimens sent to England from Tangier in 1839, determined the plant affording African ammoniacum to be the *Ferula Tingitana* of Linnæus.§

Notwithstanding the statement of Jackson that a kind of ammoniacum is a production of Morocco, it was difficult to believe that this Moroccan drug could be the *Ammoniacum* which the ancients, and especially Dioscorides, described as brought from Libya. Pereira‖ and Guibourt** having examined specimens of the gum sent to Lindley from Tangier, concurred in regarding it as a very different substance from Persian ammoniacum. The latter writer even maintained that Dioscorides had slipped into an error, and that his ammoniacum was probably none other than that of our own times.

It was also pointed out that the word *ammoniacum* was sometimes written *armoniacum*, which might well be a corruption of *armeniacum*, and point to Armenia or some country beyond as the source of the drug.

The works of a Persian writer†† recently made accessible have also proved that ammoniacum was a production of Persia as early as the tenth century.

* Lib. iii. c. 88.

† *Voyage du Chevalier Chardin en Perse*, nouvelle Édition par Langlès, Paris, III. (1811) 298.

‡ *Account of the Empire of Morocco*, Lond., 1809.

§ Pereira, *Elem. of Mat. Med.* II., part 2 (1853) 1715.

‖ Op. cit.

** *Hist. des drogues*, III. (1850) 226.

†† Abu Mansur Mowafik ben Ali, *Liber Fundamentorum Pharmacologiæ*, ed. Seligmann, 1833.

The appearance in London drug sales of a very impure kind of ammoniacum, differing notably from the worst variety of the Persian drug, attracted my attention so long ago as 1857; and I was interested in observing a much larger quantity of the same article in the year 1871. On this occasion 37 packages were offered for sale. I was unable to ascertain whence they had been shipped, but the former lot (1857) I found had been imported from Mogador.

The drug may be described as in large, compact, dark, heavy masses, formed of agglutinated tears of a gum-resin of hard, waxy consistence. The tears are opaque, white, and milk-like, or of a pale greenish yellow, or of a fawn colour, mixed with others of a dark blackish brown, which with earthy and vegetable impurities constitute a large proportion of the mass. The drug has a very weak odour not suggestive of ammoniacum, and a slightly acrid but very persistent taste.

Having recently had to investigate anew the history of ammoniacum, I was led to look into the various memoirs on the subject, and also to search for some information respecting the Morocco drug described by Jackson. In the latter inquiry I was fortunate enough to have the aid of Mr. Moryoseph, a drug merchant of London having connexions with Mogador, who not only at once supplied me with a sample of the African drug according exactly with that I had noticed in the brokers' salerooms, but also kindly wrote to Morocco for some of better quality, which proved to be less impure and to contain milky tears exactly like Persian ammoniacum.

I also enlisted the services of my friend Dr. Leared, who during a short visit to Morocco in the past autumn ascertained a few interesting particulars, which are to this effect:—

The plant is called *kelth*, and grows up rapidly after the first rains. Its gum is not much shipped to Europe, but a great deal of it is taken by pilgrims to Egypt and Mecca, where it is used as incense. Its chief shipping-port is Mazagan; a little is sent from Mogador but none from other ports. The "*Greatham Hall*," the vessel in which Dr. Leared embarked, took on board 25 serons of the gum at Mazagan for Gibraltar, where they were to be reshipped for Alexandria. The shippers call it *Fasoy*.

The facts I have narrated show that African ammoniacum is still an object of commerce, and that it is consumed not only in Morocco, but that it finds its way even to Egypt and Arabia. It can hardly be doubted that this traffic is very ancient. Nor is there, as it seems to me, any improbability in assuming that the ammoniacum which the ancients describe as brought from Libya (under which name the whole of Northern Africa westward of Egypt was included) is identical with that still collected in Morocco. That this Morocco drug resembles the Persian or ordinary kind, is evident from the fact that London drug brokers have classed it as *ammoniacum* in their catalogues,—and it is probable enough that the two drugs were confounded together at a very early period.

The Morocco gum-resin is used in fumigation: it is worthy of note that the ammoniacum spoken of by Celsus, Galen, Oribasius, Alexander Trallianus, Paulus Ægineta and Actuarius, that is to say by the Greek and Roman physicians who lived between the first and thirteenth centuries, is frequently described as *thymiama* or *suffimen*, *i. e.* an incense, or something used for fumigation.

CHEMICAL NOTES ON AFRICAN AMMONIACUM.

BY JOHN MOSS, F.C.S.,

Demonstrator in the Laboratory of the Pharmaceutical Society.

These notes are supplementary to the paper on African Ammoniacum by Mr. D. Hanbury, to whom I am indebted for the material on which the experiments were made.

African ammoniacum softens between the fingers more readily than the Persian drug, and retains its softness for some time. It also differs from the latter in that it does not become orange-coloured with solution of chlorinated lime. Gently heated with dilute nitric acid, African ammoniacum becomes bright yellow and spongy, and floats to the surface of the liquid. Strong nitric acid in the cold, acts upon it very slowly at first; but suddenly the action is intensified, the mass swells up, and dense ruddy fumes escape. What is left varies in colour from pale lemon yellow to pink, the depth of tint increasing with the duration of contact with the acid; it is soluble in nitric acid, but on diluting the solution, is reprecipitated; it is also soluble in spirit, and possesses great colorific power.

African ammoniacum does not contain sulphur. This was conclusively shown by experiments conducted as I shall describe in a note on Persian ammoniacum.

The sample employed in all the quantitative experiments detailed below, was obtained by simply powdering the crude drug in a mortar, sifting through muslin, and returning the coarser particles to be further reduced. In this way the whole piece with which the operation was commenced (about four ounces) was reduced to a uniform powder without ing.

Volatile oil and water:—When heated in the air-bath to 100° C., the ammoniacum softens, and, fusing, gives off whatever volatile oil and water it may contain. During the operation, its peculiar odour (quite distinct from that of Persian ammoniacum) is very evident. 1·751 gramme lost ·075 gramme.

Ash:—On igniting the drug in a platinum capsule the organic matter burns away very readily with a black voluminous smoke, and leaves a grey ash consisting chiefly of carbonate of calcium, lime, and sand, with oxide of iron, alumina, and a trace of sulphate of calcium. No indication of the presence of phosphate could be obtained from this ash, nor yet from the gum-resin after oxidation with fuming nitric acid. 3·697 grammes of the gum-resin gave ·498 gramme of ash.

Resin:—26·314 grammes were boiled with spirit containing 70 per cent. of alcohol, and the spirit was poured from the undissolved matter on to a tared filter warmed by a hot water jacket. This process was repeated two or three times with fresh portions of spirit, after which the whole was thrown upon the filter and washed with spirit until nothing more was removed. The spirituous solution having been received into a previously weighed dish, was evaporated on the water bath, and finally in the air bath at 100° C., till it ceased to lose weight. The residue weighed 17·83 grammes. This resin is of a reddish-brown colour, shining, and so soft as to be elastic, and to receive readily and retain for some time the impression of the nail. It breaks wi a wavy fracture, has no particular taste, and has, to a small degree, the peculiar odour of the crude drug. It melts at 38°·5 C., dissolves readily in solutions of the fixed alkalies, and in oil of vitriol, especially on the application of a very gentle heat, forming a red liquid which is decomposed by water, the mixture becoming opaque and pink—at a somewhat higher temperature the solution in oil of vitriol becomes black. The alcoholic solution reddens litmus.

Gum:—The matter insoluble in spirit was exhausted by repeated digestion with hot water in the filter. This was effected by slipping one end of a piece of india-rubber tubing over the tube of the funnel holding the filter, and supporting the free end of the tubing at a level above that of the liquid in the filter. After each digestion the liquid was transferred to a weighed porcelain dish by lowering the free end of the india-rubber tube. There was left on evaporation a dark brown, brittle, gummy residue, weighing 2·372 grammes. The gum has a faintly bitter taste; it burns almost without flame, leaving a white ash of carbonate of calcium. The aqueous solution is entirely precipitated by solution of subacetate of lead, but gives no precipitate with solution of the acetate; oxalate of ammonium gives a white precipitate of oxalate of calcium. When boiled with nitric acid diluted with half its bulk of water some oxalic acid is produced.

Non-volatile matter insoluble in water and spirit:—The material left on the filter after the removal of the gum was found to weigh 4·96 grammes. It consisted of red sand, chalk, fragments of straw, seeds, etc., held together in thick flakes by a substance of a gummy nature—very likely bassorin, for when one of these flakes was boiled with water it swelled a little, but did not fall to pieces for some time; when this occurred the liquid was somewhat thick and mucilaginous. The flakes gave a trace of oxalic acid when boiled with nitric acid as above.

The results obtained are represented in per-centages in the following table, side by side with which I have placed, for the sake of comparison, the result of an examination of Persian ammoniacum by Hagen:—

African Ammoniacum. (Moss.)		*Persian Ammoniacum.* (Hagen.)	
Resin	67·76	. . . .	68·6
Gum	9·014	. . . .	19·3
Water and Volatile Oil	4·29	Gluten	5·4
Bassorin and insoluble matter	18·85	Extractive	1·6
		Sand	2·3
		Volatile Oil and Water	2·8
	99·914		100·0

The ash left by African ammoniacum (13·47 per cent.) consists partly of lime etc. from the gum, and partly of insoluble earthy matter, and must be computed separately.

BORAX—ITS ACTION ON FERMENTS OF THE DIASTASE GROUP.

BY S. DARBY.

Being interested in the property ascribed to borax by M. Dumas in a paper presented by him to the French Academy, a translation from which in the *Comptes Rendus* appears in the PHARMACEUTICAL JOURNAL of January 18th, I was led partially to repeat the experiments; believing that such action, if existing, might be due to the alkalinity of the borax. On treating both bitter almonds and black mustard-seed with borax solution, I found the odour of the essential oil peculiar to each to be exhaled; but my experiments, though convincing me that M. Dumas was in some degree under an error, were not complete enough to warrant their publication. However, the February number of the *Journal de Pharmacie* gives a paper by M. Petit, read before the Paris Academy of Sciences, to which it would seem my crude experiments may be fairly and usefully appended. This paper has appeared in the PHARMACEUTICAL JOURNAL of March 15th.

M. Dumas states that the essential oil noticed on treating the black mustard with borax solution existed previously in the seed; this, however, is contrary to one's usual experience, as no odour whatever of the oil is perceptible when the freshly crushed seeds are treated with lime water. My tests were confined to crushed black mustard-seed and bitter almonds (the latter in lieu of amygdalin and emulsin employed by M. Dumas).

The solutions I employed were borax, containing 30 grains of the salt in two ounces of water; bicarbonate of soda, 30 grains in two ounces of water; carbonate of soda, 20 grains in two ounces of water; and lime water.

Crushed black mustard-seed and bitter almonds, in quantities of about half an ounce each, were severally treated with the above solutions and digested, at a temperature of 60° F., in closed flasks, which were from time to time carefully examined. The experiments were repeated more than once, with the following results:—

	Black Mustard Seed.	Bitter Almonds.
Bicarbonate of Soda Solution.	Oil evolved within 5 minutes.	Oil evolved within 1 hour.
Borax.	Oil evolved within 30 minutes.	Oil evolved, faintly, within 90 minutes, but strongly within 6 hours.
Carbonate of Soda.	Oil evolved within 40 minutes.	Oil not evolved until after 16 hours, and then only faintly.
Lime Water.	No evolution of oil in 36 hours.	No evolution of oil in 36 hours.

M. Dumas stated that borax neutralizes the action of yeast, synaptase, diastase, and myrosin; but it would appear, from the experiments of M. Petit, that a one per cent. solution of borax possesses no power in arresting the action of yeast upon cane-sugar solution; and from my own, that it only slightly retarded the formation of essential oil in a mixture of either black mustard-seed or bitter almonds with water.

THE EMBRYO APPENDIX.

BY CHARLES SYMES, PH.D.

The statement of Professor Redwood "that it is undesirable to publish a new edition of 'The Pharmacopœia' more frequently than once in about ten years" is fully borne out by experience. One point will suffice as an illustration. In the B.P. of 1864 more important changes were necessarily made than in any previous editions of the various pharmacopœias, this being the first published jointly by the united kingdoms, and the most obscure medical practitioner felt it incumbent on him to peruse at least some epitome indicating the principal differences in strength, etc., of the preparations; he found Liq. ammoniæ acetatis five times as strong as its prototype, and prescribed accordingly. Now this work proving a failure it became necessary in three years to issue a new edition, and the pharmacist, desirous of keeping pace with pharmaceutical progress, soon renders himself conversant with this last edition; not so the medical practitioner—he feels the change to be a bore rather than otherwise (of course there are many exceptions), and only slowly adopts the various improved preparations, and we find some even to the present day prescribing twenty minim doses of Liq. ammoniæ acetatis, presuming that quantity to be equivalent to 100 minims of the P.L. preparation.

In an appendix then, which it is intended to publish intermediately between the editions of the B.P., no alteration in the strength or general characters of any existing preparation should be made; but clearly it is desirable as far as possible to correct all the errors of the work it is intended to supplement, to introduce improvements in manufacture, to make such additions as seem desirable, and thus bring the work up to pharmacy of the day.

Ferri sulph. granulata is an acknowledged mistake: could it not be corrected by something like the following paragraph?—"Where ferri sulph. granulata is ordered, use ferri sulph. cryst., answering to the following characters and tests," etc.

Ungt. plumbi subacetatis comp. soon becomes discoloured by the formation of oxide of lead: this is readily prevented by the addition of a few drops of acetic acid, and such addition could easily be sanctioned in the appendix.

Introducing specific gravities of tinctures would, I fear, be less valuable than its advocates suppose. Two samples of opium, containing the same percentage of morphia, will contain varying amounts of extractive matter soluble in proof spirit, hence will produce tinctures of different specific gravities: to dilute the tincture of greater density, so as to bring it to the standard of the other, would of necessity reduce the percentage of morphia in the finished product, and yet uniformity of strength is of vastly greater importance than specific gravity. Again, the finest myrrh does not always produce a tincture of the greatest density, often the reverse, and yet if a tincture of *good quality* does not come up to the pharmacopœia standard of sp. g., what is to be done? macerate, of course, with a fresh quantity of myrrh—a very troublesome process, and one that would not often be followed. Instances might be multiplied, but it is unnecessary; if the specific gravities of tinctures are to be introduced, they can only be approximate and should not be imperative.

THE STUDY OF BOTANY AND MATERIA MEDICA.

BY PROFESSOR G. PLANCHON.*

It is now a long time since the sciences of observation found their true path, and, resting upon the principle of induction, first advanced surely towards the solution of the problems set before them. And still, to the extent

* Abstract of a Lecture delivered at the Paris School of Pharmacy, and published in 'L'Union Pharmaceutique,' vol. xiv., p. 18.

this route across unknown ground is thus traced out, the processes of exploration are multiplied and perfected, new points of view are discovered, the horizon is extended, and at every halting-place fresh features are revealed full of interest to the student. In this progressive march the sciences no longer remain isolated from each other; on the contrary, they lend a reciprocal support and unite their efforts against common difficulties. Some there are, which, having the most intimate relations with others, follow step by step their movements, borrow their processes, and benefit by their progress. Such a one is materia medica. Itself a science of application, it is naturally dependent upon other more general sciences. Therapeutics furnishes it with materials for study; the incessant explorations of chemistry in the organic world throw new light upon the composition of the products which it puts into use. But it is principally to natural history that it is subordinated, being, so to speak, but one of the branches of that science; the study of the products necessarily implying that of the beings which furnish them. The entire subject, however, is too vast to be dealt with under all its aspects, and here only the relations of the science of materia medica with that of its most important collateral science, botany, will be noticed.

The Renaissance was a critical period in the history of these relations; before that time of scientific renovation botany scarcely existed. Theophrastus, the disciple of Aristotle, it is true, sought to do for it what his master had done for the history of animals. He tried to co-ordinate all the knowledge of the time respecting the organs, functions, and mutual relations of plants, but his attempt remained without influence. Vegetables were only looked upon as alimentary and medical materials; they were only studied in their application to the healing art; botany became a branch of materia medica. During the centuries of the schoolmen the science was entirely confined to the works of the ancients, and botany was represented only in sterile commentary on the books of Dioscorides. In vain some few men, as remarkable as they were rare, such as Albert le Grand or Roger Bacon, tried to restore the spirit of direct observation; their voices were lost in the void, and the majority of authors clung without cessation to the errors of the time.

But with the sixteenth century all this was changed. Botany was emancipated; it broke the yoke of materia medica, and, under the inspiration of observation, shone more brilliantly than in the time of Theophrastus. From this time it took its proper rank; a phalanx of distinguished men studied plants for themselves, and not only in respect of their medical properties. Clusius brought to the service of these new studies the elegance of his style and clearness of his descriptions; Lobel his dogmatic ardour and scrupulous exactitude; the Bauhins their immense erudition; and all brought their intense desire to learn from and understand the great book of Nature.

How did materia medica fare during this movement? Did it lose anything by this overturning of parts, by this subordination of a science which had hitherto dominated? On the contrary; from this epoch must be dated its real progress. It is worthy of a remark, too, that the authors of this scientific revolution were all medical men, attached to their art, and little disposed to sacrifice one of its most important branches; the truth being, that by putting it into its proper place, they raised it from the vain and fastidious study of a book to an intelligent and free research in the field of nature. But, then, what progress there was, and how the history of medical products profited by more generally directed botanical researches! Open one of those old books, too often neglected in our day, and one may be astonished at the matter which they contain. Instead of the vague and indecisive indications of Dioscorides, in which the commentators sought, often without success, to recognize the remedies of ancient medicine, there will be found descriptions of an exactitude previously unknown; and figures, often very coarse, but nearly always of remarkable fidelity, in which may easily be recognized the plants or medicinal products employed at the time. And under a less superficial scrutiny the number of important facts brought under notice by these men will cause admiration.

Hitherto nomenclature had been a veritable chaos. Whilst plants were looked upon only as medicaments, they were not compared with each other except in regard to their virtues and their uses, and thus the same generic name would be sometimes given to species the most dissimilar. It was thus that a Ranunculaceous and a Melanthaceous plant both bore the name of hellebore; while a species of larkspur, the easter daisy and the comfrey were united under a common name. On the other hand, the commentators, seeking chiefly to discover the plants of Dioscorides, sometimes thought they had found them in countries where they were unknown, and sealed their error by giving to the new species the name which belonged only to the old one. To this was added the embarrasment caused by the fact that the names of some species were multiplied by every author who studied them. But with direct observation, the study of plants in their true aspects became the occupation of scientific men; little by little these arbitrary distinctions disappeared; a common language began to be used, and one of the promoters of this scientific renovation, Gaspard Bauhin, gathering together in a sort of table all the complicated synonomy of his day, laid the first foundations of a regular nomenclature. His "Pinax Theatri Botanici" became the scientific code accepted by authors, until Linnæus, crowning the work, applied to natural history the plan adopted by men of distinguishing each other by a family and a baptismal name, or, in scientific language, the name of the genus and the name of the species. Henceforth materia medica was assured of having at its service, together with exact descriptions, a precise nomenclature, so that it might escape the confusion and uncertainty of former times.

But botany did still more. It not only rid materia medica of the shackles which impeded its advance, but contributed directly to its progress by tracing out certain general laws. The fundamental problem of natural history is to discover the relations which exist between different orders of beings and their reciprocal affinities. This problem Tournefort partly solved by classing all the species known in his time into genera so natural that later observations, while modifying their extent, have not overthrown their foundations. But scarcely were these groups constituted when a law, most important in the application of plants in medicine, was discovered; it was that an intimate relation appeared to exist between the natural affinities of plants and their medicinal properties; that species of the same genus resembled each other not only in their organization but in their properties; formulated by Linnæus in the adage, "Plantæ quæ genere conveniunt, virtute conveniunt." This is not the place to discuss this law. Many objections have been raised against it; many exceptions, difficult if not impossible to explain, appear to invalidate, if not to disprove it. But it cannot be denied that its promulgation has exercised a considerable influence upon the progress of materia medica. It has given to researches, previously isolated, an object and a direction; it has added the attractions of generalizations, generally seductive to the *savant*, to the interest which always attaches to the study of useful products; it has led minds of a truly philosophic mould to the study of pharmacology. Finally, the discussions which it has raised have contributed to enrich with valuable facts the natural history of medicaments.

The investigation of natural affinities has rendered yet other services to materia medica: it has given rise to the idea of the relative importance of characters, an idea that has exercised, and may still exercise, a considerable influence upon pharmacological studies. The various modes by which objects are revealed to our senses, and which serve to distinguish one from another, and to gather them into natural groups, are not all of the same value

There are some, such as size, colour, etc., which vary in individuals of the same species; others, on the contrary, are remarkably constant and definite. Those of the one class are of primary importance, and are termed dominant characters; the others are subordinate to them. In seeking to find the place of any being or product of nature it is necessary to estimate the value of the characters which it presents.

These principles have made a great revolution in all sciences which pretend to group the objects of their study according to their true affinities. Applied in particular to botany, by Jussieu, De Candolle, and Robert Brown, they have led to the establishment of groups, expressing still very imperfectly the real relations of the plants, but which, perfected by later investigation, reveal better and better the plan of nature. These investigations have at the same time shown the preponderating value of certain characters, such as the constitution of the embryo, that of the seed and of the fruit, and the respective position of the various parts of the flower, inducing botanists to found their natural groups upon the consideration of these floral organs.

Pharmacologists have profited from these results for the solution of two essential questions which presented themselves: to discover in a substance the true characters which permit the recognition of its nature, and to establish the origin of such a substance by comparing its characters with those of plants which might yield it.

These researches may be applied to products of three different orders. One order consists of the liquid or concrete juices, which have not preserved any trace of the organism that furnished them, and which are thus placed outside the domain of botany. Physiology has, it is true, already been able to show the manner in which some of them have been formed in the vegetable economy; it has thus traced the transformation into gum tragacanth of the medullary cells of certain species of *Astragalus;* but in the conditions in which they are presented to the pharmacologist, it is only by the ordinary physical and chemical tests that their characters, relations, and sometimes even their origin, can be established.

At other times the product is an entire plant or part of a plant, containing the characteristic organs of the genus and species. It is then a simple case of botanical determination. If the species yielding the substance be already known, it is naturally referred to it; if not, the product takes its rank in the genus or family to which it belongs. The groups adopted by botanists thus become the natural framework where each medicament finds its place, and this is why the writers on materia medica, abandoning former errors, have adopted as the most logical arrangement for their works that of the series of natural orders.

There remains a third group of products, which deserves a little longer attention, namely vegetable organs, such as roots, branches, and barks, which do not themselves contain the characters employed in the determination of living plants, and therefore become difficult to classify. What part of them will best furnish their important characters? Should they be sought in the exterior aspect, dimensions, form, colour, or organoleptic properties? Is it not preferable to penetrate profoundly into the structure of these organs, and to study their anatomical constitution as a means of assisting in this determination? The reply cannot be doubtful. The value of a character may be estimated by its constancy, and that which is the most constant in these products is the anatomical structure. Varying conditions of the vegetation and development of a plant may and do influence considerably the dimensions, colour, and sometimes even the taste and smell of its root, bark, and leaves. It cannot be affirmed that these influences do not in some cases modify slightly the structure of these organs; but this modification would in any case be very slight, and would never affect the constancy of these characters, which gives them their true value.

An example will illustrate the services that can be rendered to materia medica by anatomical research. One of the most difficult questions is that of the sarsaparillas. To distinguish among roots so closely resembling each other those which belong to the true *Smilax* is not always easy, and everybody knows by experience how the difficulty augments in determining the various commercial varieties, and especially in referring them to the plants from which they originated. Apply anatomical investigation to these roots. Nothing is more easy than to recognize a true sarsaparilla; a transverse section suffices even to the unaided eye to show a special structure. Then if account be taken of the relative size of the zones which succeed from the circumference to the centre; if armed with a microscope, certain easily distinguished characteristics are studied, the various kinds may be determined with a surety that cannot attend an examination of the exterior characters. Moreover, in comparing the structure of Mexican sarsaparilla with that of the roots of *Smilax medica*, their resemblance is seen to be striking, and to furnish a nearly conclusive proof of an opinion already put forth upon the origin of this commercial variety.

In the same manner, if it be wished to throw light upon the plant which yields the officinal rhubarb, attention is not confined to the characters of form, colour, and odour; but regard is principally paid to the peculiar structure of this root. The same structure not being found in any of the species of *Rheum* to which the drug has been successively attributed, it is still looked upon as the product of an unknown plant in Central Asia. It would be easy to multiply examples, but sufficient has been said to show the part that anatomical researches may take in the establishment of the essential characters of certain products of the materia medica. This idea of seeking a means of classification elsewhere than in the floral organs has not originated in the present day. The first botanists who applied the principles of the natural method thought a series of parallel characters might be found in the organs of vegetation which could be employed to greater advantage. De Candolle laid down this proposition clearly in his 'Théorie Elémentaire de la Botanique,' and sought to apply it in his classification. But now, when botanists devote so much attention to vegetable anatomy, the theory has become one of the maxims of the science, and has extended from the domain of botany to that of materia medica. It was applied in France, twenty years since, by Weddell, in the difficult study of the cinchonas; in Germany, by Schleiden, in his investigation of the sarsaparillas; and in England, by Howard, in his magnificently illustrated work on various species of cinchona.

The principal phases through which materia medica has passed, in becoming a useful auxiliary instead of an obstacle to botany, have thus been traced, showing how it has acquired from the contact exactitude of description and precision of language, and been brought under the influence of general laws which have greatly contributed to its progress. The lesson to the student of the present day is, that he should no longer content himself with the study of the purely exterior characters of these products, but penetrate into the internal structure; for there he will find a new field opened to his energies.

THE RELATION OF ANIMAL AND VEGETABLE OILS TO FIRE.

BY PROFESSOR ATTFIELD.

In their relation to combustion, oils of animal origin, such as sperm or whale oil, and those obtained from vegetables, as olive and colza, differ from mineral oils, by not igniting at low temperatures, and in not giving off vapour which, when mixed with a certain proportion of air, explodes in contact with flame. But in their liability to spontaneous ignition when freely exposed to the air under certain conditions, animal and vegetable oils possess a dangerous property from which mineral oils are free. In a series of letters to *The Times*, Professor Attfield recently discussed the question of the origin, extension, and prevention of fires, and the relation of mineral and vegetable oils and other materials to fire. These letters have now been issued in a pamphlet form, together with an Appendix, in which the Professor gives the results of some experiments made by him, and from which we have taken the following.

Various animal and vegetable oils differ considerably in the rate with which they cause the generation of heat when exposed freely to the air upon the surface of wool, cloth, paper, cotton, jute, saw-dust, lamp-black, ivory-black, ground charcoal, or any similar highly porous substance; but all are more or less liable to this result of the chemical action of air when they are exposed in very thin films, or in any other minute state of division. The so-called "drying" oils are peculiarly susceptible to such atmospheric influences. Common paint exposed on wood-work becomes "dry" and glossy because the oil of which it is largely composed is converted by the action of the air into a kind of resin, and during the whole of this action heat is evolved. Thus the true chemical nature of the effect termed the "drying" of oils is one in which oil is resinified and heat concurrently produced. It is not an operation of drying, in the sense in which a cloth wetted with water is said to dry. In the latter case the wetness or moisture passes off into the air in the form of vapour of water, whereas in the drying of oil no such vapour escapes. Nor does oil "dry," as varnish dries. Varnish is a solution of hard resins in spirit; in drying, the spirit evaporates and leaves the resin. But the oil on any surface exposed to air "dries" to a solid resin by absorption of the oxygen of the air. A piece of oiled paper, unlike water-wetted or varnished paper, positively increases in weight while drying. The true nature of this drying process is, therefore, as already indicated, one of oxidation or resinification, and simultaneous evolution of heat. The emission of heat is not noticed because one painted surface affords but little, and because what is produced is at once conducted away by currents of air. But when allowed to accumulate its presence is most obvious: thus a heap of oiled rags soon becomes so hot in the central part that the temperature cannot be borne by the hand. As a result of direct experiment, I find that paper, cotton, or wool, slightly impregnated with different kinds of oil and exposed to air under similar conditions, rises in temperature from 25 to 200 degrees, according to the variety of oil, the amount of surface in contact with the air, and the duration of exposure.

Number of experiment.	Temperature at commencement of experiment.	Temperature on completion of experiment.	Total rise of temperature during experiment.
1	65°F	125°F	60°F
2	80	275	195
3	75	100	25
4	70	220	150
5	70	160	90
6	70	223	153

It will be understood that in these experiments the escape of heat was purposely prevented. They illustrate the statement that during the drying of certain oils heat is produced, and will serve to show the extreme importance of observing all precautions against the accumulation in factories, stores, and warehouses of heaps of oiled rags, papers, or other porous materials. In some of my experiments the oiled paper or wool was warmed to about the temperature of boiling water before being subjected to the influence of air in a closed vessel; in these cases the rise in temperature was more rapid, and in two instances increased till the mass charred and ignited. Moreover, I found that when very large quantities of oiled fabrics were exposed in a chamber, the temperature of the air in which was made to imitate that obtaining on a hot summer's day, a considerable quantity of vapour, irritating to the eyes and readily inflammable, was produced. Such vapours would greatly facilitate the spread of flame once started.

The drying of vegetable or animal oil on any surface is, in short, a true process of combustion,—spontaneous combustion,—differing from ordinary combustion of coal in fire-grates, or gas or oil in lamps, not in kind, but only in degree. To say that coal, wood, fat, etc., burn, is another way of stating that they absorb oxygen from the air with such avidity as to produce heat and light. So oiled surfaces absorb oxygen from the air and produce heat, and if the heat were not carried away as fast as generated, would become warm, then hot, and next burst into flame. There can be no doubt that many fires in oil-shops and warehouses where oil is stored or used are caused in this way, by the intensified spontaneous combustion of the oil exposed on cotton-waste, sawdust, textile fabrics, etc. I was recently consulted in a case where numbers of oiled sheets were crowded in a comparatively small room in which another operation involving the use of a stove was also being conducted. Here were all the conditions for spontaneous inflammation. A hot day occurring, or the stove being unusually warm, or an ordinary temperature with a larger number of sheets than usual, or hung unusually near together; either circumstance, or perhaps an unusual combination of them, would be sufficient to convert the drying or oxidising action, or modified spontaneous combustion, into one of spontaneous ignition, or ordinary combustion. In another case in which my advice was sought in order that steps might be taken to prevent recurrence of fire, a similar room was used for the desiccation of oiled fabrics. It appears also that a sheet-iron flue passed through one corner, carrying the smoke and other products of combustion of a furnace employed in an adjoining apartment. This flue had often been noticed to be red-hot. The men were sure that on the day of the fire this furnace was being used, and they said that the lowest line of oiled articles would be about eighteen inches distant from the flue. Here, again, it will be evident—bearing in mind the exact chemical nature of the oil-drying operation—that the conditions were most favourable for spontaneous ignition. I was of opinion, that in this case also the oxidizing action (or drying) was sufficiently intense spontaneously to produce flame—to produce fire, that is to say, among the oiled articles nearest the exposed portion of the furnace chimney; fire which, considering the character of the contents of the room, would spread with the greatest rapidity.

To prevent the occurrence of spontaneous combustion in cases where the exigencies of manufacture require the employment of fibres or fabrics soaked in vegetable or animal oils, such arrangements must be made as shall render the accumulation of heat impossible.

NOTES ON THE QUICKSILVER MINE AND WORKS OF VALLALTA.*

The Vallalta quicksilver works are situated in the province of Belluno (Venetia), at the south-western extremity of the Mis valley, where the two torrents, Mis and Pezzea, come together, marking the boundary between Italy and the Tyrol. The works are about ten miles from Agordo, and 2,339 feet above the level of the sea. The cinnabar mine itself lies a short distance from the works, on the right bank of the torrent Pezzea.

The rocks that are met with are chiefly clay-slate, and a reddish porphyry; the latter having broken through the former and altered it. Those who desire to study the special geological conditions of the mine can consult the small geological map accompanying the original memoir, which will give a far better idea than a tedious

* Extracted from a paper in the *Bollettino del Club Alpino Italiano* for 1871, by Cavaliere G. Antonio de Manzoni, and printed in the *Journal of the Society of Arts.*

verbal description. We will simply note the fact that the metalliferous rocks are surrounded on the north-east by black and occasionally graphitic clay-slate, in an elliptical manner, and this part of the formation has been proved to be the richest in cinnabar, not only in the upper but in the lower beds. Where the slate dies away, the porphyry widens out, and the cinnabar becomes less concentrated, and this renders the explorations more uncertain and more costly. The cinnabar occurs disseminated, both in the porphyry and the metamorphosed rocks, sometimes in the form of lumps or grains, sometimes in veins and little strings, but invariably in an altogether irregular manner. The masses occur in the form of "shoots," varying very much in dimensions and orientation.

The porphyry and slaty metamorphic rocks contain, besides cinnabar and a little native mercury, iron pyrites, gypsum, calcspar, mica, and chlorite.

As the work consists in discovering and excavating the masses of cinnabar, Vallalta mine may be said to be in a state of continual exploration.

About a century ago traces of cinnabar, disseminated through the porphyry in a valley on the right bank of the torrent Pezzea, induced two Venetian noblemen, Nani and Pisani, to commence work there. Two old levels, known by their names, still testify to the work they did. It seems, however, that soon after beginning to work they were obliged to stop, on account of a great error—viz., that of going to the expense of carrying the ore to the island of Murano, near Venice, where it is said to have been distilled. At the commencement of this century, Melchior Zanchi, a Venetian of great natural talent and a clever miner, set to work alone to reach the centre of the metalliferous zone of Vallalta; his plan was a very bold one, and was carried out eventually in 1867. Zanchi did not go on very far with his undertaking, as he was obliged to stop for want of means.

Later on, some persons named Schena, Fusina, and Nogarola, of Agordo, and Bosio of Primiero, took up the works abandoned by Nani and Pisani, and made some rude attempts to smelt the ore on the spot.

In the year 1852 the mineral rights of Vallalta belonged to three partners—Fusina, Levi, and Bosio. It was then that the Venetian Mining Company obtained the permission to search for ore wherever it liked. This company adopted the project of the Government engineer, Joseph Bauer, who afterwards became managing director, and, with the O'Conor adit, began that series of works which were destined to render Vallalta one of the most interesting of mining establishments. The O'Conor adit, after having been driven 196 metres, cut the first vein in 1854, the ore being quite sparking with native mercury condensed at the contact with the slate.

Encouraged by this success, the company bought up all the rights of the above-mentioned proprietors, and continued its explorations, not only with the O'Conor adit, but also above and below it. The year 1855 saw a large metallurgical establishment spring up rapidly and almost by magic in the unknown and hitherto solitary Vallalta, with two double cupola furnaces, a double reverberatory furnace, the necessary condensing apparatuses, buildings and houses for sundry purposes, bridges and roads. These furnaces failed, however, and it was not until 1857, with new furnaces, that the actual production of mercury may be said to have begun. Since then the production has gone on pretty regularly, although the mine suffered great damage from an inundation in 1860, and the works were partly washed away in 1868. In the following year, Cavaliere G. A. de Manzoni, the actual lessee, took mine and works off the company's hands, and continues to carry them on at the present time on his own account.

The mercuriferous rock has now been worked to a vertical depth of 122 fathoms. It is reached by various adit levels, and the workings are arranged in thirteen horizontal floors. The deepest workings are fifty-four fathoms below the lowest adit. The mode of proceeding is as follows: As soon as the existence of a mass which will pay for working has been proved, a winze is sunk through it, and then it is worked away entirely by successive horizontal floors. The timber employed is generally larch. As fast as the ore is worked away, the vacant space is filled up with unproductive rock, sometimes quarried on purpose, to prevent the chambers from falling in.

The ventilation is effected by means of a blast produced by a great fall of water and carried by wooden pipes to the workings.

The ore arriving from the mine is picked, and unproductive rock thrown away; the fine stuff or "smalls" is moistened with acidulated water, which runs away from the condensers, and, made up into compact lumps of nine pounds each, can then be treated in the cupola furnaces.

The cupola furnaces in use at Vallalta are cylindrical, lined with fire-brick, and 3 feet 11 inches in diameter by 21 feet high. They are built in pairs. Near the base is an iron grating, on which the ore rests, and the ore is charged from the top by a hopper. The cover of the hopper has a water-joint, so the top of the kiln is closed hermetically. Before putting in a charge two men work away with bars of iron through the grating, and draw out some of the burnt ore. The charge is composed of ore in large and small pieces, lumps of agglomerated fine stuff, and charcoal in the proportion of two per cent. by weight. Under the action of heat, in the presence of a good draught of air, the cinnabar is decomposed, and the mercury liberated passes off as vapour with the products of combustion into two chambers near the furnace, and thence into two rows of pipes, 3 feet 3 inches in diameter, and 49 feet long, in the open air and continually exposed to an artificial rain. The major part of the mercury is condensed in these tubes, and the residual vapours pass through four chambers at the end of the apparatus, and then by a third tube to the chimney. In former days there were occasionally difficulties with the mercurial vapour, which on a sudden change in the temperature would sometimes escape from the lower part of the furnace, and occasion thereby not only a notable loss of mercury, but also serious injury to the health of the workmen, who could not always be cured by the internal use of chlorate of potash. Besides, the sulphurous acid which escaped from the chimney exercised a very pernicious effect upon the surrounding vegetation.

These evils have been entirely cured by means of a most simple exhausting apparatus. To the top of the chimney is fixed a descending wooden pipe, which joins an almost horizontal pipe, and to the lower end of this is attached another vertical pipe, which leads into a subterranean drain. A column of water is brought into the side of the last pipe near the top, and, falling through some 16 feet, draws with it the gases from the chimney. In this manner the chimney always draws properly, and the amount of draught can be regulated at pleasure by altering the quantity of water. A double cupola furnace can treat as much as 150 tons of ore in 24 hours; and as the use of wood for the condensers allows the mercury to be drawn off at pleasure, the furnace may remain alight for two years or more, in fact, until it requires repairs.

All the mercury is not obtained with its usual bright lustre; the tubes and chambers contain a sooty deposit, from which some mercury may be extracted by mechanical means on inclined planes, whilst the residue is made up into lumps and returned to the furnaces.

As at Idria, it has been found most convenient to send away the mercury in sheepskins.

The perfection of the metallurgical process at Vallalta is proved by the low produce required for profitable working. Up to 1870 the average contents of the ore did not exceed half a per cent. of mercury; the loss of metal is less than 8 per cent. The mine and works employ about two hundred men, the majority being miners. The miners work eight-hour shifts, and get about 1 fr. 20 c. a-day; most of them possess a little land. Two per cent. of their wages is kept back, and goes to the sick club fund, the capital of which at the beginning of 1871 exceeded 18,000 francs. The quantity of mercury produced at Vallalta during fifteen years—ranging from 533 kilograms in 1856 to 34,776 kilograms in 1870—amounted to 324,856 kilograms, or nearly 320 tons.

PROFESSOR TYNDALL ON LIGHT.*

(*Continued from p.* 730.)

The most familiar illustration of the interference of sound-waves is furnished by the beats in music, which are produced by two musical sounds slightly out of unison. When two tuning-forks which are in perfect unison, are agitated at the same time, the two sounds produced flow without roughness, as if they were but one. But, by attaching to one of the forks a two-cent piece, we cause the loaded fork to vibrate a little more slowly than its neighbour. Suppose that one of them performs 101 vibrations in the same time as the other performs 100, and let us assume that at starting the condensations and rarefactions of both forks coincide. At the 101st vibration of the quickest fork they will again coincide, the quicker fork at this point having gained one vibration, or one whole wave upon the other. But a little reflection will make it clear that, at about the 50th vibration, the two forks will be in opposition; here the one tends to produce a condensation where the other tends to produce a rarefaction; by the united action of the two forks, therefore, the sound is quenched, and we have a pause of silence. This occurs where one fork has gained half a wave-length upon the other. At the 101st vibration we have again coincidence, and, therefore, augmented sound; at the 150th vibration, we have again a quenching of the sound. Here the one fork is three half-waves in advance of the other. With two forks so circumstanced, we obtain those intermittent shocks of sounds separated by pauses of silence, to which we give the name of beats (such beats were rendered audible to all in the lecture).

I now wish to show you what may be called the optical expression of those beats; and here we have to fall back upon the fact that a luminous impression persists for a certain interval upon the retina. Attached to a large tuning-fork is a small mirror, which shares the vibrations of the fork, and on to the mirror is thrown a thin beam of light, which shares the vibrations of the mirror. The fork is now still, and the beam reflected from it is received upon a piece of looking-glass, and thrown back upon the screen, where it stamps itself as a small luminous disk. The agitation of the fork by a bow converts that disk into a band of light, and if you simply shake your heads to and fro you will be able to reduce that band to its elements: you draw it, in fact, out to a sinuous line, thus proving the periodic character of the motion which produces it. By a sweep of the looking-glass we can also cover the screen from side to side by this luminous scroll, the depth of the sinuosities indicating the amplitude of the vibration.

We now pass on to the optical illustration of these beats. The large fork which we have just employed remains in its position; but instead of receiving the beam reflected from it on a piece of looking-glass, it is received upon a second mirror attached to a second fork, and cast by it upon the screen. We now sound both forks, and both of them act in combination upon the beam. It is drawn out, as you see, as before, the band of light gradually shortening as the motion subsides. Finally, when the motion ceases we obtain the disk of light. Weighting one of the forks as we did before with a two-cent piece, we throw it out of unison with the other, and now observe the screen. Sometimes the forks conspire, and then you have the band of light drawn out to its maximum length. Sometimes the forks oppose each other, and then you have the band of light diminished to a circle. Thus the beats which address the ear express themselves optically as the alternate elongation and shortening of the band of light. If I move the mirror of this second fork, you have a sinuous line, as before, drawn out upon the screen; but the sinuosities are sometimes deep, and sometimes they almost disappear, thus expressing the alternate increase and diminution of the sound, the intensity of which is expressed by the depth of the sinuosities.

Every complete vibration of our tuning-fork produces a wave of sound, and, as all sounds travel with the same velocity through air, the more rapid the vibration the shorter are the sound-waves. The pitch of a sound is wholly determined by the rapidity of the vibration, as the intensity is by the amplitude. The rise of pitch with the rapidity of the impulses may be illustrated by the syren, which consists of a perforated disk rotating over a cylinder into which air is forced, and the end of which is also perforated. When the perforations of the disk coincide with those of the cylinder, a puff escapes; and when the puffs succeed each other with sufficient rapidity, the impressions upon the auditory nerve link themselves together to a continuous musical note. The more rapid the rotation of the disk the quicker is the succession of the impulses, and the higher the pitch of the note. Indeed, by means of the syren the number of vibrations due to any musical note, whether it be that of an instrument, of the human voice, or of a flying insect, may be accurately determined.

In the undulatory theory, pitch is the analogue of colour. The waves of light have been measured, and it is found that the more refrangible the light the shorter are the waves which produce it. The shortest waves of the visible spectrum are those of the extreme violet; the longest, those of the extreme red; while the other colours are of intermediate pitch or wave-length. The length of a wave of the extreme red is such that it would require 36,918 of them placed end to end to cover one inch, while 64,631 of the extreme violet waves would be required to span the same distance.

Now the velocity of light, in round numbers, is 190,000 miles per second. Reducing this to inches, and multiplying the number thus found by 36,918, we obtain the number of waves of the extreme red in 190,000 miles. All these waves enter the eye, and hit the retina at the back of the eye in one second. The number of shocks per second necessary to the production of the impression of red is, therefore, four hundred and fifty-one millions of millions. In a similar manner, it may be found that the number of shocks corresponding to the impression of violet is seven hundred and eighty-nine millions of millions. All space is filled with matter oscillating at such rates. From every star waves of these dimensions move with the velocity of light like spherical shells outward. And in the ether, just as in the water—indeed, more truly than in the water—the motion of every particle is the algebraic sum of all the separate motions imparted to it. Still, one motion does not blot the other out; or, if extinction occur at one point, it is made good at some other point. Every star declares by its light its own undamaged individuality, as if it alone had sent its thrills through space.

The principle of interference applies to the waves of light as it does to the waves of water and the waves of sound. And the conditions of interference are the same in all three. If two series of light-waves start at the same moment from a common origin, crest coincides with crest, sinus with sinus, and the two systems blend together to a single system of double amplitude. If both series start at the same moment—one of them, however, being, at starting, a whole wave-length in advance of the

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* Abstract of a series of lectures delivered in the Cooper Institute, New York, and reported in the *New York Tribune*.

other—they also add themselves together, and we have an augmented luminous effect. The same occurs when one system of waves is any number of whole wave-lengths in advance of the other. But if the one system be half a wave-length, or any odd number of half wave-lengths in advance, then the crests of one system fall upon the sinuses of the other system; the one system, in fact, tends to lift the particles of ether at the precise places where the other tends to depress them; hence, through their joint action, the ether remains perfectly still. This stillness of the ether is what we call darkness, which corresponds, as already stated, with a dead level in the case of water.

It has been stated, with reference to the colours of absorption, that the formation of natural bodies is selective, not creative; that what they did was to pick out certain constituents of the white solar light for extinction, this causing them to appear in the colours of the unextinguished light. It must at once flash upon your minds that, insomuch as we have in interference an agency by which light may be self-extinguished, we have in it the conditions for the production of colour. But now the question faces us, How is it that certain constituents are quenched by interference, while others are permitted to remain? This is entirely due to the difference in the lengths of the waves of light.

The subject is most easily illustrated by the class of phenomena which first suggested the undulatory theory to the mind of Hooke. These are the colours of thin films of all kinds, which are known to men of science as the colours of thin plates. In this relation no object in the world possesses a deeper scientific interest than a common soap-bubble. And here, let me say, emerges one of the difficulties which the student of pure science encounters in the presence of "practical" communities like those of America and England; it is not to be expected that such communities can entertain any profound sympathy with labours which seem far removed from the domain of practice. Imagine Dr. Draper spending his days in blowing soap-bubbles and in studying their colours! Would you show him the necessary patience, or grant him the necessary support? And yet be it remembered it was thus that Newton spent a large portion of his time; and that it was on such experiments that has been founded a theory, the issues of which are of incalculable importance to the human race.

Whence, then, are derived the colours of the soap-bubble? Imagine a beam of white light impinging on the bubble. When it reaches the first surface of the film a known fraction of the light is reflected back. But a large portion of the beam enters the film, reaches its second surface, and is again in part reflected. The waves from the second surface thus turn back and hotly pursue the waves from the first surface. And, if the thickness of the film be such as to cause the necessary retardation, the two systems of waves interfere with each other, producing augmented or diminished light, quadrupling it, or totally extinguishing it, as the case may be. But, inasmuch as the waves of light are of different lengths, it is plain that, to produce self-extinction in the case of the longer waves, a greater thickness of film is necessary than in the case of the shorter ones. When, therefore, the red is quenched, the blue and green are not quenched: hence the production of colour in the case of thin plates.

The experimental illustrations to be introduced in the lecture are the colours of oil upon water; the colours of a film of air inclosed between two glass plates; the colours of films of oxide used as a guide in the tempering of polished steel; the colours of the soap-bubble by transmission and reflection; finally, the celebrated experiment by which Newton determined the thickness of a soap-bubble from its colour, and known as the experiment of Newton's Rings. To account for these rings was the greatest difficulty that Newton ever encountered. He quite appreciated the difficulty; over his eagle-eye there was no film, no vagueness in his conceptions. At the very outset his theory was confronted by the question, Why, when a beam of light is incident on a transparent body, are some of the light-particles reflected and some transmitted? Is it that there are two kinds of particles, the one specially fitted for transmission and the other for reflection? This cannot be the reason; for, if we allow a beam of light which has been reflected from one piece of glass to fall upon another, it, as a general rule, is also divided into a reflected and a transmitted portion. Thus the particles once reflected are not always reflected, nor are the particles once transmitted always transmitted. Newton saw all this; he knew he had to explain why it is that the self-same particle is at one moment reflected and at the next moment transmitted. It could only be through some change in the condition of the particle itself. The self-same particle, he affirmed, was affected by "fits" of easy transmission and reflection.

If you are willing to follow me while I unravel this theory of fits, the most subtle, perhaps, that ever entered the human mind, I think the intellectual discipline will repay you for the necessary effort of attention. Newton was chary of stating what he considered to be the cause of the fits, but there cannot be a doubt that his mind rested on a mechanical cause. Nor can there be a doubt that, as in all attempts at theorizing, he was compelled to fall back upon experience for the materials of his theory. His course of observation and of thought may have been this: From a magnet he obtained the notion of attracted and repelled poles. What more natural than that he should endow his light-particles with such poles? Turning their attracted poles toward a transparent substance, the particles would be sucked in and transmitted; turning their repelled poles, they would be driven away or reflected. Thus, by the ascription of poles, the transmission and reflection of the self-same particle at different times might be accounted for.

At the point which we have now attained, Newton's ingenuity in preserving a theoretic conception entire reached its climax. Regard these rings of Newton as seen in pure red light; they are alternately bright and dark. The film of air corresponding to the outermost of these rings is not thicker than an ordinary soap-bubble, and it becomes thinner on approaching the centre; still Newton, as I have said, attempted to measure the thickness of every ring, and to show the difference of thickness between ring and ring. How he did this may be thus made plain to you. Suppose the water of the ocean to be absolutely smooth; it would then accurately represent the earth's curved surface. Let a perfectly horizontal plane touch the surface at any point. Knowing the earth's diameter, any engineer or mathematician could tell how far the sea's surface will lie below this plane, at a yard, at ten yards, at 100 yards, at 1,000 yards' distance from the point of contact of the plane and the sea. It is common, indeed, in levelling operations, to allow for the curvature of the earth. Newton's calculation was precisely similar. His plane glass was a tangent to his curved one. From its refractive index and focal distance he determined the diameter of the sphere of which his curved glass formed the segment, he measured the distances of his rings from the place of contact, and he calculated the distance between the tangent plane and the curved surface, exactly as the engineer would calculate the distance between his tangent plane and the surface of the sea. The wonder is, that where such infinitesimal distances are involved, Newton, with the means at his disposal, could have worked with such marvellous exactitude.

Now mark the result. For the sake of convenience let us call the thickness of the film of air corresponding to the first dark ring d; then Newton found the distance corresponding to the second dark ring $2\,d$; the thickness corresponding to the third dark ring $3\,d$; the thickness corresponding to the tenth dark ring $10\,d$, and so on

Surely there must be some hidden meaning in this little distance d, which turns up so constantly? One can imagine the intense interest with which Newton pondered its meaning. Observe the outcome of his thought. He had probably endowed his light-particles with poles, but now he is forced to introduce the notion of periodic recurrence. How was this to be done? By supposing the light-particles animated, not only with a motion of translation, but also with a motion of rotation. Newton's astronomical knowledge rendered all such conceptions familiar to him. The earth has such a motion. In the time occupied in passing over a million and a half of miles of its orbit—that is, in twenty-four hours—our planet performs a complete rotation, and in the time required to pass over the distance d, Newton's light-particle must be supposed to perform a complete rotation. True, the light-particle is smaller than the planet, and the distance d, instead of being a million and a half of miles, is a little over the ninety-thousandth of an inch. But the two conceptions are, in point of quality, identical.

Imagine, then, a particle entering the film of air where it possesses this precise thickness. To enter the film its attracted end must be presented. Within the film it is able to turn once completely round; at the other side of the film its attracted pole will be again presented; it will, therefore, enter the glass at the opposite side of the film and be lost to the eye. All round the place of contact, wherever the film possesses this precise thickness, the light will equally disappear—we shall have a ring of darkness.

And now observe how well this conception falls in with the law of proportionality discovered by Newton. When the thickness of the film is $2\,d$, the particle has time to perform two complete somersaults within the film; when the thickness is $3\,d$, three complete somersaults; when $10\,d$, ten complete somersaults are performed. It is manifest that in each of these cases, on arriving at the second surface of the film, the attracted pole of the particle will be presented. It will therefore be transmitted, and, because no light is sent to the eye, we shall have a ring of darkness at each of these places.

The bright rings follow immediately from the same conception. They occur between the dark rings, the thicknesses to which they correspond being also intermediate between those answering to the dark ones. Take the case of the first bright ring. The thickness of its film is $\frac{1}{2}\,d$; in this interval the rotating particle can perform only half a rotation. When, therefore, it reaches the second surface of the film, its repelled pole is presented; it is, therefore, driven back and reaches the eye. At all distances round the centre corresponding to this thickness the same effect is produced, and the consequence is a ring of brightness. The other bright rings are similarly accounted for. At the second one, where the thickness is $1\frac{1}{2}\,d$, a rotation and a half is performed; at the third, two rotations and a half; and at each of these places the particles present their repelled poles to the surface of the glass. They are therefore sent back to the eye, producing the impression of brightness. Here, then, we have unravelled the most subtle application that Newton ever made of the Emission Theory.

[The phenomena of interference rings, obtained by curved glasses pressed together, was vividly shown upon the screen, and much enlarged by double reflection. Then coloured glasses were interposed, and the number of rings apparent very much increased, so that the whole of the light circle given by the instrument seemed covered by their ripple; but they were all of one colour, alternating only between light and darkness.]

Thus Newton, by an exceedingly artificial assumption, vaulted over the difficulty presented by the colours of thin plates. And as further difficulties in process of time thickened round the theory, his disciples tried to sustain it with an ingenuity worthy of their master. The new difficulties were not anticipated by the theory, but were met by new assumptions, until at length the Emission Theory became what a distinguished writer calls a "mob of hypotheses." In the presence of the phenomena of interference the theory finally broke down, while the whole of these phenomena lie as it were latent in the theory of undulation. Newton's "fits," for example, are immediately translatable into the lengths of the ether-waves.

Numerous other colours are due to interference. Fine scratches drawn upon glass or polished metal reflect the waves of light from their sides; and some, being reflected from opposite sides of the same furrow, interfere with each other and quench each other. But the obliquity of reflection which extinguishes the shorter waves does not extinguish the longer ones; hence the phenomena of colour. These are called the colours of striated surfaces. They are well illustrated by mother-of-pearl. This shell is composed of exceedingly thin layers, which, when cut across by the polishing of the shell, expose their edges and furnish the necessary small and regular grooves. The most conclusive proof that the colours are due to the mechanical state of the surface is to be found in the fact that, by stamping the shell carefully upon black sealing-wax, we transfer the grooves, and produce upon the wax the colours.

SEIZURE OF UNWHOLESOME DRIED FRUIT.

At the meeting of the City Commissioners of Sewers on Tuesday last, Dr. Tidy, the acting medical officer of health for the City, reported that during the last few weeks he had condemned as unfit for human food, and ordered to be destroyed, 1674 barrels of rotten and diseased figs, weighing no less than 187,488lb., and 22 barrels of currants, and that 490 barrels of figs in addition were now lying at Custom House Quay in a similarly bad condition. The fruit was used almost entirely in the manufacture of the cheaper kinds of jam and various sorts of "sweet stuff," which were largely consumed by the children of the poor. He had every reason to believe that the immense quantity already seized was but a moiety of the unsound and unwholesome fruit now lying in bonded warehouses, and constantly being delivered out, and he urged that a frequent supervision of bonded articles of food was imperatively necessary. Dried fruits, after being delivered at the various warehouses, remained in bond for eighteen months or two years, and no inspection was ever made by the wharfingers, who did not consider themselves at liberty, except with the owners' consent, to examine the goods. The result was that the fruit became completely rotten before any notice was taken of it, and after any sale the wharf premises were strewn with thousands of maggots. Dr. Tidy pointed out how such a condition of things placed in jeopardy the whole contents of the warehouses, and showed forcibly the delay which arose, in the present state of the law, in obtaining the goods for destruction, for, after the orders of the sanitary inspector, the medical officer, the magistrate, and the Customs authorities had been obtained, the wharfingers would not deliver them unless an order from the owner was in addition procured. He also explained the difficulty in obtaining the requisite information to enable the sanitary authorities to act, seeing that the wharfingers had an interest in concealment, and there was, unfortunately, a market even for rotten figs. He suggested the necessity, in the interests of the owners and wharfingers themselves, and especially of the public, of some periodical examination of bonded articles, of giving to the sanitary inspectors increased facilities for inspection, and of providing that the orders of the medical officer and a justice should be sufficient authority for the destruction of goods unfit for food, and likely to become a common nuisance. The report was referred to the sanitary committee, to take such steps in the matter, under the advice of the solicitor and medical officer, as they might think desirable.

The Pharmaceutical Journal.

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Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*
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PHARMACY IN IRELAND.

IT has been suggested in some sort, as a consolation to Mr. Gladstone for the break-down of his Irish Education Bill, that if it had been passed the Irish would have been reduced to a state of total destitution in the matters of grievances; but this is not strictly the case, for there is, besides the grievances complained of by Irish Catholics in regard to University Education, an old standing Pharmaceutical grievance, to which attention has several times been directed in these columns. In Ireland the dispensing of medicines is entirely in the hands of the apothecaries, and it is unlawful for chemists and druggists to dispense any prescription.

About two years since some move was made towards attempting to assimilate the law as to the practice of Pharmacy in Ireland with the enactments which exist for Great Britain. A draft Bill was prepared by the Company of Apothecaries, which was to have been introduced into Parliament by Sir Dominic Corrigan. That body proposed to grant licences to persons—other than medically qualified apothecaries—to assume the title of Pharmaceutical Chemists, and to keep open shop for the retailing of drugs and for dispensing medicines. Some opposition was offered on the part of the chemists and druggists, and at a meeting held in Dublin it was resolved that they would not place themselves under the control of the Apothecaries' Hall of Ireland.

Since that time the matter has remained in abeyance, but not without some advance having been made towards more harmonious action between the apothecaries—who have the command of the position at present—and the druggists, who desire to enjoy equal advantages in regard to dispensing. Only a few weeks since we announced the formation of a Society of Chemists and Druggists, which was to aim at raising the condition of the trade and obtaining for Pharmacists in Ireland a status similar to that secured by the Act of 1868 for the rest of the kingdom. At a recent meeting of this society, attended by all the principal druggists in Dublin, it was proposed that an endeavour should be made to arrange terms with the Apothecaries' Company, with a view to establishing a system of examination similar to that of the Pharmaceutical Society of Great Britain, as a qualification for compounding physicians' prescriptions. A deputation was authorized to communicate with the Governor and Company of the Apothecaries' Hall on the subject, and to ascertain the views of that body.

At this meeting the clauses of the draft Bill, drawn up two years since, were read and discussed *seriatim*, and it was finally arranged that the United Society of Chemists and Druggists of Ireland should frame a Bill and submit it for approval to the Apothecaries' Company preparatory to its being introduced into Parliament.

It seems, therefore, that an opportunity exists now for effecting some satisfactory reform, and in all probability the importance of the subject will attract the attention of the Council at its next meeting in April, especially since it has been suggested by the Irish chemists that they should petition the Society to extend the general operation of the Pharmacy Act, 1868, to Ireland, in the same way that the provisions of that Act relating to sale of poisons has already been made to apply in that portion of the kingdom.

No doubt there are certain difficulties which stand in the way of such an extension of the Pharmacy Act. It would certainly be opposed by the apothecaries if it were to give any person on the register of chemists and druggists a right to practise pharmacy in Ireland, and we can well understand that in any compromise they may agree to, they would insist on some higher test of qualification than that which now suffices for obtaining in Great Britain a licence to keep open shop for compounding medicine and for the sale of drugs.

The great argument by which the licentiates of the Apothecaries' Hall have hitherto maintained their monopoly was based upon the incompetence of the druggists, as a class, for dispensing medicine. In the present temper of society, however, the Hall could scarcely expect to maintain its monopoly any longer than it could guarantee to the public the superiority of its licentiates' qualifications over those of a class of pharmacists, admittedly better educated than it was the wont to be. In short, we cannot perceive what reasonable objection can be raised to throwing Irish pharmacy open to examined pharmaceutical chemists. Such a course would, we believe, do away with much dissatisfaction in Ireland, and it would, we hope, be of some avail on this side of St. George's Channel towards awakening a healthier appreciation of that higher qualification which it has been the chief aim of the Pharmaceutical Society to make general in the trade.

Altogether this subject is one eminently deserving of the most careful treatment by our Council, and the need for its consideration at the present moment comes opportunely as a means of diverting the current of its deliberations from the vexing question of woman's rights in matters pharmaceutical.

THE SALE OF DRUGS IN FRANCE.

A few of our correspondents, if we may judge by the tone of their communications, have a certain vague impression that the Pharmaceutical Society is empowered to regulate not only the sale and dispensing of poisons, but also the sale of almost every other substance which finds a place in a druggist's shop. Of course this is not the case, and the Council, even if it were desirous to do so, is not able to prevent grocers or any other tradesmen from retailing articles not included in the poison schedule of the Pharmacy Act, nor is it likely to be. "Monopoly" is a word peculiarly obnoxious to the Englishman of the present day, and it was pertinently remarked at the last annual meeting that the Pharmacy Act,—even so far as it goes,—is the only legislation in restraint of trade existing in this country. At present, therefore, it would be wise to rest content with the vantage ground that a registered qualification and the sole right to deal in certain indispensable drugs imparts; to assist individually in securing the privileges—not so inconsiderable as some would pretend—which the present law accords, rather than by over-reaching to make both these and those that are desired impracticable.

> "We must not make a scarecrow of the law,
> Setting it up to fear the birds of prey,
> And let it keep one shape, till custom make it
> Their perch and not their terror."

In France, however, with its greater capabilities for paternal government, they manage things differently. Recently our pages recorded penalties imposed upon unauthorized persons for selling cod liver oil and quinine wine; to-day the point may be further illustrated by a letter which has been issued by the Préfet of the Haute-Saône. That functionary having been informed of the existence in some communes of medicine stores kept by undiplomatized and unqualified persons, warns such persons that they are violating the law, and that it is his duty to proceed against them. But, recognizing the inconvenience sometimes experienced in districts at a distance from an authorized pharmacy, he announces his intention to carry into effect, as an experiment, the recommendations of a commission appointed to consider the subject. Medicine stores will be allowed to be established in such communes, upon tolerance; the privilege to be revoked in case of abuse. The drugs are in no case to be sold; and are to be delivered to the patient by the doctor in person. These communal *dépôts* are to be subject to an annual visit from the inspector of pharmacy, and the stores are to be limited exclusively to the following:—

1. Emetic (ten packets of 5 centigrams each).
2. Ipecacuanha in powder (four packets of 1 gram each).
3. Sulphate of Quinine (four packets of 1 gram each).
4. Chloroform (30 grams in a stoppered bottle).
5. Laudanum (20 grams in a stoppered bottle).
6. Solution of Perchloride of Iron (30 grams in a stoppered bottle).
7. Mustard Leaves (ten).
8. Sulphuric Ether (30 grams in a stoppered bottle).
9. Calcined Magnesia (50 grams in a wide-mouthed bottle).
10. Carbolic Acid, in crystals (30 grams in a stoppered bottle).
11. Solution of Ammonia (50 grams in a stoppered bottle).
12. Ergot of Rye (5 packets of a gram each).
13. Extrait de Saturne (100 grams in an ordinary flask).

"Aliæ nationes servitutem pati possunt: populi Romani est propria libertas." At least, so said Cicero.

PATENT MEDICINE LICENCE.

Occasionally we are asked the question whether one licence empowers a person to deal in patent medicines in more than one place. The following letter from the Assistant-Solicitor of Inland Revenue is a reply to an inquiry made with the object of setting the matter at rest:—

Inland Revenue,
Somerset House,
22nd February, 1873.

Dear Sir,—

In answer to your letter of the 20th February instant, I beg to acquaint you that a person holding a £2 licence as a medicine vendor may sell anywhere in any number of places in Great Britain; and a person holding a more limited licence may sell in any number of places if they are not within the places mentioned in the reservation in his licence.

I am, Dear Sir,
Your obedient servant,
Stephen Dowell,
Assistant-Solicitor of Inland Revenue.

E. Bremridge, Esq.

The cultivation of the poppy for the production of opium seems to be occupying some attention in South Africa just now. A commercial firm at Port Elizabeth, Cape of Good Hope, having received a parcel of fresh poppy seed from Calcutta, have distributed it to persons in the colony desirous of cultivating it and giving it a fair trial. It is stated to be the opinion of competent judges at the Cape, that the poppy can be grown successfully on the coast lands, where there is little or no danger to be apprehended from frost; consequently there seems to be no reason in the opinion of the colonists why the production of opium should not be successfully carried on, and another valuable article of commerce added to the Cape list of exports.

A curious case of poisoning by carbolic acid is reported from Wurtemberg. Two men suffering from the itch were each supplied by a medical man with 30 grams of carbolic acid dissolved in alcohol and water, which they were told to rub briskly on the parts affected. This they did so effectually that one of them died within an hour, and the other narrowly escaped with his life. The prescriber, so it turned ut, had somewhere read that carbolate of soda was an efficacious remedy for the disease in question.

Provincial Transactions.

BRIGHTON ASSOCIATION OF PHARMACY.

At a meeting of this Association on Friday, March 6th, in the Hanover Lecture Hall—the President, Mr. W. D. Savage, in the chair—an interesting paper on the potato and its commercial products, was read by Mr. J. Mathews. After showing that the subject of his paper was an interesting one, Mr. Mathews observed that next to wheat the potato is of the greatest importance as an article of human food. It has this advantage over the cereal grains, that it affords food three months earlier. As compared with wheat, its nutritive properties are low, yet one acre of potatoes give more food for man than two acres of oats. The potato consists of the tuber of *Solanum tuberosum*, a plant of the natural order *Solanaceæ*. It was introduced into England probably about the year 1597, by Sir Walter Raleigh; but before its introduction, considerable quantities of sweet potatoes, consisting of the tubercules of *Batatas edulis*, a plant of the natural order *Convolvulaceæ*, were imported into this country from Spain and the Canary Islands. This is the potato alluded to by Shakespeare, and which is still cultivated in tropical countries, though not now in England.

Potatoes, the lecturer said, contain a large quantity of starch, which is all found very near the surface, the heart containing very little. Hence potatoes should be pared thin, or better still, should be merely washed. The starch is separated from potatoes in large quantities, and is sold as potato flour, British arrowroot, etc. It may be distinguished from arrowroot by the naked eye, and by the touch, but the only means of detecting its presence with certainty is by the microscope. By a peculiar manufacturing process it is converted into substances resembling tapioca and sago, and is used to adulterate those articles. Large quantities of it are converted into dextrine, and a great deal is also consumed in the manufacture of potato spirit, which is much cheaper than grain spirit, and is therefore extensively employed in making cheap perfumery. It has a disagreeable smell, owing to the large amount of amylic alcohol contained in it. This amylic alcohol, which used to be rejected, is now converted into a number of beautiful flavouring essences, such as essence of jargonelle pear, apple, etc., and it is also the source from which the nitrite of amyl, a powerful medicine, is obtained.

At the conclusion of the paper, a hearty vote of thanks was given to Mr. Mathews for his instructive address, and the president gave a description of the method of making sugar from starch, as seen in operation by him.

Mr. W. H. Smith observed that it was quite new to him that potatoes did not contain starch in their centre, and although he was unable to make a positive statement about it, yet the section he would presently exhibit was at any rate taken very near the centre of a potato, and every cell was full of starch granules. He was also surprised to hear the potato spirit was used in perfumery for cheapness because the actual cost of grain spirit was very little; it is the duty imposed upon it which makes it so expensive.

Mr. Schweitzer explained that potato spirit is employed in perfumery because its peculiar odour is preferred, and not on account of its cheapness.

Mr. Cornish thought that if the centre of the potato did not contain starch it would not present a floury appearance.

An interesting discussion ensued as to the best way of planting potatoes. The President said he had found by experience that an entire potato, the size of a pullet's egg, gave the best results.

The meeting then resolved itself into a *conversazione*, and specimens of fruit essences, etc., were exhibited by Mr. Mathews, and various starches under the microscope by Mr. W. H. Smith.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

A special meeting was held on Monday, March 10th, 1873. The President being unavoidably absent, Mr. Druce was voted to the chair. Donations were announced of the Calendar and Journal from the Pharmaceutical Society, a large number of prescriptions from Mr. F. P. Brown, and twenty-four specimens of officinal materia medica from Messrs. P. Jeyes and Co. The Chairman said that he had noticed with great satisfaction the large and in every way successful classes that had been conducted during the winter session. He was also pleased to say that three new members had recently joined them. The examination in Botany would be held on March 17th; Materia Medica, March 21st; and Pharmacy on March 24th—the first two conducted by Mr. W. Sandall, and the latter by Mr. G. N. Maxwell, and he was sure the Association was to be congratulated upon obtaining two such able gentlemen to perform such onerous duties.

Mr. Wallis then read a very interesting and instructive paper on Sponge: its Structure and Position in the Animal Kingdom—remarking that it was his first paper. He proceeded to describe the appearance of sponge, and to notice the very slight claim it had to the name of an animal, seeing that its power of locomotion was limited to its youth, and that it had no blood-vessels or alimentary canal. But that it did belong to the animal kingdom had been first proved by Mr. Ellis, and, with few exceptions, it was classed as such by the leading naturalists of the day. He then went on to describe its habitat—the various species of sponge, both British and foreign—the manner in which commercial sponge was collected by divers, and its preparation for use by steeping it in cold water, the concretions which it contained being separated by occasional beatings, afterwards washed in water acidulated with hydrochloric acid, and sometimes bleached by means of sulphurous acid. Having referred to the spicula so generally present in sponge, and to their composition, he explained how burnt sponge was prepared, and gave its composition, referring any medicinal effect it might have to the iodide and bromide of potassium it contained. He concluded by expressing his belief that the study of even animals so low down in the scale as sponge would repay the trouble of the investigator.

Mr. Druce then read a paper on Guarana, descriptive of its origin, composition, therapeutical effects, and mode of preparation.

Votes of thanks to Messrs. Wallis and Druce, to the various donors, including one to Mr. Mayger for the loan of chemical apparatus and one to Mr. W. Marriot for the loan of a microscope, were passed.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL ASSOCIATION.

The general monthly meeting was held on Wednesday evening, March 12th inst.—Mr. W. Ward, F.C.S., President, in the chair. There was a somewhat better attendance than at the last monthly meeting.

After some preliminary business, a lecture was delivered by A. H. Allen, Esq., F.C.S., on "The True Nature of the Phenomena attributed to the Agency of Spirits." In the course of the lecture, which was listened to with great attention, Mr. Allen said, that the spiritualistic phenomena were of several distinct kinds. First, there was mere meaningless table-rapping and turning; secondly, the interpretations of the knocks into distinct and intelligible communications from spirits. These simpler "manifestations" were merely the result of unconscious muscular action. The lecturer had himself taken part in table-rapping, and though some of the answers were sufficiently curious, a careful consideration of the effects and proper modification of the arrangements invariably proved the rapping to be directly, but unconsciously, produced by the operators themselves. A third and more complicated set of phenomena were those in which so-called "levitation" came into play. Pieces of furniture were said to be raised from the ground, musical instruments played, and various other effects produced by the spirits. It was a suspicious circumstance that the musical instruments chosen were always those very easily played, such as accordions, but it would be interesting if the spirits would blow a flute or a whistle, as it would prove they had lungs as well as hands. In some cases it was stated that a profusion of flowers were showered suddenly on the tables, none having previously been in the house. But, on inquiry, it never seemed as if the observers had taken the trouble to notice what kinds of flowers were produced. If such a manifestation had occurred in his presence, it would have been the lecturer's first impulse to take the flowers to a competent botanist for him to decide whether they were normal specimens or "monstrosities." If normal, one of three things would be proved—that the botanical productions of the spirit-world were identical with those of our earth; that the spirits stole the flowers from some neighbouring garden; or that they were not produced by spirits' aid at all. If, on the other hand, the flowers proved to be monstrosities, there would be the strongest reason for believing them to have been produced by preternatural aid.

It was a curious fact that the most successful manifestations took place in the dark: suspicious as this condition seemed to outsiders, the spiritualists explained it by saying that light destroyed the visibility of the spirits, but that in the non-actinic light of a photographer's dark room, the spirits became visible. If so, they ought to be equally visible by moonlight, and a successful midnight *séance* in an open field would go farther to convince sceptics of the truth of spiritualism than a hundred meetings in the artfully prepared reception rooms of professional mediums of doubtful antecedents and reputation. Mr. Allen remarked that with proper arrangements all the astonishing manifestations of the professional mediums could be imitated by mechanical or scientific aid. The lecturer asked a number of questions of a glass bell suspended from the ceiling by a silken cord, the bell correctly replying to all by the number of strokes given by its clapper. Similar "spiritualistic" effects were obtained from a suspended drum and from a chair—Mr. Allen subsequently explaining the methods employed in producing the manifestations. The lecturer said that scientific men were often accused of ignoring the spiritualists without due cause, but this was scarcely the case. The phenomena had been investigated by Faraday, Tyndall, Carpenter, and others who had succeeded in explaining them. The organised attempt at investigation made by Mr. Crookes had resulted in a manner eminently unsatisfactory to the spiritualists, for Mr. Crookes, and those associated with him, had come to the conclusion that there was no evidence that the effects were due to the agency of spirits, but there seemed to be a power possessed by Mr. Home, and a few other persons, of overcoming the force of gravity by the power of their will; and although the experiments were in some instances very badly devised, the general impression was that the subject deserves further consideration. Any investigation of the sort is attended with great difficulties, as the power alleged by Mr. Home to be possessed by him is only met with in rare cases. Mr. Crooke's experiments have been tried again in America by some of the most eminent mediums, but have never succeeded.

At the conclusion a vote of thanks, proposed by E. Birks, Esq., and seconded by Mr. Booth (Chesterfield), was unanimously tendered to Mr. Allen, much pleasure being expressed at the way in which he had clearly explained many of those knotty points which are rather puzzling to ordinary observers. This brought the meeting to a close.

UNITED SOCIETY OF CHEMISTS AND DRUGGISTS OF IRELAND.

A deputation from the United Society of Chemists and Druggists of Ireland waited, by appointment, upon the Governor and Court of the Apothecaries' Hall on Friday, the 14th of March. The following gentlemen constituted the deputation:—Mr. Hodgson, President of the Society; Mr. Hayes, Hon. Sec.; Mr. Goodwin, Treasurer; Mr. Boyd; Mr. J. T. Holmes, and Mr. Wells. There was a full attendance of the members of the Court. Mr. Hodgson introduced the deputation, and said its object was to ascertain the views of the Court of Apothecaries on the subject of forming a Pharmaceutical Society in Ireland similar to the society in England. The clauses of a draft Bill, which had some time ago been prepared by the Apothecaries' Company, were then read seriatim by the Governor, and discussed. (The Bill was printed in the present series of the PHARM. JOURN., vol. i. p. 405.)

After each clause had been fully discussed, and several amendments suggested by the deputation and approved by the Court, it was arranged that the Chemists' Association should frame a Bill and submit it to the Apothecaries' Company. If approved of, the Attorney-General would be requested to introduce a Bill on the subject without delay.

The Governor wished the deputation to go away with the understanding that the Court was in every way disposed to assist in the matter, and no doubt a Bill similar to the draft Bill discussed will be adopted.

Proceedings of Scientific Societies.

PHILADELPHIA COLLEGE OF PHARMACY.

A pharmaceutical meeting of the Philadelphia College of Pharmacy was held on Tuesday, February 18; Mr. Samuel S. Bunting in the chair.

Mr. Shinn said that, at the meeting held in December last,* reference was made to a preparation, somewhat in demand in Philadelphia, containing fifty per cent. of cod-liver oil and a certain amount of lacto-phosphate of lime. Many experiments, before and since that time, have been made by him to devise an eligible method of combining these remedies in a palatable form, resulting in the following formula, made to contain twelve grains lacto-phosphate of lime to the ounce:—

Take of Cod-liver Oil	Oj,
Oil of Bitter Almonds .	
,, Peppermint . . .	
,, Wintergreen, each	gtt. x,
Powd. Gum Arabic . .	℥iv,
,, Sugar	℥vi,
Solution of Lacto-phosph. Lime (ʒi to f℥i) . .	f℥viss,
Lime Water	f℥viss.

Mix the gum and sugar in a capacious mortar, and make a smooth mucilage with the lime water and three ounces of the solution of lacto-phosphate of lime. Add the volatile oils to the cod-liver oil, and gradually triturate them with the mucilage until a perfect emulsion is formed. Finally, add the rest of the solution of lacto-phosphate of lime, and mix thoroughly.

The solution of lacto-phosphate of lime is made as proposed by Mr. Neergaard in the *American Journal of Pharmacy*, June, 1871, by saturating a solution of lactic acid with freshly precipitated phosphate of lime.

The magma obtained from 16 ounces of phosphate of lime dissolved in muriatic acid, precipitated by ammonia, quickly washed and pressed, will be sufficient to saturate a pound of the commercial acid mixed with 4 pints of water. After filtering the solution it is assayed by evaporating a fluid ounce to dryness and weighing the result-

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* See before, page 594.

ing lacto-phosphate of lime, when it can be made of a definite strength. In the formula given it contains 60 grains to the fluid ounce, which is about equal to 30 grains of phosphate of lime, and is of convenient strength. It has a slightly acid taste, which, however, is not unpleasant, but rather renders the emulsion less cloying than if entirely sweet. As made by the formula, the preparation will keep in good condition for two or three weeks, but will eventually spoil, as shown by the blowing out of the stopper, although the taste and character are not materially altered.

If meant for sale to the trade, the addition of about 20 per cent. of alcohol renders it more permanent, and in most cases may not be therapeutically objectionable.

This led to some remarks upon the preparation, during which Mr. Chiles gave a formula (which will be published in a future number). The question of the legality of selling the preparation was discussed, there being a patent for the manufacture of a similar compound. Mr. Chiles stated that he also prepared a lozenge of lacto-phosphate of lime and pepsin.

Parliamentary and Law Proceedings.

Prosecutions under the Adulteration Act.

At the Clerkenwell Police Court, on Friday, March 14, George Brown, a tea-dealer and grocer, of 27, Central-street, St. Luke's, was summoned before Mr. Barker, by James Neighbour, sanitary inspector, appointed by the vestry of St. Luke's, Middlesex, under the Act to Amend the Law for the Prevention of Adulteration of Food and Drink and Drugs, 35th and 36th Vict., cap. 74, "for unlawfully selling tea, and knowing the same to be mixed with another substance, with intent fraudulently to increase the weight and bulk, and without declaring such admixture to the purchaser thereof, before delivering it."

Mr. Parkes opened the case at some length, and having stated the provisions of the act under which these proceedings are taken, said that the vestry, anxious to repress the illicit trade in adulterated food and drink, and other articles, prevailing in the parish, at the earliest opportunity determined to put in force the provisions of the act, and for that purpose appointed Dr. Pavy, of Guy's Hospital, M.D., F.R.S., analyst, and Mr. James Neighbour (sanitary inspector of the parish), inspector under the said act. As soon as the appointments were ratified by the Local Government Board, samples of apparently adulterated articles of food and drink were procured by the inspector and submitted to Dr. Pavy, for the necessary analysis, and the result had been the taking out the present summons. The case before the magistrate was a most flagrant one, and the fraudulent intent was clearly palpable, for upon analysis the rubbish sold as tea in each case was found to contain ingredients consisting of iron filings and clippings, gritty matter, small fragments of wood, and foreign stalks which could be plainly seen by the aid of a microscope, and the iron filings adhered in profusion to a magnet placed in it. He contended that the defendant, being a professed dealer in tea, could not but know that the articles so sold were fraudulently increased in weight and bulk, and he asked for a conviction, as this case came within the meaning of the act. He then called

Mr. James Neighbour, who deposed that on the 19th of February last he entered the defendant's shop, and asked for 4oz. of 1s. 4d. tea, which was supplied, also 4oz. of 8d. tea, and that was also supplied, he paying 6d. for the whole. The person who served him did not declare that there was any other substance or admixture in the tea purchased, or that the tea was in any way adulterated, and he saw no notice of any admixture or adulteration. He took the packets of tea and delivered the same to Dr. Pavy, the analyst, in the same condition, and in the same packets, as delivered to him by the person who served him. Each packet was divided into two parts, one of such parts being retained by Dr. Pavy for analysis, and the other parts were sealed up in his presence, and have remained in the same state as now produced. He received the two certificates produced from Dr. Pavy, who certified that both samples of tea were in an adulterated condition, one sample being adulterated with iron filings and clippings, gritty matter, and foreign stalks, whilst the other consisted of tea dust, with adulteration composed of iron filings and clippings, gritty matter, small fragments of wood, and foreign stalks.

By Mr. Ricketts.—He did not expect to get a good and unadulterated tea at 8d. per lb. He did not see in the defendant's shop placards, "This capital mixture 8d. per lb.," nor "Our noted mixture 1s. per lb.—try it." He did know that tea got between the lead and the chest, and that it was knocked out and sold as tea. He should not say that that would make "noted mixture."

Mr. Barker looked at the mixture through a microscope, and also applied the magnet to it. When the magnet was taken out there were many particles adhering to it.

Mr. Parkes said that was the case for the prosecution.

Mr. Ricketts said if that was so there must be an end of the case, for the certificates of the analyst did not comply with the provisions of the act. By the 9th section the analyst had to certify whether such article in his opinion submitted to him was adulterated, and also whether, if it be an article of food or drink, it is so adulterated as to be injurious to the health of persons eating or drinking the same. He had a good answer to the case on its merits.

Mr. Parkes said that by the 3rd section the words cited by this section were not necessary.

Mr. Barker said he should adjourn the case for a fortnight to consider the point. There was no doubt from the samples he had seen that they were very much adulterated.

Mr. Ricketts said he hoped that the prosecutors would not be allowed to re-open their case, or to supplement it with fresh evidence.

Mr. Barker adjourned the case for a fortnight.

Ellen Jones, of 151, Lever-street, and David Jones, of 5, York-road, St. Luke's, were also summoned by Mr. James Neighbour, for selling adulterated milk; and these were adjourned to know the result of the objections taken in the last case.—*Standard.*

Attempted Suicide by Red Precipitate.

A few days since Emily Thompson was charged at the Worship Street Police Court with attempting suicide. It appeared from the evidence that the prisoner, being in liquor, put some red precipitate powder into a cup of tea and drank it off. She was attended by a doctor, but did not appear to suffer much. Upon her were found two papers which were labelled "Red precipitate—poison," and Mr. Hannay said that he should like to know how these poisons came to be sold. For that purpose he sent for the chemist whose name was upon the packets. The witness, carrying on business at 70, Hyde-road, Hoxton, stated, in reply to Mr. Hannay, that red precipitate was red oxide of mercury. The two packets would contain about two scruples—quite sufficient to destroy life. He put in the regulations recently made by the Pharmaceutical Society as to the sale of the poison in question, but said that he had no recollection of selling to the prisoner. It was a very common thing to sell either red or white precipitate, and witness sold about a hundred packets a week.

Mr. Hannay, after looking into the law as to the sale of poisons, said that the witness had complied with it.

The prisoner said that she was sorry, and her husband promised to take care of her for the future. He thought her attempt was the result of grief.

Mr. Hannay, after cautioning the prisoner, discharged her.—*Standard.*

The Sale of Laudanum.

A man was charged at Portsmouth last week with attempting to commit suicide. In a letter which he had written he bade his landlord good-bye; and he was afterwards found with a bottle in his hand containing laudanum, which he said he had obtained in pennyworths at a number of chemists in the town. The prisoner was remanded.

Suicide of a Commercial Traveller.

On Monday, March 17, an inquest was held in Little Britain on the body of Alexander Jackson, aged 39 years. Joseph Houldsworth, chief clerk to Messrs. Maw, Son, and Thompson, Aldersgate Street, said deceased was one of their town travellers. On Friday morning witness saw him at No. 12, Aldersgate Street, and told him that a customer had written stating that an account which they had rendered to him had been paid. Deceased replied, "Yes." Witness then said, "It's a very serious matter, and I shall inform the firm of it." Deceased was accountable to witness for moneys he received, and this was not the first time he had mentioned it to him, but not to the firm, but told him he must do so if it occurred again. On Friday deceased entreated witness not to tell the firm, but he told deceased he must do it, and accordingly told Mr. Thompson, the junior partner. Soon after, Mr. Maw arrived, and witness told deceased to tell Mr. Maw himself the whole particulars, as it would be much better than if witness told him. Witness saw deceased again afterwards, and said to him, "Have you told Mr. Maw?" He said, "No, I cannot; what use is it?" and he turned round and left the counting-house, and went down stairs. Soon after the charwoman called witness, and he went down, and saw the deceased standing near the kitchen with his head resting on the steps leading into the street. He was not sensible, and a doctor was sent for. Sophia Warr, charwoman, said, when deceased came down stairs he had a blue bottle in his hand; he held it to his mouth, and drank the contents, and then threw the bottle across the kitchen. Witness called for assistance. John Prior Parkes, compounder at Messrs. Evans and Lescher's, Bartholomew Close, wholesale druggists, said he knew deceased, whom he met on Friday morning in Aldersgate Street. Deceased said, "I want you to let me have an ounce of prussic acid, for killing cats. I have some at home, but it is decomposed." Witness objected to go back at first, but, knowing deceased was a chemist and druggist, he let him have the prussic acid. Witness saw nothing peculiar in his manner. He said people ought to be very careful with prussic acid; he had seen many accidents with it himself. Mr. W. Wallford, surgeon, said he was called in, and found deceased in a chair, perfectly insensible. He died directly. The cause of death was poisoning by hydrocyanic acid. Verdict, "Temporary insanity."—*City Press.*

Reviews.

A Course of Qualitative Chemical Analysis. By Wm. Geo. Valentin, F.C.S. London: J. and A. Churchill. 1873.

We had an opportunity a few weeks ago of commenting on the "Introduction to Inorganic Chemistry," constituting the first of the two volumes into which Mr. Valentin has thought it expedient to divide his original work. We now have before us the second volume, which is devoted to a systematic course of experiments arranged for exercise in practical qualitative analysis.

The general principle which appears to have guided the author in the arrangement of his work is not new, but we do not think any the worse of it on that account.

The book commences with a short chapter devoted to an explanation of the objects of qualitative analysis, in which the author says, "Chemical analysis consists in the performance of certain experiments with the object of putting, so to speak, certain questions to a substance, in order to ascertain the presence or absence of certain bodies. It is termed *qualitative* analysis, if the answer which is received reveals merely *what kind* of matter is present without regard to quantity." It is quite true that this is the primary object of qualitative analysis, and the one which is usually kept in view by both teachers and students, to the almost complete exclusion of another object which in some respects may be regarded as no less important. By studying the action of reagents upon bodies, and systematizing the knowledge so obtained, we may learn not only how to recognize definite chemical compounds, and to detect any one or the whole of the constituents of a complex mixture, but we ought to be able to base upon that knowledge methods for the complete separation of the constituents of bodies, so that they may be presented in an isolated form in a condition of chemical purity. It is quite true that separations are universally practised by students according to the well-known system of classification, by the aid of group and special reagents. But we think a very useful set of exercises might be devised, in which a student should be required to carry to completion this process, which, according to the usual practice, is considered to have served its purpose, and to be finished when, by the use of certain tests, corresponding appearances have been produced. In other words, we think it would have a beneficial influence on both the mental and manipulative habits of the student if he were expected occasionally, and when practicable, to produce, in a state of chemical purity, and by the usual analytical method, specimens of the sulphides, oxides, and other compounds of the elements towards the discovery of which search is commonly directed. It would have the effect of informing the student as to how far the processes which he employs are really serviceable for the true separation and isolation of chemical species, and in many cases work of this kind would tend probably more than anything to check the slovenliness which in some students is a constant source of difficulty both to their teacher and themselves.

In this same introductory chapter, the author gives some hints as to manipulation, short but sufficient. He then goes on to give the usual "tests" for the metals, taking them in order, and commencing with the alkaline group. At the end of each group those reactions which may be called diagnostic are indicated, and the student left to construct for himself a process for the separation of the members of the group, one from another. Tables for his guidance are afterwards introduced. This is a very good plan, and when faithfully carried out, is calculated to diminish the injurious influence which the injudicious employment of tables undoubtedly exercises. The work is done more intelligently, and there is far less risk of the study assuming the character of a mere mechanical art.

With regard to the tables given in the book we have no fault to find. The processes recommended are very good, probably the best, that could have been adopted. In many cases the methods of separation possess the advantage of being those which are practically available for quantitative purposes.

The author insists very properly upon the necessity for washing precipitates; this is an important point, and one which is too often neglected by students.

It generally seems to be considered necessary to draw up very elaborate tables for what is called the "preliminary examination."

Any attempt to make such a table complete we should regard as superfluous and almost useless, inasmuch as the power to interpret correctly the results of preliminary experiments can only be the result of experience, and must be based on a previous knowledge of the appearance and properties of a large number of substances. To those, therefore, who possess that knowledge, such a table would be of very little use, and those who have it not, the table, even if complete, would do very little to enlighten, and its employment would consume a great deal of time.

We most cordially commend Mr. Valentin's book, so far as its practical aspect is concerned, and, in all but one point, we consider it as nearly perfect as possible. We allude to the notation. It is certainly a most unfortunate thing that so many otherwise admirable books should be objectionable in this one respect. We could, at this moment, name several other chemical manuals in which some eccentricity in the notation adopted is actually a bar to their use by a great many teachers.

The author in the work under review employs constitutional formulæ, written on Frankland's system, throughout the book, tables and all. He reminds one of a boy with a watch. He is not content with referring, when necessary, to see what o'clock it is, but must for everlasting be telling you the time of day. Added to this, the system employed is, as we have before taken occasion to point out, one which has a tendency to cramp the ideas of the student worse than almost any that can be conceived. We should not grumble if the author would consent to alter the shape of the formulæ just now and then, but it seems to us preposterous to introduce into analytical tables formulæ which are not unfrequently written on two or three lines, and are full of brackets and dashes.

We have the same kind of objection, and one equally decided, to the invariable employment of systematic names, and indeed to the use of any one class of names to the exclusion of others. As very justly observed by Whately,* the disposition to do "this is that which chiefly constitutes what is called narrowness of mind"—a complaint from which chemists are no more exempt than other mortals.

But to return to the book;—though, as we have already explained, we have a strong objection to the system of notation employed, and should be glad to see it at least partially supplanted by some other and less rigid style of formulæ, we confess to having thorough confidence in the practical part of its contents, and should have no hesitation in recommending it to students as a very excellent and trustworthy manual of qualitative analysis.

Posological Tables; being a Classification of all Officinal Substances, for the Use of Students and Practitioners. By W. Handsel Griffiths, Ph.D., etc, etc.

The compiler of this broad-sheet has endeavoured to provide for the student who would learn the authorized doses of medicines, and for the practitioner who may for the moment have forgotten them, a means of obtaining the required information more easily than by turning over the pages of the Pharmacopœia.

The first part of his design is, he says, to make the Tables useful to students as an aid to memory, and we presume he calculates on doing this by a certain method of grouping.

The tables are arranged under three headings, "Inorganic Substances," "Organic Substances," and "Pharmacopœial Groups."

The classification under each heading, instead of being alphabetical as commonly adopted, appears to be made with reference to the active power of the articles. Thus in the group of acids we find the dose of the first, "Acid. Nitric." to be ♏ j—v; two others follow singly, marked respectively ♏ ij—viij and ♏ v—xx; then we have five bracketed as ♏ v—xxx, and two more singly ♏ xxx—ʒj and ʒj—ʒij. A notable deviation from the ordinary method of posological tables is seen here in the fact that "Acid. Nitric. Dil." does not immediately follow the strong acid, but stands among the five bracketed with the dose ♏ v—xxx. This necessarily involves some previous acquaintance with the acids in question and the proportions of their dilution, so that Dr. Griffiths' table will be less likely than it otherwise might be, to be used as a kind of parrot-lesson by students.

We have mentioned the acids because they meet the eye in the first column, but the last column gives a more perfect idea of the system of classification according to doses. We there find tinctures divided into groups, the first those of which the dose ranges from ♏ v—xx, then ♏ v—xxx, ♏ v—ʒj, ♏ xxx—ʒij. Where the same medicine is given in varying doses for different purposes we find it put down at different points of the scale—thus, third under "Zincum," "Sulphas (Tonic) gr. j—iij," and eighth, "Emetic gr. x—xxx," and similarly with "Ipecacuanha;" but we here notice that, doubtless by inadvertence, the word emetic is omitted where the larger dose is stated.

On the whole we think the Posological Tables form a convenient chart for reference; and we like them the better because they are compiled apparently on the understanding we hinted at before, that those who use them will do so with some previous knowledge of the power of the medicines passing through their hands, and would not, for example, when seeking the authorized dose of "Senna" expect to find it immediately following "Sabina" and "Scilla."

* 'Logic.'

Obituary.

Notice has been received of the death of the following:—

On the 6th January, 1873, Mr. Thomas Simpson, Pharmaceutical Chemist, of Stowmarket. Aged 72. Mr. Simpson had been a member of the Pharmaceutical Society since 1842.

On the 28th January, 1873, at the Cape, whither he had gone in the hope of re-establishing his health, Mr. R. C. Hopgood, Pharmaceutical Chemist, late of Chipping Norton. Aged 30. Mr. Hopgood had been a member of the Pharmaceutical Society since 1868.

On the 7th March, 1873, Mr. Alexander Hugh Douglas, Chemist and Druggist, of Cheshunt. Aged 31.

BOOKS RECEIVED.

Grundlagen den Pharmaceutischen Waarenkunde. Einleitung in das Studium der Pharmacognosie. Von Dr. F. A. Flückiger. Berlin: Julius Springer. 1873. From the Author.

The Origin, Extension, and Prevention of Fires, and the Relation of Mineral and Vegetable Oils, and other Materials to Fire. Four Letters to The Times, and an Appendix. By John Attfield, Ph.D., F.C.S., etc. London: Van Voorst. From the Author.

Nugæ Canoræ Medicæ; Lays by the Poet Laureate of the New Town Dispensary. Second Edition. Edinburgh: Edmonston and Douglas. 1873.

Outlines of Physiological Chemistry, including the Qualitative and Quantitative Analysis of the Tissues, Fluids, and Excretory Products. By Charles Henry Ralfe, M.A., M.B. London: H. K. Lewis. 1873.

APPOINTMENT.

Mr. R. W. Houghton, pharmaceutical chemist, formerly of Bermuda, has been appointed Dispenser in charge of medical stores at the Royal Naval Hospital, Jamaica.

VACANCY.

A Dispenser is required for the Southern Dispensary, St. Marylebone, W., who must be a Licentiate of the Apothecaries' Company or registered under the Pharmacy Act. For particulars, see advertisement.

Notes and Queries.

[332.]—FATTY OAK VARNISH.—Having got a quantity of old fatty oak varnish, can any correspondent inform me the best mode to adopt to liquefy it and render is serviceable?—G. W.

MONOCHROMATIC LIGHT FOR ALKALIMETRIC OPERATIONS.—The difficulties attending the use of litmus by gas or other artificial light, in delicate operations, has been the subject of a communication by M. L. d'Henri to the French Academy. He suggests the use in a darkened room of the non-luminous flame of a Bunsen burner into which a platinum wire, previously moistened with a paste of common salt and water, is made to pass. In the intense yellow light so produced the red colour of litmus appears as colourless as water, while the blue appears as black as ink.

DETECTION OF NITRATE OF POTASH MIXED WITH NITRATE OF SILVER.—M. Pollacci (*Bollettino Farmaceutico*) states that an adulteration of Nitrate of Silver with Nitrate of Potash may be detected by heating about a gram of the suspected nitrate to redness in a porcelain crucible, allowing it to cool and adding to the residue a few drops of distilled water. If the liquor be alkaline to test-paper, it is proof that the specimen contained nitrate of potash. The test is based upon the reaction by which nitrate of potash is converted into the oxide when heated in presence of metallic silver (arising from the reduced nitrate), and afterwards into the hydrate by combination with water.

SUCCUS APARGIÆ.—Upon treating the roots of *A. autumnalis* according to the process for succus taraxaci I found the yield of juice small, the albuminous deposit large, and the product intensely bitter, with a strong odour of succus taraxaci. The extract treated with menstrua gave nothing crystallizable.—J. B. S.

SUPPOSITORIA EXTEMPORANEA.—For suppositories containing cacao butter, a strong jelly of glycerine and tragacanth will be found a useful excipient (about one part of jelly to two parts of cacao butter). Incorporate the active ingredient with the glycerine of tragacanth, add the cacao butter in small pieces, and weld into a mass, roll and mark divisions on an ordinary pill machine. The suppositories can be moulded by the hand, they soon harden, keep well in a dry place, require no heat in their preparation, and melt at the ordinary temperature of the body.—J. B. S.

DEPILATORY.—Boettger (Neues Jahrbuch f. Pharm. xxviii. 230) recommends as a safe depilatory, one part of crystallized sulphydrate of sodium rubbed to a very fine powder and mixed with three parts of prepared chalk. He states that it should be mixed with water and applied to the skin for two or three minutes only, at the end of which time the hair becomes soft and is easily removed by water. A longer contact is liable to corrode the skin.

The following journals have been received:—The 'British Medical Journal,' March 15; the 'Medical Times and Gazette,' March 15; the 'Lancet,' March 15; the 'London Medical Record,' March 19; 'Medical Press and Circular,' March 14; 'Nature,' March 13; 'Chemical News,' March 15; 'Gardener's Chronicle,' March 15; the 'Grocer,' March 15; 'Journal of the Society of Arts,' March 15; 'Grocery News,' March 15; 'Produce Markets Review,' March 15; 'Scientific American,' March 15; 'New York Druggists' Circular' for March; 'American Journal of Pharmacy' for March; 'Anti-Adulteration Review' for March; 'L'Union Pharmaceutique' for March; the 'Educational Times' for March; 'British Journal of Dental Science' for March; the 'Practitioner' for March; 'Journal of Applied Science' for March; 'Florist and Pomologist' for March; 'Journal de Pharmacie et de Chimie' for March; 'Chemist and Druggist,' March 15; Zeitschrift des allgemeinen österreichischen Apotheker-Vereines,' March 10.

Correspondence.

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

Benevolent Fund.

Sir,—In looking down the list of Members of the Pharmaceutical Society, I was surprised to see how few subscribed to the Benevolent Fund. The reason is, I think, very evident; viz., the non-subscribers see how little good is done at present by means of the Fund. There is upwards of £13,000 in the Consols, yielding about £400 per annum interest; and the latter sum is divided, I believe, among about twelve annuitants, yielding the paltry sum of £30 each,—about enough to find them in *coal* at the present price.

Now, Sir, my proposition is that the £13,000 remain as at present, and the interest of that sum, together with all donations and subscriptions, be distributed every year in grants of not less than £50 a year. Then I feel sure, when members see such an amount of good being done, they will almost all be eager to subscribe, and we shall have a report something like the following:—

2,300 Pharmaceutical Chemists, £1 each	£2,300
10,000 Chemists and Druggists, 5s. each	2,500
Interest on £13,000	400
	£5,200

This would give 100 persons £50 per annum each; and surely there must be as many candidates as that for our bounty throughout all England, and many of these are now rejected with aching hearts.

It has just struck me that if this scheme is thought too radical, we might have two classes of subscribers; the one whose money might go to swell the principal, as at present, and the other who might request their money to be immediately bestowed.

If you think my proposition worthy of consideration, I hope you will use your powerful influence in that direction.

Reading. J. B. B.

The Sale of Poisons.

Sir,—I trust you will believe me when I say that in writing the letter which appeared in Journal of the 8th inst., and which you noticed in your leader, I wished not to cast the slightest slur upon the sincerity of your motives for expressing the views from which I differed, but in this, as in all other matters, whether agreeable to my own ideas or not, I believe you have "in view simply the interests of chemists and druggists." I wish to say this because, on reading your article, it gave me the impression that you felt I had entertained a different feeling. And, on the other hand, allow me to say that "interference with trade" was far from the motive that led me to address you: so far as the trouble went, I would register every sale I made, if I could see any real good in it. I desire to see this matter discussed simply on principle. I believe the system of registering vermin-killers to be *not* in accordance with the spirit of the Act. "Charges of negligence in the sale" of vermin-killer I do not think any sane magistrate would make after once reading the Act; and I was glad to see the magistrate at Worship Street yesterday made no remark about a brother chemist at Hoxton, who stated he sold 100 packets of red precipitate a week, because, "as to the sale of poisons, witness had complied with the law." But I find what I was ignorant of before (having been out of business till recently, and not knowing what had been done in the way of poisons), that the Pharmaceutical Council can add to the schedules whatever they consider comes within the spirit of the Act—that, I suppose, if I keep diarrhœa mixture in bulk, that is to be considered a preparation of opium, and must be registered if they will it so. And, under *this* view of the matter only, I must apologise for alluding to Mr. Kitchin.

Fredk. Tibbs.

81, *Chalk Farm Road, N.W., March 13th*, 1873.

Tincture of Quinine.

Sir,—I regret to differ from such an authority as Mr. Giles, but I must still maintain that the B.P. formula for this tincture does yield unexceptionable results, and not only so, but that the closer the instructions are followed the more successful is the preparation.

Many of your correspondents, Mr. Giles apparently among the number, appear to have assumed that the crystalline deposit was either quinine or some salt of that alkaloid, whereas in point of fact it contains no quinine whatever, it is not bitter, and is insoluble in dil. sulph. acid.

If to a tincture of orange made with *fully proof* spirit a few drops of dilute sulphuric acid are added, exactly the same result is obtained, *no quinine being present.*

The crystals are in reality "sulphate of lime" (see also Mr. Hustwick's paper in last issue), and are derived partly from the quinine salt and partly from the orange peel.

The *quantity* will vary with the quality of the peel used, and depend partly also upon whether the peel is *thinly* or *thickly* cut, the lime salts of some organic acids (probably citrate and malate) residing in the white portion of the peel.

As, therefore, sulphate of lime is less soluble in a *fully proof* spirit than in one of less strength, there is but little probability of sufficient being left in solution to give any subsequent crystals.

The objection to using dilute sulphuric acid is also apparent, for by its use the formation of the crystals which it is desired to prevent is actually favoured.

J. H. Baldock.

South Norwood, S.E., March 17th, 1873.

Sir,—Had Mr. Hustwick been present at the pharmaceutical meeting of November 6th, 1872, or had the report of the discussion that followed the reading of Mr. Haselden's paper been accurate, he would have learned that I recognized the precipitate as sulphate of lime, and assigned its origin to a double decomposition between the sulphate of quinia and a soluble salt of lime, present in the fresh peel, but not apparent in the old dried peel.

Mr. Hustwick finds the reaction take place in tincture of the *dried* peel, but does not specify the age of the specimen. I think he will find the fresh peel yield a very much larger proportion of the substance than the dried, especially if the latter have been kept in the dry state a considerable time.

I write not merely for the sake of correcting my evidence, but also to suggest to Mr. Hustwick a continuance of the investigation he has so well begun. Could he not endeavour to isolate and identify this salt of lime that is soluble both in water and in weak spirit? I some time since made a few experiments with that view, but discontinued them before arriving at any definite result.

I should be very pleased to have the matter cleared up. Although it seems of little importance, facts of an interesting character could hardly fail to be brought to light by such an investigation.

Weymouth, March 17th, 1873. Thos. B. Groves.

Suppositories.

Sir,—I am sorry to see that new compositions are being talked of for making suppositories; I have made many with cacao butter, and have never had that base objected to.

Can the following ready method of making suppositories be easily beaten?—I must premise that I keep cacao butter ready in a bottle in fine shavings, according to a suggestion which appeared in this Journal. Take a small mortar, and invert it, with the pestle inside, over the gas stove. Reach out the suppository mould, and smear the inside with glycerine; weigh out the ingredients and sufficient shaved cacao butter. By this time the mortar is ready; mix in it the ingredients with a little cacao butter, and then the remainder, stir in the mortar till just melted, and pour into the mould, then set the mould to cool.

A very little experience will show the desired temperature of the mortar, and I would suggest to young dispensers the advantage of weighing materials for one or two extra suppositories to allow for waste in pouring.

W. J. Churchill.

Birmingham, March 18th, 1873.

Aqua Chloroformi.

Sir,—I just wish to throw out a very simple suggestion with regard to aq. chloroformi, one of the preparations mentioned by Professor Redwood as likely to be inserted in the reprint of the "Pharmacopœia." Forty-eight minims of chloroform will dissolve in one pint of distilled water, and such a solution is one-tenth the strength of sp. chloroformi, one very convenient to remember in prescribing. Thus:—

Sp. Chlorof.	Chloroform.	Aq. Chlorof.	Chloroform.
1 fl. oz. =	24 mins.	1 fl. oz. =	2·4 mins.
$\frac{1}{2}$ fl. oz. =	12 „	$\frac{1}{2}$ fl. oz. =	1·2 „

Ilfracombe. W. Tearle.

Public Analysts.

Sir,—I am glad to find by your report that the electing bodies of Clerkenwell, St. Giles's, and Holborn have seen the wisdom of appointing a professor of chemistry as public analyst, and have not allowed the mania of the moment to blind their discretion by appointing medical officers of health, as in the majority of cases, simply because the word "medical" was inserted in the Act of Parliament. I strongly advocated this course in St. Pancras a short time ago by moving an amendment (lost by eight votes) that the officer appointed should be *bonâ fide* a professor of chemistry, who could devote the necessary time to the requirements of the office. I did so, not from any doubt which I entertained as to the ability of the medical officer, but from a strong conviction that, as medical officer of health, he could not possibly afford to give the necessary time and attention required for analysis.

Surely it was never intended by the promoters of this Act that medical officers of health should monopolize these appointments, and then engage the services of an assistant to perform the duties; a fact admitted during the debate in St. Pancras. This system of seeking an appointment upon certain merits, and afterwards transferring such important duties into the hands of an assistant whose ability and qualifications are entirely unknown to the electing board, is not only objectionable, but fraught with very serious consequences; from the fact that the character, reputation, and commercial morality of the trading community are at stake, and in all probability, upon the positive or negative assertion of this unknown deputy, they either stand or fall. But when we find such men as Dr. Redwood appointed, it becomes a passport of safety to the public interest on the one hand, and a guarantee to the Act on the other.

There are, doubtless, many difficulties in the way of working this Act effectually; but in sanctioning such an appointment, the Local Government Board will at least have the satisfaction of knowing that, as far as regards the appointment of public analyst, they have placed the right man in the right place.

Tollington Park, March 18th, 1873. T. C. Jones.

Pharmaceutical Students in Edinburgh.

Sir,—Just now, when the subject of providing schools and libraries for students of pharmacy, is deservedly attracting so much attention, perhaps an apprentice's opinion would not be out of place.

The branch of the Pharmaceutical Society in Edinburgh, with praiseworthy intention, have at length succeeded in providing handsome and lofty rooms for the use of all connected with the profession, as a place of meeting and mental recreation. They have also provided a museum, library, and reading-room,—but to what purpose? No doubt many useful and instructive journals are to be found on the table, and books of the highest class, well fitted to cultivate a taste for scientific knowledge, are obtainable from the library. There are also specimens, etc., from which an inquiring mind might obtain a great insight into the mysteries of botany; but the old saying still presents itself forcibly, "The harvest is ripe, but the labourers are few."

On looking at the visitor's book, we see on one day four or five names, and on some only one or two. One naturally asks the reason of this. Here is a fine reading-room, in the centre of a town which has been long and worthily called "the seat of learning," and in which are many enthusiastic disciples of the pestle and mortar; but why is it not taken more advantage of?

At first it may be thought that the young men are not of a studious or diligent temperament, but on looking more carefully into the facts of the case, we find the true reason. Till the beginning of this year, only a few shops were shut at eight o'clock, while the great majority were open till ten or half-past ten o'clock. Even take the favoured few who shut at that preposterously early hour (?) eight o'clock, and see what opportunities were afforded to assistants and apprentices to cultivate their minds or to take advantage of the reading-room.

After working from nine in the morning till eight o'clock at night, they go home tired and weary, and sit down to puzzle out the intricacies of the artificial alkaloids, or perhaps a difficult chapter in Cæsar, Scoresby-Jackson, or Bentley. A large number of them are attending classes, and how can they prepare themselves for class or other examinations, and spend even a short time in the Society's rooms?

There are remedies for everything, and if the masters would show that they were anxious for the welfare of their *employés*, by either allowing some of them away every day for an hour to the rooms, or by giving each one a half-holiday once a fortnight, I am sure there would be a better attendance. Even if the masters went themselves, it would be a great inducement; but I am afraid that they are still more seldom there than their assistants.

We have been hitherto looking at the bright side of the question, but if we turn to the other side, we find that by far the larger number of shops are open till nine o'clock; in these, a half day is never thought of. How, then, can young men ever be expected to enter our profession (?), when they have examinations to pass, no time to prepare for them, and after all a paltry £50 per annum. Our trade is the only one which has examinations to pass, and yet its business hours rival those of the public-house or tavern, while drapers, booksellers, etc., close their shops at seven o'clock on weekdays and four o'clock on Saturdays. Let us, then, be up and doing, so that at least one ray of hope may be left for the chemist's apprentice.

Edinburgh, March 14th, 1873. A Prenty Cuss.

Pharmaceutical Women.

Sir,—Will you allow a small space to enable one who, though not a pharmaceutist, is a regular reader of your Journal, to state the impression conveyed to his mind by the recent discussion in your columns. The continued exclusion of women from the profession has been defended on three grounds: first, that it will introduce a new element into the already too crowded field of competition; second, that women are not competent to perform the duties of pharmaceutical chemists; third, that if competent, it is still undesirable that they should do so. The first ground—although I have been surprised to see it taken up by some of your correspondents—is surely not one that can be seriously held. Have Englishmen so lost their sense of chivalry and of regard for women, that we must fall back on the old barbaric maxim, that—

"They should take who have the power,
And they should keep who can;"

that in order to increase or maintain our own incomes we must exclude from all share in the emoluments of the profession the weaker half of the nation? This argument is revolting to every honorable mind, and I, for one, sincerely thank Mr. Balkwill for entering his protest against it; and I would strongly advise your correspondents "M.P.S." and "H. L.," unless they want to raise a *furore* in favour of women pharmaceutists, to abstain from using such arguments in future. The second ground of objection is scarcely more tenable, seeing the road to the profession is guarded by adequate examinations. If women are unable to pass these examinations, it is needless to forbid them to try; if any are able, it is unjust. We presume that every man, whatever his other qualities, who is able to pass these examinations, is fit to be a pharmaceutical chemist; what right have we to say that sex shall be the only disqualification for an otherwise qualified person? The only ground of objection, then, that can be seriously argued is the third. Monopolies of all kinds are opposed to the genius of the English constitution; but if the opponents of the admission of women to the profession can show that grave social or political evils will result from persons otherwise qualified, being allowed to practise pharmacy because they are females, their arguments must deserve the fullest consideration. At present I have met with none such, either in your columns or elsewhere. It is not proposed, as far as I am aware, to lower the standard of examination in order to let in women; and the argument of "H. L." on the ground of prescriptions for the cure of noisome diseases, falls to the ground as long as we employ female nurses in our hospitals and applaud the labours of a Florence Nightingale. Until such arguments are presented to me in a far more forcible way than they have been at present, I must heartily wish success to those who are endeavouring to break down these barriers, and to enable women to enter those fields of usefulness for which they themselves believe they have a vocation.

London, March 17th. Outsider.

Sir,—As the question of woman's rights in general, and her pharmaceutical rights in particular, have long been, and are likely yet to be, abundantly discussed, with more benefit, perhaps, to the printer than to the interesting object herself, I beg leave to request the favour of your publication of my reflections thereon, in her own best interests.

Sober-minded men ask themselves the cause of the restless agitation and unsatisfied hankering after the fruit of forbidden knowledge, which stamp the female tastes of the present day. We remember that our mothers "cared for none of these things;" and yet they succeeded in life precisely where their daughters have failed. They understood the secret of woman's influence and success, and they were content to work it out *at home*, to their own honour, and to the comfort of those about them. Their daughters despise their ways, and they reap a reward accordingly in blighted hopes. These offer poor encouragement to young men to select them for partners in life, and in their vexation they dare their opposition as competitors in business. Defeat is, of course, the foregone issue.

If woman would only devote herself to that which is, above all else, *woman's speciality*, the art of making man happy and home comfortable, then the old demand for her would be revived; her faculties would find their true, ample, and congenial sphere; and her reward would be great in this life, and, it may be, in that also which is to come. If, on the other hand, she will venture beyond her depth, then both the substance and the shadow of her happiness will be alike lost to her.

Thomas Saunders.

30, *Conduit Street, Bond Street.*

"*An Old Girl*" is thanked for her communication, but we think sufficient space has already been given to our rhyming friends.

A. G.—We do not know that any reaction would take place under the circumstances.

G. T. Green.—Christison's work on Poisons, or Taylor's 'Medical Jurisprudence.'

J. C.—(1) The Latin portion of the Preliminary Examination includes "translation into English of a paragraph from the first book of Cæsar ('De Bello Gallico'), or a passage from each of the following works: Pereira's 'Selecta è Prescriptis,' and the last edition (Latin) of the 'London Pharmacopœia.'" (2) The regulation concerning the metric system of weights and measures comes into force on the 1st October, 1874.

T. R.—"Cinnabar of Antimony" is a synonym of Mercuric Sulphide.

Sunday Closing.—"*An Assistant*" writes complaining of the practice adopted by some chemists and druggists of keeping the door-shutter down on Sunday and a light burning in the shop during the evening of that day, as one justified neither by poverty nor necessity. He asks whether steps cannot be taken to enforce Sunday closing.

W. B.—The plan you mention might answer the purpose, but for several reasons it would be inadmissible.

Communications, Letters, etc., have been received from Mr. Andrews, Mr. Pocklington, Mr. Hutchinson, Mr. Webb, Mr. De Lancy (Paris), Mr. Mumbray, Mr. Taylor, Mr. Jackson, "Combustion," "Clodhopper," "Glycerine."

DOES PERSIAN AMMONIACUM CONTAIN SULPHUR?

BY JOHN MOSS, F.C.S.,

Demonstrator in the Laboratory of the Pharmaceutical Society.

No one consulting the various works on materia medica for an answer to this question would feel very well satisfied at the close of his search. Some of them make no reference to sulphur, whether present or absent; others affirm decisively that it is *not* present, leading to the inference that there are yet others who affirm that sulphur *is* present. The doubt that has existed on this point seemed so easy to be resolved, that one wonders why it has not led to special and conclusive experiment before now. At the suggestion of my friend Mr. Hanbury, I undertook to make such experiment, and now publish the result.

Assuming that sulphur, if present in ammoniacum, existed in combination, forming a sulphur oil as in assafœtida, the readiest plan for its detection which presented itself, was to oxidize with nitric acid and test for sulphuric acid; but the difficulty of obtaining nitric acid free from traces of sulphuric, led me to prefer the use of pure nitrate of potassium.

Process:—Eight grammes of the pure nitrate were brought to a state of tranquil fusion in a platinum capsule supported over a Bunsen flame by an iron plate having an orifice in the centre. This plate extended round the capsule for a distance of four inches from the edge, so as to prevent sulphurous gases from the flame passing so near to the contents of the capsule as to be absorbed. The nitre being in this condition, ammoniacum, from carefully scraped tears of the largest and purest kind, was added little by little to the extent of about one gramme. When the action had ceased, the lamp was first removed, and then the capsule was turned round obliquely so that the fused contents should solidify in a thin crust over the sides, and so be more rapidly dissolved away by the water which was subsequently added. During the action of the fused nitre on the ammoniacum, a quantity of tarry matter condensed on the inner edge of the capsule where it was not in contact with the flame, and as it was found to be impossible to burn away this tarry matter without introducing sulphur, it became necessary to remove it from the aqueous solution by filtration. The filter employed was washed with acidulated water, and the washings examined with nitrate of barium. A solution being thus obtained presumably holding, in the form of sulphuric acid, whatever sulphur was present in the ammoniacum, a second solution was prepared in a precisely similar manner, with the important exception that no ammoniacum was used. The two solutions were placed side by side in beakers of equal size, and now a few drops of barium nitrate solution were added to each, and the beakers covered; at the end of three days no precipitate had appeared in either. To prove that the test was delicate enough, two drops of a liquid containing 1 in 300 of sulphuric acid were added to the contents of each beaker, and in a few minutes, three at the most, there was a marked turbidity produced in each. In a few hours a white film covered the bottom of each beaker.

This experiment, *one of nine*, demonstrates the fact that ammoniacum contains no sulphur.

Conditions necessary to secure the above result:—

1. The reagents and apparatus employed must be free from sulphuric acid.
2. The operation must be conducted in an atmosphere free from sulphuretted hydrogen and other sulphurous gases—a condition not easy to be attained in the laboratory, save in the early morning, before general work commences, at which time the fusions spoken of were made; even an additional lamp burning in the fume closet where the operation was conducted, seemed to affect the result.
3. The gas flame employed must not come in contact with the edge of the capsule.

A strip of silver leaf partially immersed in an emulsion of ammoniacum is not darkened after many days.

THE MICROSCOPE IN PHARMACY.

BY HENRY POCKLINGTON.

Continued from p. 703.

Ulmi Cortex.—As generally met with in commerce, the thickness of this bark very greatly exceeds the $\frac{1}{24}$th of an inch allotted to it in the B. P. description, but this is a matter of secondary importance, as the astringent principles are quite as present in the thicker as in the thinner specimens. It is an easy bark to examine, and will not present any features of special interest. The details of structure are best studied in ordinary transverse sections and in vertical sections cut parallel with the surface, and, therefore, cut across the medullary rays.

Seen in cross section the tissues may be grouped in three divisions: liber cells, either isolated or in twos and threes; the oblong thin walled cells of the medullary rays; and irregularly sized and shaped thin walled parenchymatous cells, amongst which the liber tubes are distributed with an apparent attempt at regularity. The medullary rays alone can be best studied in transverse sections, and are most easily examined in carefully stained specimens. In a well prepared logwood stained section the nature of the cell wall and the cell contents, with nuclei, etc., can usually be seen with a comparatively low power. As also the liber cell-structure may be best studied in similar sections from which the greater portion of the staining fluid has been removed by the aid of hydrochloric acid, the colour being subsequently redeveloped by ammonia. But the general arrangement of the liber tubes, with relation to the other tissues, can only be studied in vertical sections, and preferably in thin sections that have been treated with dilute solution of caustic soda or potash, and very slightly stained with magenta. The liber is seen to be very fibrous, almost cordlike, and is sufficiently tough to permit of easy separation from the other tissues. Two or three liber cells would appear to lie side by side in the normal state; medullary rays, composed of a considerable number of cells, passing between the fibres, force them into, what is seen in cross section to be, a loop or mesh of a net-work of vessels, the fibres intimately cohering again after they have encircled the ray. Some of the liber cells bifurcate, and, after having run some distance, unite by an imperfect natural graft (anastomose is hardly the word) with their neighbouring liber cells. They are imperforate and devoid of any other contents than fluid, which appears to possess in small degree the astringent properties of the bark.

In the cells of the parenchymatous tissue, which does not itself require other notice, and lying chiefly alongside the liber cells, are great numbers of small crystalline bodies, irregularly prismatic in shape and intensely doubly refractive. They are precisely similar to the crystals found in the testa of the seed, and figured by Quekett in his "Lectures on Histology" as a typical form of this particular "raphide." The liber cells are also very doubly refractive, and a carefully mounted section (in balsam) forms a very effective polariscope object, and admirably adapted for exhibition at "Chemists' Association Soirées."

Quercus Cortex.—The structure of this bark is somewhat complex, and requires considerable skill in the use of reagents to avoid errors of interpretation. Not itself adulterated, it plays sometimes the part of an adulterant, and on this account it is desirable that we should make ourselves familiar with its structure. To fully describe every detail of its structural element would occupy considerable space, and prove tedious to most. It will perhaps suffice if I indicate the more important points, and the mode of their demonstration. The general tissues of the outer barks do not differ greatly from those of other barks. Certain sclerogenous cells aggregated in groups of a dozen or more, and liber tubes are alone of importance. Many of these hard cells or "stellate cells" are of abnormal form, and will strongly remind the diatomist of the well-known campylodiscus. They are porous, their pores being of two characters, one very minute, the other large and bifurcate. The central cavity is frequently large and filled with a nitrogenous substance, probably the original cell substance, that stains intensely with magenta. The large, bifurcate pores also frequently stain, and then remind one forcibly of Dr. Beale's celebrated drawing of the capillary exudation of fluid bioplasm through the cell walls of Torula, but it is not easy to believe that these excessively hard cells can be sufficiently alive and active to manifest such a phenomenon, and it is much more probable that the staining of these pores is purely mechanical. At the same time it must be mentioned that the whole bearing of the central cavity and these stained pores towards reagents is that of active, living bioplasm. The question, however, is one hardly suited for discussion here. The stellate cells now spoken of differ widely in size, and are also found singly amongst the cells of the outer barks. They are easily recognisable in the powdered bark, and are very well shown by Dr. Hassall in his "Adulterations Detected," where typical cells only are shown. Their form is much more varied than is indicated in that work.

The inner bark is the most interesting and the most difficult. It can only be studied in very carefully cut sections stained with magenta or with solution of indigo (B. P.). The chief difficulty in the examination is caused by the great variety of cells present, and by the fact that these are in all stages of development. A well stained (indigo) section, shows the relations of the cell contents to the cell wall very beautifully, and also demonstrates very admirably the various germinal cells of the new bark. The liber tubes are best studied in radial sections (sections cut downwards and parallel with the surface) very slightly stained after slight washing in dilute liquor potassæ. And in this portion of the bark lies a *pons asinorum*, which cost me considerable trouble to cross. The liber cells themselves do not differ from ordinary liber to any extent, but with these are rows of somewhat globose cells, very inaccurately depicted in the drawing in Dr. Hassall's book, where they are shown as long cells —longer than the liber cells, with internal septa. This is exceedingly wide of the truth, the fact being that the length of these cells does not exceed the width of the liber cells, and that their contents are not granular or chlorophyllian, but crystalline and fluid. The error has evidently arisen from not using reagents. A simple section examined in water or glycerine does look somewhat as shown, and specimens of the powdered bark similarly examined are seen to contain similar structures.

These cells are exceedingly interesting and characteristic. Their walls are thin, beautifully transparent, and imperforate. They contain only fluid, and, each cell, a single flat four or six-sided prismatic crystal, beautifully doubly refractive and consisting of some salt of lime. A carefully made section, washed with dilute potash and alcohol, and mounted in glycerine, at once shows the true nature of the tissue, and is also a very splendid object (of doubtful permanence) when examined by polarized light. Stellate cells are also found with the liber, and but somewhat rarely, embryo vessels, or cells partaking of the first stage of the characteristic vessels of the oak.

A thin transverse section of the bark, stained with dilute perchloride of iron, shows the whereabouts of the astringent principle of the bark very successfully. In such a section the liber cells are seen to be wholly unstained, whilst the parenchymatous cells and the cells of the more purely cellular tissues are stained a deep blue-black. The stellate cells also, as a rule are not stained. The contents of the central cavity of the liber cells stain always, but the contents of the stellate cells either do not stain or not so deeply. This observation, it may be remarked, requires careful use of a moderately high power on a very successfully prepared section. This use of ferrous salts gives rather divergent results from the results of chemical analysis of the different portions of the bark. For whereas the outer barks are said to be comparatively inert (as regards tannic acid), the whole of the sections that I have examined show large quantities present in the mesophlœum cells,—weight for weight far larger quantities than in the liber region proper, if depth of colour produced may be taken as a guide. It is quite possible, and, indeed, likely, that in the outer regions the acid may not be so easily removed from the tissues, and therefore those portions may be of less economic value.

(*To be continued.*)

FALSE CHINA ROOT.

BY E. A. WEBB.

At the weekly drug sales on the 6th inst., there was offered, among other things, by public auction, a parcel that was described as China Root, but which in reality was nothing more than that curious fungoid production that has been named *Pachyma cocos*, a full description of which may be found in a paper, illustrated by very truthful engravings, in the "Linnæan Transactions," vol. xxiii. page 94, also in the Pharmaceutical Journal, in a paper entitled "Notes on Chinese Materia Medica," by Mr. Daniel Hanbury.

Mr. Hanbury there describes this drug (for so it may be called) as resembling "large ponderous rounded tubers, having a rough blackish-brown bark-like exterior, and consisting internally of a compact mass of considerable hardness, varying in colour from cinnamon brown to pure white." He tells us they are found attached to the roots of fir trees, or sometimes buried in the ground in localities where firs no longer grow.

They seem to occur in South Carolina, and parts of China and Japan.

That these are not tubers, but the production of a fungus, there seems to be but little doubt, as they contain no trace of starch, but when examined under the microscope are found to consist of what appears to be a mass of mycelium.

Dr. Macbride states that this *Pachyma* originates between the wood and the bark of the living roots; that it gradually detaches the bark while it spreads round the wood, and converts it into a substance similar to itself.

It is curious that, as the old writers and naturalists considered this production to be a species of China root, it should now be offered on our market as the same thing—the first time of its appearance in commerce in this country. Like many other strange things that from time to time are offered at our sales, it has probably been sent over here to see if there is any use for it, and, not being taken up by the medical profession or the trade, will probably never appear again for some years.

But from accounts which have been published of this *Pachyma cocos*, it is by no means without its medicinal and economic value. In China it is used in a variety of complaints, and made into edible cakes, which are offered for sale in the towns. In America it has also been used as an article of food, and hence derived the name of Indian Bread, by which it is there known.

It may readily be distinguished from true China root by its general appearance, and by its containing no traces of starch. In fact, it is difficult to understand how it could ever be mistaken for it.

EXAMINATION OF CITRATE OF IRON AND QUININE.

BY A. W. GERRARD,

Pharmacist, Guy's Hospital.

Eight samples of citrate of iron and quinine were obtained from various sources and different makers, for the purpose of ascertaining whether they contained the percentage of quinine directed to be obtained by the B.P., thus:—"Fifty grains dissolved in a fluid ounce of water and treated with a slight excess of ammonia, give a white precipitate, which, when collected on a filter and dried, weighs eight grains."

No.	Weight taken.	Weight of Precipitate.
1	50 grains	6 grains
2	"	2·5 "
3	"	5 "
4	"	8 "
5	"	4 "
6	"	8 "
7	"	6 "
8	"	4·5 "

These results show that there is great variation in the strength of this preparation: a prescription prepared with number six would contain more than three times as much quinine as that dispensed with number two. This may in some measure account for cheap dispensing. The sale of these lowered preparations is unjust and dishonest, for the prescriber is deceived, and the progress of the patient retarded, for no other purpose than increasing the gains of the seller.

On reference to wholesale price lists, I observe that some of them quote three qualities, each I suppose containing variable quantities of quinine, one perhaps B.P., two undoubtedly lowered, and therefore not "legal pharmaceutical preparations," although they are sold by the same name as the legal. Now it may not have occurred to those who sell and dispense these cheap preparations, that they render themselves liable to a prosecution under the "Adulteration Act;" yet such is the fact, and it requires their serious consideration and attention, especially as those upon whom the working of the Act devolves are not at all inclined to view the retailer as innocent; they argue that he should have that knowledge of his business which will enable him to test and judge of the purity and strength of all preparations which have a definite standard.

[As an appendix to the foregoing may be quoted from the *New York Druggists' Circular* some remarks of Mr. P. W. Bedford, who has recently had occasion to inquire into the respective value of six different specimens of this preparation, obtained from as many prominent American manufacturers. With the exception of one (which probably was made strictly by the formula of the U.S.P.) the specimens were of the variety which is soluble in cold water, the scales being of a greenish golden yellow colour, and somewhat deliquescent, and containing more or less citrate of ammonia.

One hundred grains of each specimen were dissolved in water, in a test-tube, to which first ether, and afterward water of ammonia in slight excess were added, the ethereal solution was poured into a small porcelain capsule which had been previously carefully tared, and after another portion of ether had been shaken with the solution in the tube and decanted into the capsule, it was set aside to allow the ether to evaporate. Exposure to a temperature of 120° F. for a few moments completed the drying. The increase in weight gives the amount of quinia present. Three experiments were made with each specimen, and the result is as follows:—

The weight of quinia obtained from 100 *grains of the salt, in grains and tenths of a grain:*—4·3—8·2—10·0—11·5. One specimen contained quinia 10 grains and cinchonia 2 grains, and another specimen contained quinia, 7·7 grains, cinchonia, 1·5 grains.

As this salt is a specimen of many others in which neither price nor appearance is any guide to the quality, we have been particular to give the mode of examination. If in applying this test there should be an insoluble white powder in a stratum between the ethereal and the watery solutions, it is cinchonia, and the amount may be found by carefully collecting it on a tared filter, and weighing.

The weights given above are of the simple alkaloid quinia, not the citrate. As the combining equivalent of citric acid free from water is 165, and quinia 324, the amount of citrate of quinia present is about 50 per cent. greater than the amount of quinia given as the result of the above assays—the sample assaying 11·5 of quinia having 17·39 of citrate of quinia.]

CHURRUS.

BY JOHN R. JACKSON, A.L.S.,

Curator of the Museums, Royal Gardens, Kew.

Three well known products of the Hemp plant (*Cannabis sativa*) are known in India as Gunja, Bhang, and Churrus: the first being the dried flower branches pressed together while in a fresh state, and used for smoking like tobacco; the second, the leaves and capsules, from which an infusion or intoxicating drink is made; and the third, a kind of an earthy resin, which is always described as the most powerful of all. Churrus varies, however, in quality, three or more kinds being known: the first or highest quality occurring in large irregular lumps, the second in smaller lumps, and the third in finely broken pieces, with a large proportion of dust. All these have a more or less earthy fracture, but there are two small samples in the Kew Museum which have been apparently moulded by pressure into hard and compact masses, each about two inches long, and about half as thick again as a man's thumb, rounded at each end, and which have a somewhat greenish fracture, and a perceptible odour of musk. Whether this has been imparted to them in the course of preparation, or by contact with other articles, I am not able to say. The specimens formed part of the collection of the Medico-Botanical Society of London, and were obtained for the Kew Museum in 1853, since which time they have been kept in a glass jar, separate from other specimens, sufficient time, one would think, for them to lose any perfume not actually incorporated into their substance. Churrus is said to be seldom or never the pure resin as it exudes from the leaves, stems, and flowers of the hemp plant, so that it is not improbable that musk may sometimes be mixed up with it. And, as a further proof of the system of adulteration, the following fact may also be stated:—Amongst some fruits, seeds, and other botanical specimens recently received at the Kew Museum from Yarkand, were some of the mealy fruits of the Trebizonde date (*Elæagnus hortensis*). The information which accompanied them was to the effect that the tree was cultivated for the sake of the fruits, which were largely consumed as food, and were carried in quantities in caravan journeys. The wild fruits, however, are not eaten, but the meal obtained from them is used entirely to adulterate Churrus. In India the hemp is an officinal plant, its principal use being in tetanus, hydrophobia, and neuralgia, in its various forms; but it has also been used, it is said, with success in such diseases as cholera, rheumatism, asthma, and some phases of skin disease. It is applied in the forms of extract and tincture, and has been recommended for use in this country. In the Indian Pharmacopœia are some remarks by Sir Robert Christison, who speaks of it not only as an excellent substitute for morphia, but as being suitable in cases where morphia could not be applied, or was objected to by the patient. He further says, he has "long been convinced, and new experience confirms his conviction, that for energy, certainty, and convenience, Indian Hemp is the next anodyne, hypnotic, and anti-spasmodic to opium and its derivatives, and often equal to it." All the products of the hemp are, however, so much adulterated, that the difficulty seems to be in obtaining Gunja of good quality from which to prepare the extract, which Sir R. Christison considers the best of all forms in which it can be used.

Under the name of "Majoon," a compound is used in India composed of Bhang, butter, sugar, flour, and milk.

FERROUS MANNATE.

BY M. GHYSEN.

The author has reported to the Medical Society of Liége the result of some experiments he has made to obtain a preparation of iron in the ferrous state which could be kept without undergoing change, and in which he used manna as a preservative agent. The method adopted was as follows:—75 grams of pure crystallized sulphate of iron was pulverized and mixed intimately with 100 grams of manna in tears. 80 grams of solution of ammonia (sp. gr. ·905) was then added, and the mass rubbed up so as to obtain a thoroughly homogeneous mixture. To this was added, a little at a time, 130 grams of alcohol (94°), which mixture separated clearly into a soft mass and a supernatant ammoniacal liquid that was rejected. The residue was again washed with 130 grams of fresh alcohol, and the product afterwards dried quickly and pulverized. The liquors rejected weighed together 310 grams. The quantity of ferrous mannate so produced consisted of 125 grams of a beautiful green powder, entirely unalterable in the air. The powder, suspended in water, coloured it green without dissolving, and the liquor passed through a filter colourless. Nevertheless, directly the iron entered into solution it oxidized with great rapidity, turning the liquor yellow, and showing that water acts injuriously by causing the iron to pass into the higher state.

Ammonia was used in preference to potash or soda, in order easily to eliminate by evaporation the excess of alkali, and so obtain a product composed entirely of manna and iron. As a ferruginous preparation, M. Ghysen believes the mannate, in regard to the quantity of active principle it contains, to be one of the richest. It may be administered in powder, in doses of from a few centigrams to a gram, or in pills. The following formula he has found to yield a good result:—

Ferrous Mannate, in powder . .	10 grams
Water	150 "

Make into pills of 20 centigrams.

He states that the mass is hard, but may be rolled and divided with facility, while the pills keep perfectly without being coated.

THE DISCRIMINATION OF GOOD WATER AND WHOLESOME FOOD.*

In the second of a course of lectures on sanitary science now being delivered weekly in Dublin, under the auspices of the Royal Dublin Society, Dr. Emerson Reynolds said that the impurities often present in water used for drinking purposes, and the numerous adulterations to which articles of food are liable, have frequently formed subjects for able and interesting discourses. Most of these objec-

* Printed, but not published, by Thom and Co., Dublin, for H. M. Stationery Office; from the *London Medical Record*.

tionable bodies can only be *identified* by the chemist and microscopist; but it is often possible by very simple means to ascertain whether or not a particular article is impure or adulterated—whether it exhibits the characters that serve to distinguish the substance, though it is not possible to name the particular impurity or adulterant without the possession of that "competent medical, chemical, and microscopical knowledge" required by the Adulteration Act. Information of the first kind should be possessed by every medical man, and even by the head of every household, and the lecturer's aim was to afford as much of this class of information as happens to be available at present. The chief subject-matter of the lecture is condensed in the following short notes; but mention is therein made only of the more important articles of food, excluding most of the so-called condimental foods on one hand, and alcoholic liquids on the other.

Potable Water.—Its impurities are mineral (lime and magnesia compounds, iron, sulphuretted hydrogen, etc.), and organic "sewage contamination," including animal and vegetable nitrogenous matter, either capable of, or in process of decomposition, and the products of such change). *Good water* should be free from colour, unpleasant odour and taste, and should quickly afford a good lather with a small proportion of soap. If half a pint of the water be placed in a perfectly clean, colourless, glass-stoppered bottle, a few grains of the best white lump sugar added, and the bottle freely exposed to the daylight in the window of a warm room, the liquid should not become turbid, even after exposure for a week or ten days. If the water become turbid, it is open to grave suspicion of sewage contamination; but if it remain clear, it is almost certainly safe. We owe to Heisch this simple, valuable, but hitherto strangely neglected test. Frankland has shown that it is extremely delicate, and that the production of turbidity under the circumstances named is due to the minute quantity of phosphoric acid present in sewage.* The Vartry water, as delivered from the street mains in Dublin at present, withstands this test perfectly; but it often becomes very impure when allowed to pass through ill-kept cisterns.

Tea.—Adulterations. There are two chief classes of teas—the green and black varieties. Under the first head are included the Hysons, Twankay, and Gunpowder; and under black teas, Pekoe, Souchong, Congou, and Bohea Both classes are subject to many serious adulterations at the hands of the exporters, and again on arrival in Europe. Mixtures of different kinds of tea are legitimately made in the course of trade for the purpose of suiting special tastes; but inferior varieties are often dishonestly mixed with the more costly kinds in order to increase profits. Leaving aside the consideration of "tea-mixing," we find that to green and black teas have often been added the leaves of other plants. Those of plum, sloe, ash, willow, poplar, hawthorn, beech, plane, orange, elm, horse-chestnut, elder, and oak have been detected. These leaves are dried and prepared by roasting and "facing" so as to resemble genuine tea very closely. The product is sometimes called "Maloo mixture." Facing is used for the purpose of colouring the leaves and increasing weight. The bodies employed are china clay, gypsum, chalk, French chalk, black lead, Prussian blue, indigo, chromate of lead, carbonate, and even arsenite of copper, Venetian red, and fine white sand. The powders are attached to the leaf-surface by a convenient adhesive material. Spent (exhausted) tea-leaves are often dried, coloured with catechu and an iron salt, then faced, and the product mixed with good tea, "Maloo mixture," or Lie tea. The last-named substance is made up of the tea and other leaves, sand, or plaster of Paris, bound together by starch or gum, so as to form granular particles that can be "faced," so as to resemble black or green gunpowder. *Genuine Tea*, when placed in a muslin bag and kneaded in warm water for a few minutes should not give up any powder, quickly subsiding when the water is allowed to stand.

Coffee.—Adulterations. Chicory, acorns, sawdust, roasted roots of various kinds, and grain, tan, croats, lentil seeds, baked livers, Venetian red, burnt sugar. Admixture with chicory is allowable if the compound be truly labelled. *Genuine Coffee* should not cake when pinched between the fingers. When a little is thrown on cold water it floats, and very slightly tinges the water. Adulterated coffee sinks, and rapidly colours the water brown.

Cocoa. — Adulterations. Chicory, cocoa-husk, fats, starches, sugar, Venetian red, bole. *Genuine Cocoa* should not have a sweet taste, nor red colour. As much cocoa as can be piled up on a threepenny piece, when placed on a square of platinum foil, and strongly heated by a spirit-lamp flame should burn almost completely away, leaving a very minute quantity of reddish coloured ash.* The same remarks apply to *chocolate.*

Sugar.—Adulterations and Impurities. Fine white loaf-sugar is rarely adulterated, but coloured sugars sometimes contain chalk, sand, clay, starch, sugar, flour, dextrine, plaster of Paris: as impurities, fragments of cane, molasses, vegetable albumen, and sugar-mites or acari. *Good Sugar* should be free from the least bitter taste, and ought to dissolve completely in water. Loaf-sugar should give a perfectly clear and colourless solution; brown sugar, a clear but coloured liquid. If insects be present they float on the syrup, and appear as small specks, which can be easily removed for microscopic examination. *Bon-bons*, unless when mixed with harmless starch or injurious white or coloured mineral powders, produce clear solutions when dissolved in water. If any insoluble residue be left, the deposit should be allowed to settle, the liquid poured carefully off, and the powder collected, dried, and heated on platinum-foil. If white, and wholly combustible, it probably consists of starch. Chromate of lead (yellow), arsenite of copper (green), china clay and gypsum (white), and most other injurious mineral pigments, give insoluble and fixed powders. Sulphide of mercury or vermilion, though volatile when heated on platinum-foil, is easily recognised by affording a heavy red powder on treatment of the sweets with water.

Milk.—Adulterations. The chief is undoubtedly water; but skim-milk, annatto, brains, chalk, gum tragacanth, and other gums; sugar, decoction of white carrots, starch, and turmeric, are stated to be used occasionally. *Good Milk* should be free from acidity, and when allowed to stand in a vessel ought not to deposit solid matter. When placed in a tall graduated glass cylinder, it should throw up at least 10 per cent. of cream after standing for twelve hours. This is on the whole the least objectionable rough test that can be used.

Butter.—Adulterations. Water, much salt, starch, flour, dripping, and lard. *Good Butter* should not have a rancid smell. When a quantity is melted and poured into a small narrow phial, and the latter allowed to stand near to a good fire, the milky layer of water that falls to the bottom of the bottle should not form more than one-tenth of the total bulk of fluid. When the melted butter is poured off, the water should not strike a blue colour when shaken with a drop of tincture of iodine.

Bread.—Adulterants. Water, rice, potato, and other starches, salt, alum, bone-dust, clay, carbonate of magnesium, chalk, gypsum, and sulphate of copper; or impure from bad flour. *Good Bread* is sweet and agreeable to the taste. It does not present a mouldy appearance, and ought not to give a thick liquid when steeped in water. If bread become soft and sodden on standing, it is probably adulterated with rice. When a piece containing much alum is dipped in a very weak solution of the colouring matter of logwood, the bread is quickly dyed of a purple tint.

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* The turbidity is caused by fungoid growths.

* The microscope is alone able to detect mixtures of many organic bodies, as starches, fats, chicory, etc., in this and other cases. The simple tests given usually serve simply to exclude injurious substances.

Good bread ought not to contain more than 38 per cent. of water, and should burn to a very minute ash when heated on platinum foil.

Flour (Wheaten).—Adulterants and Impurities. Rice, barley, dari, bean-flour, "cones" flour, Indian corn, rye, potatoes, alum, gypsum, clay, ergot, darnel. *Good Flour* should not be acid or musty, but ought to have a pleasant flavour. When a small quantity is burnt on platinum-foil (see Cocoa) a scarcely perceptible residue of mineral matter should remain. As flour containing ergot is poisonous, it is a matter of importance to be able to distinguish this dangerous product of disease in the wheat. We can accomplish this easily by shaking up the suspected flour with a mixture of one part of chloroform and six parts of strong spirit of wine. The ergot, if present in the flour, will float on the liquid and form a brown scum.

Arrowroot (West Indian). — Adulterants. Potato-starch, sago-meal, rice, gypsum, china clay, chalk. *Genuine Maranta Arrowroot* is a dull white powder, which crackles strongly and in a peculiar manner when pressed between the fingers. When mixed with twice its weight of strong hydrochloric acid, it yields an opaque jelly. Potato-starch, under similar circumstances, affords a transparent jelly. When burnt on platinum-foil, arrowroot should leave a scarcely perceptible residue if unadulterated with mineral powders. A fragment of iodine placed on a warm plate near to the sample, colours Maranta arrowroot chocolate brown, sago-starch yellowish, wheaten starch violet, and potato-starch a dull lilac colour.

Meat.—Beef: Mutton. Good meat should possess the following easily observed characters. 1. It ought to be of a full, slightly brownish, red colour; neither of a pale pink tint on the one hand, nor of a deep purple hue on the other. If pink, disease is indicated; and if purple, the animal has probably not been slaughtered, but has died with the blood in it, or has suffered from acute fever. 2. It should have a marbled appearance, from the ramifications of little veins of fat among the muscles. 3. It should be firm, and elastic to the touch, and should scarcely moisten the fingers. Bad meat is usually wet, sodden, and flabby, with the fat looking like jelly or wet parchment. 4. It should have little or no odour, and not disagreeable; for diseased meat has a sickly cadaverous smell. Any disagreeable odour is most easily detected when the meat is chopped up and drenched with warm water. 5. It should not shrink or waste much in cooking. 6. It should not become very soft and wet on standing for a day or so, but should, on the contrary, dry on the surface (Letheby).—*Pork*, if unsalted, should present the characters above stated; but the colour of the meat, if sound, is of very pale red tint. When infested by the dangerous parasite, trichina spiralis, the meat is usually of a dark colour. Unfortunately, the animal itself can scarcely be detected by the unaided eye; not so the cysticercus, or measle, whose little sac is often as large as a hempseed, and can be easily seen.—*Sausages* are liable to partial decomposition, and then become poisonous, from whatever kind of meat they may have been prepared. Good sausage-meat should be firm, not moist, gelatinous, and vesicular. It should be free from disagreeable smell and taste, and from acidity.—*Poultry.* It is unnecessary to say more under this head, than to point out that this class of meat should fulfil the conditions 4, 5, and 6, given above.—*Fish* should only be used when fresh, and this condition can be easily ascertained. Fresh fish is free from offensive smell, and the flesh is not soft or gelatinous. It may be well to mention that fresh salmon or trout should not only have the well-known pink-coloured flesh, but, when the finger is drawn quickly and firmly across the fish, the depression so caused ought to fill up quickly, find a corresponding elevation or ridge soon appear. Sea-ash is not tested in this way, but the rigidity of the fish is sufficient to indicate its fresh condition. The bright red colour of fish-gills is a sign of very little importance, as the gills are often artificially tinted.

Isinglass.—Adulterants. Though the best, or Russian isinglass, is an unimportant article of food, it may be well to mention that it is sometimes adulterated with gelatine and with inferior Brazilian isinglass. *Genuine Russian Isinglass* occurs in opaque white filaments, which do not become transparent when placed in water, nor do they swell to a material extent. Gelatine, on the contrary, becomes transparent, and swells considerably. Russian isinglass affords a firm, translucent jelly; the Brazilian variety, for corresponding weights of material and water, does not afford nearly so firm a jelly, and it is much more milky.

Vegetables and Fruit.—Under this head it is only necessary to say that these articles of food should be invariably used in a fresh and ripe condition. It is, however, often a matter of importance to be able to distinguish poisonous *Mushrooms* from those that are edible. It may be generally stated that mushrooms which have a disagreeable, styptic taste and a pungent smell should always be rejected. The edible mushroom used in this country has a white top and pink gills; as the fungus grows the gills change to a brownish or even nearly black colour. *Preserved Fruits*, etc., should not be eaten if mouldy or in a state of decomposition, as evidenced by effervescence or slight frothing, and an unusually acid taste. All preserves, if made in copper vessels, should be tested for copper by stirring a thick bright needle for some time through the preserve, mixed with a little warm water. If, after stirring and standing for an hour or so, the needle, on removal and rinsing with water, be free from any of the well-known reddish deposit of metallic copper, the preserve cannot contain any sensible quantity of the poisonous metal. The same test should always be applied to *Pickles.*

Vinegar. — Adulterants. Sulphuric acid, and other mineral acids, water, "grains of paradise," chilies, corrosive sublimate (?). Arsenic and copper as accidental impurity. *Unadulterated Vinegar* is allowed by special enactment to contain one-thousandth of oil of vitriol. When paper moistened with vinegar containing this proportion of sulphuric acid is dried before the fire, no charring takes place until the paper is rather strongly heated; but if the proportion of acid be much greater, blackening results before the paper seems quite dry. It must be remembered that this is but a very rough and indecisive test. When a piece of clean and bright copper wire is immersed in vinegar, diluted with a little water, and heated nearly to boiling in a glass vessel, the copper quickly loses its colour and assumes a leaden hue if arsenic or mercury be present. Copper may be detected in a fresh sample, much diluted with water, by means of the steel needle, as described under *Preserved Fruits.* Pungent substances, "grains of paradise," for example, may be detected by evaporating a quantity of the vinegar nearly to dryness in any convenient porcelain vessel. The residue should not have a fiery taste.

Mustard.—Adulterants. Ordinary mustard is rarely free from admixture with one or other of the varieties of flour, turmeric being added to improve the colour. The addition of flour in moderate proportion may be permitted on the score of convenience, but turmeric should not be added. For flour, china clay, plaster of paris, or chalk have been substituted, the colouring material being yellow ochre, or even the poisonous chromate of lead. *Mustard* should not become brown when moistened with a little "spirit of hartshorn," and when burnt on platinum-foil should leave but a small quantity of nearly white ash.

Cayenne Pepper.—Adulterants. Dense flours or starches, mustard, turmeric, ochre, vermilion (?), red lead. *Cayenne*, when shaken with cold water, the mixture allowed to stand for a minute, and the liquid poured off, should not leave any heavy red powder at the bottom of the vessel. It ought to leave but little ash when burnt on platinum-foil.

Cheese. — Adulterants and Impurities. Setting aside such colouring matters as annatto, saffron, &c., we find that the mineral pigments, Venetian red (red lead ?), are used, and various flours or starches to increase weight.

Cheese should not be eaten when in a mouldy condition, or when containing "jumpers." It ought not to become blue when touched with dilute tincture of iodine, and it should leave but little ash when burnt on platinum.

CHERRY JUICE.*

BY A. W. MILLER, M.D.

Large quantities of cherry juice are now imported from Germany into the United States, no less than 1500 casks, each containing from 150 to 200 gallons, being entered at the New York Custom-house within the year. This juice is chiefly manufactured in the vicinity of Magdeburg, by expressing the common black cherries cultivated there for the express purpose. In the United States it is principally used by the compounders of liquors; but the author believes that it could also be employed with advantage for pharmaceutical purposes.

Cherry juice is a richly-coloured, dark-red liquid, somewhat glutinous, but perfectly bright and clear. Its taste is rather pleasant, fruity, slightly acidulous, and somewhat alcoholic. Without the addition of sugar it is rather too sour to be agreeable as a beverage. The specific gravity of a specimen examined was 1·041, but this may vary materially.

The importers state that its alcoholic strength ranges from 10 to 15 per cent. In one gallon of it subjected to fractional distillation, the proportion of alcohol was about 12½ per cent., or one-eighth of the entire bulk. The above amount of alcohol seems to be sufficient to preserve the juice under ordinary circumstances, although it will occasionally ferment during the hot weather of summer, particularly when left in half-filled barrels.

As the importer's price for German cherry juice is usually rather less than one dollar (gold) per gallon, this low figure is one of its main recommendations. The small proportion of alcohol contained in the cherry juice connot be held to detract from its merits, as it can readily be expelled by heat. The fact of the juice being perfectly clear and transparent, so that it will mix in all proportions with syrupy and alcoholic liquids without producing the slightest turbidity, is another important point in its favour. Besides this, the juice is always ready for immediate use, requiring neither filtering, straining, nor any other troublesome and tedious preparation, and it is not near so liable to spoil as solutions of cochineal. Indeed, it will be very difficult to find any other article, by means of which an equally beautiful tint can be given to elixirs, Curaçoa cordial, or other elegant pharmaceutical preparations, in so convenient a manner.

Cherry juice seems also to be specially suited for the compound syrup of phosphates, with the colouring of which most manufacturers have heretofore had trouble. Used in the proportion of one ounce of juice in a pint of the syrup, it produces a brilliant claret-red colour, which is not affected by either muriatic or phosphoric acids, and which is neither precipitated nor bleached by exposure to the light. The fruity flavour imparted to the syrup, of course, is rather an advantage than otherwise.

Soda-water syrups, prepared from strawberry and raspberry juice, particularly when it is a year old, have often less colour than is desirable. While most druggists are reluctant to add anilin or any other artificial colouring matter, there can be no possible objection raised to the crimson-tinted cherry juice, about four ounces of which will be found to be sufficient to bring one gallon of strawberry syrup up to the proper shade. Professor Parrish, in his 'Practical Pharmacy,' even highly recommends the admixture of black cherries with raspberries in the preparation of the syrup; and the same suggestion occurs in several French works. For enriching the colour of raspberry syrup, eight ounces of cherry juice can be used advantageously to a gallon.

The following formulæ illustrate some additional applications of cherry juice. All of them have been thoroughly tested, and most of them have been in use for some time, having met with general approbation among the consumers:—

Cherry Soda Water Syrup.

German Cherry Juice	1 quart.
Water	1 quart.
Best Crushed Sugar	7½ lbs.
Citric Acid	½ oz.

Boil in a porcelain capsule and strain. This yields a finely flavoured and richly tinted syrup, which is much admired by the frequenters of the fountain.

Cherry Wine.

German Cherry Juice	3 quarts.
Grape Sugar Syrup	1 pint.
Simple Syrup	1 pint.

This furnishes a cheap, palatable, and gently stimulating beverage. Its taste resembles the best of the popular domestic fruit wines.

Cherry Jelly.

Gelatine	1½ drachm.

Wash with cold water, and add

White Sugar	1 ounce.
German Cherry Juice . . .	½ „
Boiling Water	5 ounces.

Stir until all the gelatine and sugar have been dissolved, and then set aside in a cool place to gelatinize. As a pleasant variation in the diet of invalids, this can be highly recommended. It is also occasionally quite acceptable as a dessert for the table.

Translated into the language of the kitchen, the above may be directed to be made by putting two heaped spoonfuls of gelatine into a coffee cup, washing it with cold water, adding a heaped tablespoonful of sugar and one tablespoonful of cherry juice, then nearly filling the cup with boiling water, and stirring until all is dissolved.

Imitation of the Syrup of Red Oranges of Malta.
(Sirop d'Oranges rouges de Malte.)

Simple Syrup	1 gallon.
Cherry Juice	6 oz.
Essence of Curaçoa orange (containing 2 oz. of oil in a pint) .	½ oz.
Citric Acid	1 oz.

The quality of this syrup depends almost entirely on the purity and freshness of the essence of Curaçoa, which is difficult to obtain of good flavour. The syrup itself should be made in small amounts, as it is liable to be changed to an unpleasant rancid flavour on long exposure.

Imitation Strawberry Syrup.

Simple Syrup	1 gallon.
Cherry Juice	4 oz.
Tincture of Orris Root . . .	1 oz.
Citric Acid	6 drachms.
Strawberry Flavour	3 „

Imitation Raspberry Syrup.

Simple Syrup	1 gallon.
Cherry Juice	8 oz.
Tincture of Orris Root . . .	2 oz.
Citric Acid	6 drachms.
Raspberry Flavour	3 „

The compounders of liquors use cherry juice chiefly, if not exclusively, for manufacturing cherry brandy (known also as cherry bounce or guignolet), blackberry brandy, and an imitation of port wine. For the benefit of those who may be desirous of knowing the composition of these fancy liquors, which have a large sale in the South, the following receipts are appended, which have been obtained from trustworthy sources:—

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* Abstract from the *American Journal of Pharmacy* [4], vol. iii. p. 99.

Cherry Brandy.

Cherry Juice	15 gallons.
Pure Rectified Spirits . . .	20 ,,
Simple Syrup	5 ,,
Oil of Bitter Almonds . . .	1 drachm.

Rectified spirit is understood to be whiskey, which has been thoroughly deodorized by percolating through charcoal, and which is of first proof = 50 per cent. alcohol.

Blackberry Brandy.

Cherry Juice	3 gallons.
Pure Rectified Spirits . . .	25 ,,
Simple Syrup	5 ,,
Clear Water	5 ,,
Oil of Cinnamon	1 drachm.
Oil of Cloves	1 ,,

The oils are to be first dissolved in about a pint of alcohol, or high wine, and then to be mixed with the spirits before the addition of the other ingredients.

PROFESSOR TYNDALL ON LIGHT.*

(*Continued from p.* 750.)

In our last lecture we sought to familiarize our minds with the characteristics of wave-motion. We drew a clear distinction between the motion of the wave itself and the motion of its constituent particles. Passing through water-waves and air-waves, we prepared our minds for the conception of light propagated through the luminiferous ether. The analogy of sound will fix the whole mechanism in your minds. Here we have a vibratory body which originates the wave-motion, we have, in the air, a vehicle which conveys it, and we have the auditory nerve which receives the impressions of the sonorous waves. In the case of light we have in the vibrating atoms of the luminous body the originators of the wave-motion, we have in the ether its vehicle, while the optic nerve receives the impression of the luminiferous waves. We learned, also, that colour was the analogue of pitch, that the rapidity of atomic vibration augmented, and the length of the ether-waves decreased, in passing from the red to the blue end of the spectrum. The fruitful principle of interference we also found applicable to the phenomena of light; and we learned that, in consequence of the different lengths of the ether-waves, they were extinguished by different thicknesses of transparent films, the particular thickness which quenched one colour glowing with the complementary ones. Thus the colours of thin plates were accounted for.

But one of the objects of our last lecture, and that not the least important, was to illustrate the manner in which scientific theories are formed. They, in the first place, take their rise in the desire of the mind to penetrate to the sources of phenomena. The desire has long been a part of human nature. It prompted Cæsar to say that he would exchange his victories for a glimpse of the sources of the Nile; it may be seen working in Lucretius; it impels Darwin to those daring speculations which of late years have so agitated the public mind. We have learned that in framing theories the imagination does not create, but that it expands, diminishes, moulds and refines, as the case may be, materials derived from the world of fact and observation.

This is more evidently the case in a theory like that of light, where the motions of a subsensible medium, the ether, are presented to the mind. But no theory escapes the condition. Newton took care not to incumber gravitation with unnecessary physical conceptions; but we have reason to know that he indulged in them, though he did not connect them with his theory. But even the theory as it stands did not enter the mind as a revelation dissevered from the world of fact. The germ of the conception that the sun and planets are held together by a force of attraction is to be found in the fact that a magnet had been previously seen to attract iron. The notion of matter attracting matter came thus from without, not from within.

The general facts of magnetism are most simply illustrated by a magnetized bar of steel, commonly called a bar magnet. Placing such a magnet upright upon a table, and bringing a magnetic needle near its bottom, one end of the needle promptly retreats from the magnet, while the other as promptly approaches. The needle is held quivering there by some invisible influence exerted upon it. Raising the needle along the magnet, but still avoiding contact, the rapidity of its oscillations decreases, because the force acting upon the needle becomes weaker. At the centre the oscillations cease. Above the centre the end which had been previously drawn toward the magnet retreats, and the opposite end approaches. As we ascend higher, the oscillations become more violent, because the force becomes stronger. At the upper end of the magnet, as at the lower, the force reaches a maximum, but all the lower half of the magnet attracts one end of the needle, while all the upper half attracts the opposite end. This doubleness of the magnetic force is called polarity, and the points near the ends of the magnet in which the forces seem concentrated are called its poles.

What, then, will occur if we break this magnet in two at the centre? Will each of the separate halves act as it did when it formed part of the whole magnet? No; each half is in itself a perfect magnet, possessing two poles. This may be proved by breaking something of less value than the magnet—the steel of a lady's stays for example, hardened and magnetized. It acts like the magnet. When broken, each half acts like the whole; and when these parts are again broken, we have still the perfect magnet, possessing, as in the first instance, two poles. Push your breaking to its utmost limit; you will be driven to prolong your vision beyond that limit, and to contemplate this thing that we call magnetic polarity as resident in the ultimate particles of the magnet. Each atom is endowed with this polar force.

Like all other forces, this force of magnetism is amenable to mechanical laws; and knowing the direction and magnitude of the force, we can predict its action. Placing a small magnetic needle near a bar magnet, it takes up a determinate position. That position might be deduced theoretically from the mutual action of the poles. Moving the needle round the magnet, for each point of the surrounding space the needle takes a definite direction and no other. A needle of iron will answer as well as the magnetic needle; for the needle of iron is magnetized by the magnet, and acts exactly like a needle independently magnetized. If we place two or more rods of iron near the magnet, the action becomes mere complex, for then the iron needles are not only acted upon by the magnet, but they act upon each other. And if we pass to smaller masses of iron—to iron filings, for example—we find that they act substantially as the needles, arranging themselves in definite forms, in obedience to the magnetic action.

Placing a sheet of paper or glass over this bar magnet and showering iron filings upon the paper, I notice a tendency of the filings to arrange themselves in determinate lines. They cannot freely follow this tendency, for they are hampered by the friction against the paper. I help them by tapping the paper; each tap releases them for a moment, and enables them to follow their bias.

The aspect of these curves so fascinated Faraday that the greater portion of his intellectual life was devoted to pondering over them. He invested the space through which they run with a kind of materiality; and the pro-

* Abstract of a series of lectures delivered in the Cooper Institute, New York, and reported in the *New York Tribune*.

bability is, that the progress of science by connecting the phenomena of magnetism with the luminiferous ether, will prove these "lines of force," as Faraday loved to call the magnetic curves, to represent a condition of this mysterious substratum of all radiant action. But it is not with the magnetic curves as such that I now wish to occupy your attention; it is their relationship to theoretic conceptions that we have now to consider. By the action of the bar magnet upon the needle we obtain a notion of a polar force; by the breaking of the strip of magnetized steel, we attain the notion that polarity can attach itself to the ultimate particles of matter. The experiment with the iron filings introduces a new idea into the mind; the idea, namely, of structural arrangement. Every pair of filings possesses four poles, two of which are attractive and two repulsive. The attractive poles approach, the repulsive poles retreat; the consequence being a certain definite arrangement of the particles with reference to each other.

Now, this idea of structure, as produced by polar force, opens a way for the intellect into an entirely new region, and the reason I ask you now to accompany me into this region is, that our next inquiry relates to the action of crystals upon light. Before I speak of this action, I wish you to realize the process of crystalline architecture. Look then into a granite quarry, and spend a few minutes in examining the rock. It is not of perfectly uniform texture. It is rather an agglomeration of pieces, which, on examination, present curiously defined forms. You have there what mineralogists call quartz, you have felspar, you have mica. In a mineralogical cabinet, where these substances are preserved separately, you will obtain some notion of their forms. You will see there, also, specimens of beryl, topaz, emerald, tourmaline, heavy spar, fluor-spar, Iceland spar—possibly a full-formed diamond, as it quitted the hand of nature, not yet having got into the hands of the lapidary. These crystals, you will observe, are put together according to law; they are not chance productions; and if you care to examine them more minutely, you will find their architecture capable of being to some extent revealed. They split in certain directions before a knife-edge, exposing smooth and shining surfaces, which are called planes of cleavage; and by following these planes you sometimes reach an internal form, disguised beneath the external form of the crystal. Ponder these beautiful edifices of a hidden builder. You cannot help asking yourself how they were built; and familiar as you now are with the notion of a polar force, and the ability of that force to produce structural arrangement, your inevitable answer will be, that those crystals are built by the play of polar forces with which their ultimate molecules are endowed. In virtue of these forces, atom lays itself to atom in a perfectly definite way, the final visible form of the crystal depending upon this play of its molecules.

Everywhere in nature we observe this tendency to run into definite forms, and nothing is easier than to give scope to this tendency by artificial arrangements. Dissolve nitre in water, and allow the water slowly to evaporate; the nitre remains, and the solution soon becomes so concentrated that the liquid form can no longer be preserved. The nitre molecules approach each other, and come at length within the range of their polar forces. They arrange themselves in obedience to these forces, a minute crystal of nitre being at first produced. On this crystal the molecules continue to deposit themselves from the surrounding liquid. The crystal grows, and finally we have large prisms of nitre, each of a perfectly definite shape. Alum crystallizes with the utmost ease in this fashion. The resultant crystal is, however, different in shape from that of nitre, because the poles of the molecules are differently disposed; and if they be only nursed with proper care, the crystals of these substances may be caused to grow to an enormous size. The condition of perfect crystallization is, that the crystallizing force should act with deliberation. There should be no hurry in its operations; but every molecule ought to be permitted, without disturbance from its neighbours, to exercise its own molecular rights. If the crystallization be too sudden, the regularity disappears.

Water may be saturated with sulphate of soda, dissolved when the water is hot, and afterward permitted to cool. When cold, the solution is supersaturated; that is to say, more solid matter is contained in it than corresponds to its temperature. Still, the molecules show no sign of building themselves together. This is a very remarkable, though a very common fact. The molecules in the centre of the liquid are so hampered by the action of their neighbours that freedom to follow their own tendencies is denied to them. Fix your mind's eye upon a molecule within the mass. It wishes to unite with its neighbour to the right, but it wishes equally to unite with its neighbour to the left; the one tendency neutralizes the other, and it unites with neither. We have here, in fact, translated into molecular action, the well-known suspension of animal volition produced by two equally inviting bundles of hay. But if a crystal of sulphate of soda be dropped into the solution, the molecular indecision ceases. On the crystal the adjacent molecules will immediately precipitate themselves; on these again others will be precipitated, and this act of precipitation will continue from the top of the flask to the bottom, until the solution has, as far as possible, assumed the solid form. The crystals here formed are small, and confusedly arranged. The process has been too hasty to admit of the pure and orderly action of the crystallizing force. It typifies the state of a nation in which natural and healthy change is resisted, until society becomes, as it were, supersaturated with the desire for change, the change being then effected through confusion and revolution, which a wise foresight might have avoided.

Let me illustrate the action of crystallizing force by two examples of it: nitre might be employed, but another well-known substance enables me to make the experiment in a better form. The substance is common sal-ammoniac, or chloride of ammonium, dissolved in water. Cleansing perfectly a glass-plate, the solution of the chloride is poured over the glass, to which, when the plate is set on edge, a thin film of the liquid adheres. Warming the glass slightly, evaporation is promoted; the plate is then placed in a solar microscope, and an image of the film is thrown upon a white screen. The warmth of the illuminating beam adds itself to that already imparted to the glass-plate, so that after a moment or two the film can no longer exist in the liquid condition. Molecule then closes with molecule, and you have a most impressive display of crystallizing energy overspreading the whole screen. You may produce something similar if you breathe upon the frost-ferns which overspread your window-panes in winter, and then observe through a lens the subsequent recongelation of the film.

Here the crystallizing force is hampered by the adhesion of the film to the glass; nevertheless, the play of power is strikingly beautiful. Sometimes the crystals start from the edge of the film and run through it from that edge, for the crystallization being once started, the molecules throw themselves by preference on the crystals already formed. The solid chloride of ammonium possesses a power of provoking precipitation upon itself which is not possessed by the solid glass. Sometimes the crystals start from definite nuclei in the centre of the film; every small crystalline particle which rests in the film furnishes a starting-point. Throughout the process you notice one feature which is perfectly unalterable, and that is, angular magnitude. The spiculæ branch from the trunk, and from these branches others shoot; but the angles inclosed by the spiculæ are unalterable. In like manner you may find alum-crystals, quartz-crystals, and all other crystals, distorted in shape. They are thus far at the mercy of the accidents of crystallization; but in one particular they assert their superiority over all such accidents—angular magnitude is always rigidly preserved.

My second example of the action of crystallizing force is thus: By sending a voltaic current through a liquid you know that we decompose the liquid, and if it contains a metal we liberate this metal by the electrolysis. This small cell contains a solution of sugar of lead, and this substance is chosen because lead lends itself so freely to this crystallizing power. Into the cell dip two very thin platinum wires, and these are connected by other wires with a small voltaic battery. On sending the voltaic current through the solution, the lead will be slowly severed from the atoms with which it is now combined; it will be liberated upon one of the wires, and at the moment of its liberation it will obey the polar forces of its atoms, and produce crystalline forms of exquisite beauty. They are now before you, sprouting like ferns from the wire, appearing indeed like vegetable growth rendered so rapid as to be plainly visible to the naked eye. On reversing the current, these wonderful lead-fronds will dissolve, while from the other wire filaments of lead dart through the liquid. In a moment or two the growth of the lead-trees recommences, but they now cover the other wire. In the process of crystallization, Nature first reveals herself as a builder. Where do her operations stop? Does she continue by the play of the same forces to form the vegetable, and afterward the animal? Whatever the answer to these questions may be, trust me that the notions of the coming generations regarding this mysterious thing, which some have called "brute matter," will be very different from those of the generations past.

There is hardly a more beautiful and instructive example of this play of molecular force than that furnished by the case of water. You have seen the exquisite frond-like forms produced by the crystallization of a film of water on a cold window-pane. You have also probably noticed the beautiful rosettes tied together by the crystallizing force during the descent of a snow-shower on a very calm day. The slopes and summits of the Alps are loaded in winter with these blossoms of the frost. They vary infinitely in detail of beauty, but the same angular magnitude is preserved throughout. An inflexible power binds spears and spiculæ to the angle of 60°. The common ice of our lakes is also ruled in its deposition by the same angle. You may sometimes see in freezing water small crystals of stellar shapes, each star consisting of six rays, with this angle of 60° between every two of them. This structure may be revealed in ordinary ice. In a sunbeam, or failing that, in our electric beam, we have an instrument delicate enough to unlock the frozen molecules without disturbing the order of their architecture.

According to the emission theory, the velocity of light in water and glass is greater than in air; according to the undulating theory, the reverse is the case. This point has been subjected to the test of an experiment proposed by Arago, and executed by Foucault and Fizeau, and decided in favour of the undulatory theory. Whenever the two theories have come into collision this has been the result.

Consider a small portion of a wave issuing from a point of light so distant that the portion may be regarded as practically straight. Moving vertically downwards, and impinging on a horizontal surface of glass, the wave would go through the glass without change of direction. But, as the velocity in glass is less than the velocity in air, the wave would be retarded in passing into the denser medium. But suppose the wave, before reaching the glass, to be oblique to the surface; that end of the wave which first reaches the glass will be the first retarded, the other portions as they enter the glass being retarded in succession. This retardation of the one end of the wave causes it to swing round and change its front, so that when the wave has fully entered the glass its course is oblique to its original direction. According to the undulatory theory, light is thus refracted.

The two elements of rapidity of propagation, both of sound and light, in any substance whatever, are elasticity and density, and the enormous velocity of light is attainable because the ether is at the same time of infinitesimal density and of enormous elasticity. It surrounds the atoms of all bodies, but seems to be so acted upon by them that its density is increased without a proportionate increase of elasticity; this would account for the diminished velocity of light in refracting bodies. Now, in virtue of the crystalline architecture that we have been considering, the ether in many crystals possesses different densities in different directions; and the consequence is that some of these media transmit light with two different velocities. Now, refraction depends wholly upon the change of velocity being greatest where the density is greatest. Hence in many crystals we have two different refractions, a ray of light being divided by such crystals into two. This effect is called double refraction.

In water, for example, there is nothing in the grouping of the molecules to interfere with the perfect homogeneity of the ether; but, when water crystallizes to ice, the case is different. In a plate of ice the elasticity of the ether in a direction perpendicular to the surface of freezing is different from what it is parallel to the surface of freezing; ice is, therefore, a double refracting substance. Double refraction is displayed in a particularly impressive manner by Iceland spar, which is crystallized carbonate of lime; the difference of ethereal density in two directions in this crystal is very great, the separation of the two halves of the beam being, therefore, particularly striking. Upon the screen is now projected an image of our carbon points. Introducing the spar, I permit the beam which builds the image to pass through it; instantly you have the single image divided into two others. Casting upon the screen an image of the aperture through which the light issues from the electric lamp, and introducing the spar, two luminous disks instead of one appear immediately upon the screen.

The two beams into which the spar divides the single incident-beam do not behave alike. One of them obeys the ordinary law of refraction discovered by Snell, and this is called the ordinary ray. The other does not obey the ordinary law. Its index of refraction, for example, is not constant, nor do the incident and refracted rays always lie in the same plane. It is, therefore, called the extraordinary ray. Pour water and bisulphide of carbon into two cups of the same depth; looked at through the liquid, the cup that contains the more strongly-refracting liquid will appear shallower than the other. Place a piece of Iceland spar over a dot of ink; the two dots are seen, but one appears nearer than the other. The nearest dot belongs to the most strongly-refracted ray, in this case the ordinary ray. Turn the spar round; the extraordinary image of the spot rotates round the ordinary one.

The double refraction of Iceland spar was first treated of in a work published by Erasmus Bartholimus, in 1669. The celebrated Huyghens sought to account for the phenomenon on the principle of the wave theory, and he succeeded in doing so. He made highly important observations on the distinctive characters of the two beams transmitted by the spar. Newton, reflecting on the observations of Huyghens, came to the conclusion that each of the beams had two sides; and from the analogy of this two-sidedness with the two-endedness of a magnet, wherein consists its polarity, the two beams came to be described as polarized.

(*To be continued.*)

SYRUP OF LACTO-PHOSPHATE OF LIME.

Take of Chloride of Calcium . . . ℥i
Phosphate of Soda . . . ℥iv
Concentrated Lactic Acid . ℥i.

Dissolve the chloride of calcium and phosphate of soda separately, and mix the solutions; wash the precipitate and dissolve in the acid. Filter and mix with sufficient syrup to make two and one-half pints.—E. CHILES, *in American Journal of Pharmacy.*

The Pharmaceutical Journal.

SATURDAY, MARCH 29, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, *17, Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary, 17, Bloomsbury Square, W.C.*

Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE BENEVOLENT FUND.

NOTWITHSTANDING the whirl and din arising from conflicts between chivalric feminine advocates and "benighted obstructives," added to denunciations of alleged excessive examination fees, lamentations because of long hours and low prices, and endless discussions about education, examination, cramming, crammers, and a host of other subjects, there is one question that is always put forward in these columns in the same spirit, and that is, How the pharmaceutical world may best deal with its heritage of poor and distressed brethren. Common ground this, where friendly rivals strive for the same goal. The Pharmaceutical Benevolent Fund is enriched alike by the gifts of the prosperous few and of the many who, to judge from their own reports, are compelled to "live upon their losses," and the desire of all is that the money given shall be funded or spent so as to do the greatest good to the greatest number. It therefore needs but little excuse to draw attention to some remarks that appeared in our correspondence columns last week, and are reiterated this week by other writers.

Fifteen months since Mr. STEVENSON called attention to the fact that the income for the year 1871 did not represent one shilling per annum from each of the twelve or thirteen thousand chemists and druggists upon the Register, and he urged that an effort should be made to render the interest in the Fund more general. Shortly afterwards Mr. SCHOLEFIELD gave as his reason for not subscribing to the Fund, that the subscriptions were invested instead of being spent, and said he considered that the reserve fund ought not in such a Society to exceed the amount of five years' expenditure, and that, with the exception of large sums arising from legacies and special donations, the whole of the yearly income should be divided amongst the deserving applicants for relief. The fact that those who criticize do not subscribe does not invalidate the claims of their suggestions to careful consideration, to see whether it be possible, by a removal of any defects in administration, to secure a more general response to the appeal for more funds.

What proportions, then, should the funded capital, the year's income, and the year's expenditure bear to each other? With upwards of £13,000 invested in the Consols, is it advisable that in future the expenditure in the shape of grants should more nearly balance the income, or should the operation of the fund be restricted to its present extent until a larger reserve fund has been accumulated? The question has been propounded before, but has not yet received an authoritative and decisive answer; and yet it is one of considerable importance in its influence upon the future of the Fund.

Probably a principal reason for the existing uncertainty is the equal indefiniteness of ideas as to the ultimate limits and nature of the relief to be given. The donor of a guinea, who complains that little more than sixpence of his money is spent, while the remainder is put by for the benefit of posterity, has some plausibility and reason in his complaint; but it is not to be forgotten that the sixpence is spent yearly, and that it will be required yearly, if the relief takes the form of an annuity. This is shown by the fact, that the interest on the funded property is but little more than sufficient to meet the engagements already incurred in the shape of annuities, leaving the fresh income available for temporary grants, and to form the nucleus for future annuities.

Still it may be that there are some who would prefer that their subscriptions should be bestowed immediately, and the suggestion of our correspondent that there should be two classes of subscriptions is therefore worthy of the attention of the Council. But that, even with this opportunity, the time will ever come when every pharmaceutical chemist will be eager to subscribe his guinea, and every chemist and druggist his five shillings, our knowledge of human nature forbids us to hope, however much we may desire it. For notwithstanding the efforts that have been and are continually made to explain to the whole trade the nature of the Benevolent Fund, there are many persons who still fail to comprehend its true character, to say nothing of the percentage who always ignore such things until they are open to receive a service from them.

Nevertheless, much more can be done than at present is done; and if any of our readers who do not subscribe should feel disposed to forward subscriptions with an intimation of their wish that the money should be spent at once, we have as little doubt that their wish will be complied with, as that the Council will find objects for its proper disposal. Mr. BRETON, however, suggests visions of homes for those whose

"Length of life is length of woe,"

and schools for those who, like the proverbial bear, have all their troubles to come. To these forms of benevolence may be added the proposition of those who think that much expensive machinery may be saved and an objectionable pauperizing influence avoided, by giving to widows of deceased chemists and druggists,—who may have been left in straitened circumstances but not sufficiently so to induce them to come, as it were, *in formâ pauperis* upon the Fund,—assistance in providing a sound education for their children without taking them from their own homes. For such ends not only will a large increase of spending money be required, but also a considerable augmentation of the reserved funds. So that there is plenty of work cut out for the advocates of both plans.

CONTINENTAL EDUCATION.

Foreign travel, according to Lord Bacon, is the appropriate *finale* to a course of education at home, It "crowns the edifice" of culture. It adds a grace and a harmony to the solid substructure of native discipline. In a profession cognate to our own—that of medicine—nothing is more usual, nothing more advantageous, than to supplement English training by a visit to foreign schools. Why should not the young pharmacist more frequently go and do likewise? The "provinciality" engendered by our insular life and traditions is common to all our professions, and receives its proper corrective by a well-devised course of foreign experiences. At the close, therefore, of the curriculum at home, we would counsel the young aspirant to pharmaceutical fame to avail himself of the first opportunity to spend a few months at some of the continental seats of learning. France is open to him; so is Italy; so is Germany. But of the three the last named is richer in the men and the materials wherewith to deepen knowledge, to correct prejudice, and to enlarge the mind.

The pharmaceutical chemist might do worse than reside for a session at the University of Leipzig, for example, which, especially since the war, is gaining rapidly on Vienna and Berlin in scientific attractiveness. Physics, Chemistry, and Botany are admirably represented there. In the physico-chemical laboratory of Professor Wiedemann, the student can either obtain or supplement his culture in that special branch under the most favourable auspices; while the physical cabinet of Professor Hankel and the physico-technological apparatus under the direction of Professor Marbach may also be consulted with advantage. In Chemistry Leipzig stands very high. Dr. Kolbe, of European reputation, is its professor; and in connection with his chair there is the chemical laboratory, one of the largest and most practically constructed and appointed to be found in any seat of learning. Botany is not so well represented; but the deficiencies of the Botanical Garden are being rapidly repaired; while there is an excellent Botanical Laboratory and Herbarium under Professor Schenke. Life in Leipzig is not nearly so expensive nor so seductive as at Berlin or Vienna; while in a hygienic point of view it is far pleasanter, not to say safer, than the former, and certainly not inferior to the latter. Add to this, that all the faculties are ably, and in some chairs brilliantly, represented, giving to the academic *ensemble* a tone and an atmosphere at once bracing and expanding. "For every language one knows," said Charles the Fifth, "he is so much the more a man;" and the aphorism holds good for the scientific culture of foreign civilizations, and for the development—the intellectual new-birth, so to speak—it can vouchsafe. Wherefore, say we to those of our aspiring pharmacists who can afford the time and the money, "Try Leipzig."

ENGLISH PHARMACISTS IN CANADA.

At the semi-annual council meeting of the Ontario College of Pharmacy on the 5th February, it was resolved that certificates of proficiency or diplomas of the Pharmaceutical Society of Great Britain, the Pharmaceutical Association of Quebec, and the Philadelphia College of Pharmacy, should be recognized by the College, provided that the holders had been four years in business; and the production of such diplomas is to be considered by the Board of Examiners under the Ontario Pharmacy Act sufficient evidence of qualification. At the same meeting it was decided to elect Professor Redwood and Professor Attfield of London, Mr. H. B. Brady of Newcastle, Professor J. M. Maisch of Philadelphia, and Dr. E. R. Squibb of Brooklyn, Honorary Members of the College.

The Atlantic cable of 1865 is broken, and speculation are rife as to the cause. In a letter to the *Daily News*, Mr. Highton expresses his opinion that the breakage is due to the formation of rust upon the iron wire sheath, and the action of this rust upon the hemp within, and he points to analogous results in the rotting of linen where spots of "iron mould" occur. Mr. Fleming Jenkin, however, combats this conclusion, saying an extended experience has shown that in submarine cables no such action takes place, hemp in contact with iron lasting perfectly sound for twenty years at least, if covered with the iron. At present the only thing certain upon the subject is that the cable is broken.

Dr. Henry Bence Jones having been compelled, by ill-health, to resign the office of Secretary to the Royal Institution, which he has so ably filled for many years, it is proposed to acknowledge his services by a testimonial in the shape of a bust of himself, to be placed in the Royal Institution, and a fund is being raised for the purpose.

Professor Balfour has been appointed Lecturer on Botany to the Edinburgh Veterinary College in the place of the late Professor Davidson.

Berthelot has at length been elected a member of the French Academy of Sciences.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

March 19*th*, 20*th*, *and* 21*st*, 1873.

Present—Messrs. Allchin, Barnes, Brown, Carteighe, Cracknell, Davenport, Edwards, Gale, Haselden, Linford, and Martindale.

Dr. Greenhow was present on the 21st, on behalf of the Privy Council.

MAJOR EXAMINATION.

Four candidates presented themselves, of whom *one* failed. The following *three* passed, and were declared duly qualified to be registered as "Pharmaceutical Chemists:"—

*Colling, Robert .... Stockton-on-Tees.
Dunn, Henry .... Shipley.
Botterill, George Thomas ...... Boston.

MINOR EXAMINATION.

Sixty candidates presented themselves, of whom *twenty-one* failed. The following *thirty-nine* passed, and were declared duly qualified to be registered as "Chemists and Druggists:"—

	*Tooke, George Stannard	Norwich.
Equal.	*Hunt, Freeman William	London.
Equal.	*Severs, Samuel Thomas	Leeds.
	*Bramley, William	Uppingham.
Equal.	*Askew, John	Grange-over-Sands.
Equal.	*Blackmore, James	Doncaster.
Equal.	*Hodges, Edwin Goodall	Bristol.
	Thorp, John	Manchester.
	Roberts, William	London.
	Shrimpton, Frederick George	London.
Equal.	Bennett, Henry Charles	Leigh, Lancashire.
Equal.	Scott, Thomas Alexander	London.
Equal.	Clement, Joseph	Coleford.
Equal.	Gould, Robert George	Poole.
Equal.	Adams, Richard	Market Drayton.
Equal.	Ward, William Edwin	Nottingham.
	Cox, William Dennis	Grantham.
	Kitchen, William	Kendal.
	Wilson, Richard	Hull.
	Laycock, John	Skipton.
	Roach, Herbert William	London.
	Cartwright, William Adam	Hyde.
	Dixon, Daniel	Preston.
	Smithard, Herbert Henry	Guernsey.
	Walker, William	Stockport.
	Horsfield, Robert Francis William	Walworth Road.
	Basker, John Anthony	Grantham.
	Lockwood, Charles Henry	Dorking.
	Lawson, Edward James	Whitstable.
Equal.	Barnes, William James	Dover.
Equal.	Pownall, Thomas	Mold.
Equal.	Prettejohn, Robert Froude	Torquay.
	Tripp, Zeno	Plymouth.
	Aris, George Henry	Wellingborough.
	Currah, George Ingersoll	London.
Equal.	Cronkshaw, John	Manchester.
Equal.	Matthews, Ernest	Royston.
	Gibbs, Henry	Aylesbury.
	Stephens, Henry Isaac	Bristol.

The above names are arranged in order of merit.

* Passed with Honours.

PRELIMINARY EXAMINATION.

The Certificates presented by the under-mentioned were received in lieu of the Preliminary Examination:—

Certificate of the College of Preceptors.

Price, Robert John .... Wrexham.

Certificate of the Royal College of Surgeons.

Dawson, George Alan .... Hanley.

Certificates of the University of Cambridge.

Basker, John Anthony .... Grantham.
Clarke, Herbert .... Lowestoft.
Green, Arthur .... Halifax.
Hands, Henry Joseph .... Chipping Campden.

Certificate of the University of Durham.

Marshall, John Colville .... York.

Certificates of the University of Oxford.

Cotterell, Edward .... Weymouth.
Currah, George Ingersoll .... London.
Hulland, Charles Richard .... Bath.
Phillips, Frank Leslie .... Birmingham.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The ninth general meeting was held at the Royal Institution, March 15th; the President, E. Davies, Esq., F.C.S., in the chair.

Mr. Edmund B. Ewart, B.A., was elected a member of the Association.

The following donations were announced:—'Proceedings of the American Pharmaceutical Association for 1872,' 'The New York Druggists' Circular,' current numbers of the PHARMACEUTICAL JOURNAL.

Mr. A. H. Mason, F.C.S., showed a beautiful specimen of guaranine made by Mr. J. Williams, and gave some particulars of his process for producing it.

Mr. Samuel Shaw Brown then read the paper for the evening, on "The Manufacture and Relative Therapeutic Characteristics of the Lints of Commerce."

A discussion on the subject of the paper followed, in which the President, Messrs. Brown, Abraham, Shaw, Mason, Tanner, and Hallawell took part, and the proceedings terminated with a vote of thanks to Mr. Brown.

The following paper on guarana was read at the meeting on the 13th ult., by Mr. J. Hallawell.

GUARANA.

Some time ago, on the occasion of Mr. T. H. Abraham presenting to this Association a specimen of guarana, I promised to give a notice at a future meeting of the history and uses of this medicine, with which I was familiar during my residence in Brazil, where it is extensively employed, having in fact a place in the Pharmacopœia used in that country.

Mr. Tanner not being able to read his paper this evening enables me to choose the present occasion to fulfil my promise.

When last in Paris I was fortunate enough to meet with a complete series of specimens of guarana, including seeds and medicinal powder, which were kindly placed at my disposal by M. Rigaud, one of the present proprietors of Grimault's establishment there. This gentleman also favoured me with a copy of a paper on guarana, written by his partner, Dr. Leconte, who had devoted considerable time and attention to the study of this product, and I found this paper so complete in itself that I obtained permission to translate what I thought proper for the present occasion, and I have drawn very largely on Dr. Leconte's composition in the following remarks, some paragraphs being almost a literal translation of his.

As a question in therapeutics formerly much discussed and subsequently abandoned, guarana is once more a subject of considerable attention. American doctors are carefully studying its effects, and English physicians are discussing its merits in the *Lancet*. We believe we may with some advantage step in, and take part in elucidating the subject, by publishing the documents we possess in reference thereto.

Guarana is a substance prepared by the South American Indians for commerce, from the seeds of the *Paullinia sorbilis*, a climber of the family of the *Sapindaceæ*, growing in Brazil. The cultivation of this plant, called also "Narana," *i.e.*, *a climbing plant*, has during the last few years enormously increased, owing to its introduction into Europe as a medicinal agent. The exportation of it at the present time, according to Brazilian returns, in one year, being put down as 30,000 kilos., about 30 tons.

Paullinia, in a wild state, grows to a height of from 10 to 12 metres (or about 36 to 40 feet), but its seeds are only used by the natives themselves. Those of the cultivated plant are reserved exclusively for the preparation of guarana intended for sale. The plant is propagated from the seed, but still better from cuttings of the plant. It produces fruit from the third year after planting, and after that period requires to be pruned, exactly as a vine. It flowers in July; the fruit is ripe in November. You will remember that these are the earliest months of spring in that latitude. The fruit, said to be scarcely larger than a walnut, contains five or six seeds. By careful cultivation, each stem will furnish four kilos., or about 9 lbs. of seed annually, and will live for forty years. The fruit of the plant cultivated in the neighbourhood of Mauhé is preferred. Topiriambaranas had for a long time the monopoly of the production of guarana, but subsequently it was found at Moxos and Chiquitos, and lastly at Villa Boa.

The Mauhées prepare it as follows: they remove the seeds from the capsules in November and dry them in the rays of the sun. After having slightly roasted them over a charcoal fire, they reduce them to a fine powder in stone mortars, or in stones hollowed for the purpose; they then moisten the powder with a little water, and expose it to the dew by night. In this way they produce a hard paste, often increased in bulk by mixing seeds and fragments of seeds. They afterwards roll it into cylinders of 12 to 16 oz. each, rounded at each extremity.

These cylinders or rolls are dried in the sun or in the chimneys of their huts. They measure 10 to 20 centimetres (4 to 8 inches) in length and 3 to 5 centimetres (or $1\frac{1}{4}$ to 2 inches) in breadth.

These cylinders are so hard that they have to be broken with an axe, or reduced to powder by means of a rasp. The different manipulations by which the mass is rendered hard, conduce to its preservation in a perfect state for many years. For exportation, the cylinders are enveloped in cocoa-nut leaves, and packed in baskets. It is in this form that the guarana appears in the European markets, though the samples sent from the Province of the Amazons to the Paris Exhibition resembled pine apples in form.

In reference to the seeds, they are very difficult to procure. According to Silva Continho, the mode of preparation varies a little from that described above, in that the Indians previously macerate the fruit in water, in order to detach more easily the pericarp from the seed, and of which they make a yellow pigment. The fruit also furnishes them with a red colouring-matter, with which they dye their teeth.

Guarana is not generally exported in a state of great purity, either being sometimes prepared from seeds in a state of fermentation, or mixed with cocoa-berries or tapioca flour. All authorities are agreed that seeds in a state of fermentation give a product of inferior quality; nevertheless, according to the Brazilian catalogue of the Paris Exhibition, the mass of "Guarana prepared and moistened, ought to be submitted to a slight fermentation." I think that the different manipulations to which the seeds are submitted, and during which it is dried three times, appear, on the contrary, to have for their object to preserve the preparation from fermentation. Peckholt asserts that the substance of the seeds alone is not sufficient to produce a firm mass, and that the Indians, to obtain this result, are obliged to add tapioca flour,—an addition, in this case, which does not constitute a fraud.

Jules Wiesner is not, however, of this opinion, and he brings as proof of his views, facts which it is in the power of every one to verify. He says, "At first sight one might think that the hard compact mass of the cylinders of guarana no longer possesses the organic structure of the seeds. It is not so. If we immerse a morsel of guarana in distilled water, the mass will give to the water a brownish colour, which changes to a kind of light pulp, from which the bulkier grains separate. If this matter be spread out and examined by the microscope, it will be seen clearly that the grains and fractions of grains are nothing more than fragments of seeds, readily recognized by their alveolar texture, and that the earthy portion of the mass represents well-defined histological elements. Among all the samples that I have analysed, I have not found one mixed with tapioca. It is, then, an error to suppose that that substance is necessary for the preparation of the mass of guarana."

We must agree with this conclusion; it carries with it not only the force of the authority of Professor Wiesner, and that of a microscopic examination, but is confirmed by other circumstances of which we shall speak hereafter.

Guarana, when perfectly pure, has the appearance, when fractured, of a piece of mosaic-work, generally of a darkish colour. The surface is of a shiny or greasy appearance, and the structure amygdaloid. In the middle of somewhat uniform masses are embedded smaller morsels of two to three millimetres in diameter ($\frac{1}{12}$ in. to $\frac{1}{8}$ in.), of which some are of a darker, and others of a lighter shade than the mass itself. Almost all of these are covered over with a whitish layer, not clearly definable. The substance is very hard and is crushed with difficulty in a mortar. The powder is of a bright brown or cinnamon colour, but with very little smell. But when it has been closely corked up for some time, or when it has been left a few instants in contact with the sides of a hot vessel, it acquires a peculiar odour. Heated slightly in the open air it has the smell and taste of roasted coffee. Guarana in a mass has the bitter styptic taste of the cocoa-berry; it softens in water, giving the liquid a brownish colour, while the insoluble portions lose little by little all their colour in the menstruum.

True guarana is distinguished from the inferior qualities by its greater hardness and specific gravity; the powder being of a reddish grey, whilst that of the sophisticated product is of a whiter appearance.

All these details, which appear more minute than useful, are important, as the end in view is to put the pharmacist on his guard against fraud,—so frequently the cause of unfavourable judgment when the merits of a new medicine, procurable with difficulty, are in question.

Guarana is for the Indians, at the same time, an indispensable aliment and a universal remedy. They live almost entirely on what is called "agua branca," a mixture of the powder and cold water, somewhat resembling chocolate. They reduce the mass to powder by means of a particular kind of fishes' bone or by sharp stones. The Indians have all the appearance of the freshness and vigour of those who live on animal food. They make use of it, medicinally prepared, with great success in the cases of diarrhœa and dysentery so frequent and so serious in their country; and in convalescent stages it is used as a tonic and stomachic.

The Brazilians and the civilized Indians learnt from the Mauhées the value of guarana, and at first bought it at very high prices. They employ it for the same purposes, modifying its bitter and styptic taste by means of sugar. It is now to be found in several Pharmacopœias, and is considered specially efficacious in cases of sick-headache.

Martius was the first to introduce to us this substance, in his work 'Travels in the Brazils.' Since then many authors have noticed it, amongst others Gavarelle, Petzholt, and Silva Continho. The subject, abandoned for a time, was taken up again by Jules Wiesner, who published a remarkable notice of it in the 'Ausland.' Latterly Dr. Wilks, of Guy's Hospital, has communicated to the 'British Medical Journal' a series of observations that leave no doubt as to the active properties of guarana. Dr. Leconte adds:—

"We were not at all surprised at the results obtained by Dr. Wilks; we were cognizant for a long time before of the properties of guarana. In our hands it has rarely failed, and we are convinced that its success is certain if it is employed pure and without any admixture or adulteration."

The powder of guarana prepared by Grimault is an alcoholic extract of guarana, and represents in a small bulk all the active principles of "Paullinia."

Dechastilus has found in this plant the following substances,—gum, starch, a resinous matter of a reddish-brown colour, a fatty oil coloured green by chlorophyll, tannin, colouring solutions of iron, green, and a crystallizable substance containing the chemical properties of caffeine.

More recent analysis, due to Trommsdorf, Petzholt, and Stenhouse, have shown that the crystallizable substance alluded to by Dechastelus is identical with the alkaloid of tea and coffee. These chemists have found in addition, saponine, carbonates and phosphates of soda, potassa, and lime. While tea contains but ·06 to 2 per cent. and coffee ·02 to ·08 per cent. of caffeine, these chemists have found in guarana 4 to 4·28 per cent. and as much as 5 per cent. of this substance.

Trousseau gave guarana in quantities of 1 or 2 grams (15 to 30 grains), not all at once, but distributed into several doses. This dose, he says, is sufficient to remove the most severe headache. Recent trials have proved, however, that this quantity may be increased; two grams (30 grains) may be administered at once, and repeated in a couple of hours if necessary.

The introduction of this remedy has been attributed to several sources, but there is no doubt its medicinal value was first discovered by the Indians, who in South America differ greatly from their brethren of the northern hemisphere. While the latter take interest in little except what pertains to the war-path or hunting, the former are a quiet, laborious, and patient race, living in a country especially rich in medicinal products, few of which have been brought before the notice of civilized mankind; and for a long time past they have learnt the uses and applications of many medicinal agents, the names of which are unknown to us. Formerly (for of late years there have been fewer of these visits) it was a common thing for the Indians to travel thousands of miles with a collection of these medicines to sell their "specifics" in the towns and villages of the whites; amongst these was guarana, which, on account of its superior merit, claimed special attention, and thus became known. It was sought for and procured, but until recently, in very small quantities, and could only be bought at a very high price. As the demand increased, the supply was found to be readily met, and at the present time the exportation has reached a very considerable figure. We believe the reason why it has sometimes failed in this and other European countries, is, that, on its being largely sought for, it was sent out in a very mixed and adulterated state, some specimens which I have seen not containing more than sufficient guarana to give a colour and appearance to the substance, the bulk being merely a mass of hardened farinaceous matter; and the characteristics of the true guarana being so little known, the mixture passed undetected. But I am convinced that a full and fair trial of its medicinal properties, made with specimens unmixed and unadulterated, would lead to its adoption in numerous forms of biliary and stomachic derangements, and that ultimately the medicine would take rank in this country, as in that in which it is found, as a valuable and indispensable therapeutic agent.

Lastly, as to the dose. Of the powder made from an average sample of guarana from 30 to 60 grains is, I believe, the right quantity. It remains to be tried how and in what manner a certainty is to be arrived at in its administration—whether an alcoholic or other extract may not be made, which shall be invariable in strength, for at present the samples received vary so greatly, that, except to an expert, it is difficult to ascertain the exact value of the material as imported. Messrs. Rigaud and Leconte have introduced what they state is an alcoholic extract, and of a certain and fixed strength; but should guarana be found to have the merit its advocates claim, it will be very easy to discover the best form for employing it with certainty and exactness. It has been suggested to import the seeds, and prepare in this country from them, either the guarana or a better form still for embodying the active principles of this substance. This suggestion is worth attention, meanwhile the substance as known already might be thoroughly tried, from reliable samples; and its value once established, the seeds might possibly be procured in sufficient quantity to enable the pharmacist to make his own guarana, or something better still to substitute it.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The fourth meeting of the session was held in the rooms of the Society, Exchange Buildings, on February 28th; the President, Mr. J. H. Atherton, in the chair. The following donations were announced: The Calendar of the Pharmaceutical Society, from the Society; Specimen of Scammony Root, from Mr. Ransome Kitchen; Variety of chemicals, from Messrs. Hearon, Squire, and Co. The thanks of the Society were cordially given to the respective donors.

Three new members were elected. After which the president introduced the subject of the "Recent Schedule of Poisons" sent to chemists and druggists throughout the country; and elicited some discussion respecting the sale of vermin killers.

Dr. Souter delivered an interesting lecture on the "Cryptogamics of the Coal Measures." A hearty vote of thanks was awarded to the lecturer.

The fifth general meeting of the Association was held on Friday evening, March 21; the President, Mr. J. H. Atherton, in the chair. Several members and associates were elected, and the thanks of the Society given to donors to the library and museum. The president congratulated the Society on the receipt of a donation of £15 towards the museum from the Pharmaceutical Society of Great Britain, and announced that a sub-committee had been formed to arrange for glass cases to hold the chemical and other specimens. Subsequently a special vote of thanks was accorded to the Pharmaceutical Society for the valuable assistance given.

Mr. Smith then gave an illustrated lecture on the "Construction and uses of the Microscope." The lecture was one of an exceedingly practical nature, and the lecturer was warmly applauded at its conclusion. Before and after the lecture many interesting objects were shown by various members of the Society who had kindly brought their microscopes.

LEEDS CHEMISTS' ASSOCIATION.

The fifth meeting of the present session was held in the Clergy-room, on Wednesday, February 12th; the President, Mr. E. Brown, in the chair. The minutes of former meeting having been read and confirmed, Messrs. J. W. Longley and H. B. Young were elected members. The President introduced Mr. O. Pegler, associate of the Royal School of Mines, who proceeded to read a paper on Mineralogy and Crystallography. He said that mineralogy treats of the properties of mineral substances and comprehends the study of all inorganic substances in the earth or on its surface—as a science it holds as high a position as botany and zoology, and offers to the diligent student ample scope for investigation, opening out the storehouses of nature for the fertile discoveries and application of the chemist. Referring to the variety of colour, form, and physical properties of the minerals constituting the earth's crust, the lecturer pointed out that these modifications were merely due to a rearrangement of a few of the known elements, the smallest portion of a mineral possessing the same constituents, form, and colour as the largest crystal or the mountain mass, the growth of a mineral being by accretion of its particles, illustrating his remarks by reference to a great number of minerals arranged upon the table. In consequence of the lapse of time, Mr. Pegler was unable to go into the subject of crystallography as fully as he had hoped to do; but, at the request of the President, he consented to bring the subject forward at another meeting. A cordial vote of thanks was given to the lecturer upon the motion of the President, seconded by Mr. S. Taylor.

ROCHDALE CHEMISTS' ASSOCIATION.

The fourth ordinary meeting of this Association was held at the Public Baths, Rochdale, on Wednesday evening, the 19th inst.

Mr. Alderman Booth read a paper on Guarana, giving a clear and interesting account of the plant *Paullinia sorbilis*, and the method adopted for the manufacture of the drug. The description was illustrated with a complete collection of specimens of the fruit of *Paullinia sorbilis*, guarana in rolls, and alcoholic extract. There were also exhibited a fine sample of pyrophosphate of iron and soda, and some elegant French preparations.

After a short discussion on the subject of the paper and an examination of the various objects on the table, a vote of thanks was unanimously passed to the President, to which he replied, "That he received their thanks as wholly due to Mr. Joseph Hallawell, of Liverpool, who had furnished at his request the illustrative specimens as well as the instructive paper on guarana, to which they had listened with so much interest; and to whom he would express their thanks."

ABERDEEN SCHOOL OF PHARMACY.

A course of lectures by Dr. Beveridge, for the summer session of the Aberdeen School of Pharmacy, Hospital Court, Gallowgate, in connection with the Society of Chemists and Druggists in that city, is announced to be commenced on Tuesday, April 1, at half-past eight, and continued every Tuesday, Wednesday, and Thursday evening, at the same hour, until July 31. The subjects will be the Practical Study of the Materia Medica, with the Chemistry and Botany of the Pharmacopœia. Fee for the Course, 20*s*.

It is earnestly hoped that assistants and apprentices will avail themselves of these lectures specially provided to assist them in qualifying themselves for passing the necessary examinations of the Pharmaceutical Society, and as the course will only be proceeded with on the condition of a certain number coming forward, it is requested that those desirous of attending it will leave their names as early as possible with Mr. Andrew Ross, 43, Castle Street.

The library is open every Friday evening from 8 to 10 o'clock.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, 20th March, 1873, Dr. Frankland, F.R.S., President, in the chair. The names of the visitors having been announced, and the minutes of the previous meeting read and confirmed, the President called on Mr. C. W. Siemens, F.R.S., etc., to deliver his lecture "On Iron and Steel." The lecturer, after adverting to his former discourse delivered before the Society in 1868, and describing the various experiments he had since made to obtain malleable iron direct from the ore, gave an account of the process by which he had succeeded in completely attaining that object. It consists essentially in fusing the ore in a revolving furnace, and then adding the requisite amount of carbonaceous matter to reduce the iron to the metallic state. The malleable iron thus precipitated in the molten mass becomes aggregated into balls by the revolution of the furnace, and can then be easily removed. It is free from sulphur, phosphorus, and other impurities, and dissolves readily in a bath of molten cast iron, producing steel of a quality equal to that made from the best Swedish bar iron.

After some discussion, the Society adjourned until the anniversary meeting, which will be held on Monday, the 31st March. The next ordinary meeting will be on Thursday, 3rd April, for which the following papers are announced:—

1. "A Way of Exactly Determining the Specific Gravity of Liquids," by Dr. H. Sprengel. 2. "On Cymene from Various Sources," by Dr. C. R. A. Wright. 3. "Researches on the Action of the Copper-Zinc Couple on Organic Bodies, II. On the Iodides of Amyl and Methyl," by J. H. Gladstone, F.R.S., and A. Tribe. 4. "Contributions from the Laboratory of the London Institution, No. XI., Action of the Acid Chlorides on Nitrates and Nitrites," by Dr. H. G. Armstrong.

Parliamentary and Law Proceedings.

Suicide by Strychnine.

An inquest was held at Doncaster on Thursday, March 20, upon the body of Joseph Mordue. It was shown that the deceased, who was a butler, had received notice to leave his situation, and his employer, upon going to his room to settle accounts with him, found the door locked. An entrance was forced, and Mordue was found to be dead. A bottle containing strychnine was on the mantel-piece. It was labelled "Strychnine," but no information could be obtained by the police as to its purchase.

The coroner remarked that the bottle had at one time been filled with strychnine, sufficient to kill two hundred persons. There was enough left to poison five or six. It was a mystery where the poison had been obtained.

Dr. Sykes, the foreman, said that probably the deceased had had the bottle by him a long time.

The jury returned a verdict that death had been caused by strychnine, taken while in an unsound state of mind.

Suicide by Chloral Hydrate.

On Friday afternoon, March 21, Mr. Humphreys held an inquiry at the Workhouse, Mile End, respecting the death of Mr. Charles Carter Bewley, aged 21, who committed suicide under very painful circumstances.

Mr. Charles Bewley, surgeon, of Kingsland Road, stated that the deceased was his son, and that he was a medical student at the London Hospital. About one o'clock on last Tuesday afternoon he left his house in good spirits, being more cheerful than usual. He was engaged to be married in a fortnight's time. He was in the habit of taking a large quantity of chloral to procure sleep.

Mr. Alfred James Mitchell, a medical student, said that about half-past five o'clock on last Tuesday evening the deceased called upon him, when they both went out together in the direction of Stepney Green. The deceased went to the post office, and sent a telegram to his lawyer's stating that he would call the next day and explain all. He said that it was his intention to go to Belgium the next day, and that he had written to his friends to meet him at the evening boat. He then went to a tavern, called the King Harry, where a disturbance took place, in which he was concerned. Witness afterwards saw the deceased coming out of a chemist's shop. He said he had been to get a draught to quiet himself. They then went into the King Harry together, and about five minutes afterwards the deceased said, "Will you have a parting glass with me, as we shall never meet again." Shortly afterwards he exclaimed, "I am a dead man," and added, "I have taken a drachm and a half of chloral." The deceased was taken to Dr. Todd's, and as soon as they laid him on the surgery floor he expired. He believed that he took the poison whilst in a state of excitement arising from the disturbance.

Mr. Alfred Rushton, chemist, 285, Mile End Road, said that about eight o'clock on Tuesday night the deceased came to his shop for a draught, which he gave him. He came in a second time, at a quarter to ten o'clock, and asked to be served with two drachms of chloral, when witness said that he had not so much in the house, but would give him what he had, which was 1 drachm 25 grains, which he had put into a one and a-half ounce bottle. The bottle was labelled, "Poison—a teaspoonful to be taken three times a day." He knew him to be a medical man, or he should not have served him with it, he having been in his shop several times before. He was perfectly sober at the time he served him.

The Jury returned a verdict of "Suicide whilst in a state of Temporary Insanity."—*Standard.*

Reviews.

THE FIRST BOOK OF BOTANY. By E. A. YOUMANS. London: H. S. King and Co.

The Pharmaceutical Calendar is a rather respectable looking book, containing a good deal of valuable information, but the Calendar proper to be found therein is very meagre and destitute of interest. We find a few Pharmaceutical "fixtures," and here and there are references to the illustrious departed, but saints are unknown in the Pharmaceutical Calendar. There is no *Beatus Paracelsus* nor *Beatus Gerardus*, Raymond Lully and Cornelius Agrippa have no name days; Dioscorides and Pliny, the early Pereiras—so to speak, are not claimed as apostles of the craft. This blankness struck us in dipping into the Calendar—between its two pages we should say—but we referred to it to see if there was any notice of the Pharmaceutical seasons. We have no doubt that Francis Moore, Physician, gives information on many points of Pharmaceutical interest, at least he did formerly, but here we find naught but empty spaces. It is probable, however, that very few people consult the Calendar as an almanack, but who knows how many might not, if it was made generally interesting?

What then are seasonable considerations? Is this the season for dandelion roots and colchicum corms, or for coltsfoot flowers? According to ordinary almanacks the sun enters Aries this month, when, of course, it follows that spring commences, though it is difficult sometimes to assure ourselves of the fact. The incipient botanist may therefore leave mere book study and look out for flowers on which to apply his sharpened intelligence. *Helleborus niger* and *Viola odorata* were in flower in January, *Daphne Mezereon* and *D. laureola*, also pharmaceutical plants, are now bursting into blossom. *Corylus Avellana*, *Alnus glutinosa*, and other amentaceous trees are putting forth their catkins. The male junipers are golden. Primulas and many herbaceous exogens are already in bloom, whilst the early bulbs supply almost daily new endogens. A crocus or a Dutch tulip furnishes *multum in parvo*, and garlic will soon be to hand, with the additional charm of odour. Last year, during March, we were staying in Somersetshire, beloved of Flora, and in a short time noted nearly seventy plants in flower. Any sunny old wall will be sure to repay research in spring, later on in the season its plants will have withered away. On such a place we may look for the lovely little crucifer *Draba verna*, which is already in fruit by the end of the month, when its white seed-vessels glitter in the sun an inch above the surface, whilst a whole plant would safely bear removal on a halfpenny. Coltsfoot, almost neglected by the pharmaceutist, thrusts up his flowering-stems and golden heads. Sweet violets are to hand, but the dark blue pansies that do much duty instead of them, are early summer flowers. *Arum maculatum*, "Lords and Ladies," hunted after by boys, allied to pharmacy, and having Rosicrucian affinities, will soon thrust up its pale membranous spathes, sheathing its mysterious spadices. The sallow, *Salix caprea*, not rich in salicine, but renowned for its golden "Palms," feathery and redolent of pollen, will be ready by Palm Sunday. Butcher's Broom, *Ruscus aculeatus*, sole English representative of shrubby endogens, produces at this time of year its small green flowers, curiously placed in the centre of its spiny leaves or cladodes. It may be found, in gardens at least, in most of the southern counties. *Amygdalus communis*, the almond tree, though not a native, is frequent in gardens, and its early flowers have great beauty. Its relative, the common or cherry laurel, flowers rather later. These and many others display their treasures to the young pharmaceutical botanist, and show clearly that it is time to begin out-of-door's work. Many features of structural botany may also be studied now better than at any other time. Vernation is one of these, and in working it out a good deal of information will be picked up respecting the formation of stems and branches as well as of leaves. A juvenile botanist often despises buds when he has leaves and flowers to work upon; but every leaf-bud has a history, and the buds of the horse-chesnut and garden rhubarb, for example, are large enough to resist the attacks of the most rudimentary of beginners.

The little work, the title of which is placed above, is an attempt to carry out in a simple manner the schedule system of the late Professor Henslow. It is compiled by an American lady, who claims for the system that it is not merely a course of botanical instruction, but a good method of carrying out the systematic training of the perceptive faculties. It is properly described as a "First Book," being evidently intended for children. The child uses it, not to read or to learn off by heart; but by its aid is enabled to distinguish, by the comparison of living specimens with the figures and descriptions which it contains, what are the actual characteristics of any leaf or flower. The first exercise is on the parts of a leaf. A leaf is found, pinned to a piece of ruled paper, and on referring to the book, it is seen that the several parts are called blade, petiole, and stipules. These terms are written down on the paper and constitute a schedule, proper forms for preparing schedules being given in connection with each exercise.

In this manner the different features of roots, stems, leaves, flowers, etc., are described and examined. The language is simplified as much as possible, the work being intended for children; and of course so small a volume can include only a preparatory course; but the groundwork of knowledge obtained in this way appears pretty sure of being efficient. It may be asked how far such a plan is likely to prove acceptable to ordinary children, and the answer is said to be favourable wherever it has been tried. Our own experience is limited to the fact that our little girl of twelve, seeing the book, was in stantly seized with a passion for making schedules. It may also be said with truth that any knowledge respecting plants or animals or other objects around us, is much more valuable than a great deal taught at schools which has no reference in particular to anything on the earth beneath or in the waters under the earth.

NUGÆ CANORÆ MEDICÆ: Lays by the Poet Laureate of the New Town Dispensary. Second Edition. Edinburgh: Edmonston and Douglas. 1873.

Besides his well-earned reputation and position as a medical practitioner and academic teacher, Dr. Douglas Maclagan, of Edinburgh, enjoys considerable local fame as a song-writer and singer. The "grey metropolis of the north," in all her professions, has been distinguished for the number of her wits and versifiers,—London herself having few better names to show than Aytoun and Martin (who wrote under the well-known *nom de guerre* of Bon Gaultier), Lord Neaves, Patrick Robertson, Outram, Ballantine, Sidey, and Blackie. Nor can Dr. Douglas Maclagan be omitted from the list. His "Nugæ Canoræ Medicæ," of which the second edition is now before us, abounds with lyrics, nearly all humorous in their tenor, in celebration of the annual social gatherings of the past and present officers of the Edinburgh New Town Dispensary. Wonderful command of metre, dexterous rhyming, and a happy flow of animal spirits, rather than wit, are the chief characteristics of the volume. Dr. Maclagan makes no pretension to the exquisite humour and liquid versification of the authors of the "Bon Gaultier Ballads;" nor even to the far inferior effusions of Lord Neaves, as reprinted from *Maga*. Add to this that his vein is almost purely local, and in its expression so essentially Scotch as almost to necessitate a glossary for us Southrons. With all these drawbacks, however, he has certainly contrived to amuse us; though not, of course, in the degree in which he must have tickled the midriffs and shaken the sides of his fellow-convivialists, when a good dinner, with floods of champagne, followed by the grateful tumbler of his native land, had promoted "good will towards men," if not "peace on earth." We are afraid to give our readers a specimen of his Scottish vein, as the effort to pronounce the words might seriously affect the muscles of articulation, or probably end in tetanus, let alone aphasia. But the following on "Liebig's Physiological Chemistry," may be read with safety, and even considerable enjoyment:—

"If you please, Mr. Preses, make use of your time,
And don't let's get dry in the throttle,
But take my advice, as the claret is prime,
And order us in a fresh bottle.
We've Liebig's authority, well you're aware,
That we men of the North can consume
More alcohol far than the Southrons dare,
Without being the worse for its fume.

"This Liebig has found out our life's golden rule,
And much will it please honest people,
To find that he proves Father Mathew a fool,
And that life is maintained by the tipple.
For by oxygenation to vapour we turn;
This, he says, one of Nature's strange laws is;
And without hydrocarbons within us to burn,
We perish by eremacausis.

"Teetotallers dabble in coffee and tea,
And think themselves wise all the while;
But if Liebig be right, these'll not do for me,
For he says that they turn to bile.
No! a taste of the alcohol's nearer the thing
For a man of poetic vocation;
For your bard couldn't laugh, and still less could he sing,
Without elements of respiration.

"Thus, man's but a big spirit-lamp, as we see;
And lamps all require you to cram 'em
With plenty of spirit of good density,
In order to *alere flammam*.
Then keep up the alcohol stimulus all;
Thus alone you'll preserve your condition;
Or you'll find yourselves soon in what Bennett would call
A state of abnormal nutrition."

The "Battle o' Glen Tilt" is a long and, in some respects, felicitous account of the repulse sustained by Dr. Balfour and a company of botanists at the hands of the Duke of Athol, in their attempt to pierce the unbroken solitudes of the Glen. This poem, it is right to add, is most effectively illustrated by the Brothers Faed, Ballantyne, Douglas, Archer, and Crawford, names well known to the artistic world on both sides of the Tweed. Their sketches are photographed for the present volume by Mr. E. W. Dallas, and most ludicrous, occasionally weird, they are. "A Dinner at Douglas's Hotel," in Irish dialect, is not unworthy of Father Prout; though we hope the unprofessional prostration to which the medical convivialists were reduced on the occasion, was the result of poetic, not of vinous, license. Another capital lyric is that intitled the "Æsculapian," from which we extract the following humourous reference to the ex-Professor of Chemistry in the University of Edinburgh:—

"Lyon Playfair last winter took up a whole hour
To prove so much mutton is just so much power;
He might have done all that he did twice as well
By an hour of good feeding in Slaney's Hotel;
And instead of the tables he hung on the wall,
Have referred to the table in this festive hall;
And as for his facts—have more clearly got at 'em
From us than from Sappers and Miners at Chatham.
Whilst like good jolly souls,
We emptied our bowls,
And so washed down our grub
In a style worth the name,
Wealth, honour, and fame
Of the Royal Society Club."

Dr. Douglas Maclagan intimates that the proceeds, *if any*, of his volume are to be dedicated to the New Edinburgh Infirmary. We can assure him that the qualification which we italicise is out of place, and that his 'Nugæ' will owe their success, not so much to their charitable object as to their intrinsic merits.

BOOKS RECEIVED.

HANDBOOK FOR THE PHYSIOLOGICAL LABORATORY. By E. KLEIN, M.D., J. BURDON-SANDERSON, M.D., F.R.S., MICHAEL FOSTER, M.A., M.D., F.R.S., and T. LAUDER BRUNTON, M.D., D.Sc. Edited by J. BURDON-SANDERSON. Two Volumes. London: J. and A. Churchill. 1873. From the Publishers.

A HANDBOOK OF HYGIENE. By GEORGE WILSON, M.D. Edin. London: J. and A. Churchill. 1873. From the Publishers.

OZONE AND ANTOZONE: THEIR HISTORY AND NATURE. When, Where, Why, and How is Ozone observed in the Atmosphere? Illustrated with Wood Engravings, Lithographs, and Chromo-Lithographs. By CORNELIUS B. FOX, M.D. Edin. London: J. and A. Churchill. 1873. From the Publishers.

ON PUTREFIERS AND ANTISEPTICS. By JOHN DOUGALL, M.D. Glasgow. 1873.

Notes and Queries.

[333.]—ESSENCE OF RENNET.—"*Edina*" would feel obliged by any reader of the Journal favouring him with a receipt for making Essence of Rennet that will keep.

[The following formula was sent to this Journal some years since by Mr. Houlton, of Wetherby:—

"One Fresh Rennet (or Calf's Stomach).
¾-gallon Boiling Water.
20 oz. Salt.

Set by for twelve hours and strain; then add—
Spirit of Wine, 6 oz."—ED. PH. JOURN.]

DR. LOCOCK'S HAIR LOTION.—"*Glycerine*" is informed that the following is the formula for this preparation as given in Cooley's 'Cyclopædia of Practical Receipts':—

"Oil of Mace (Nutmeg) . . 1 oz.

Liquefy at a gentle heat with—
Olive Oil . . . . ½ oz.

When cold form into an emulsion by agitation with—
Rose Water . . . . . ¼ pint.
Spirit of Rosemary . . . 2½ fl. ozs.
Stronger Liquor of Ammonia 1½ fl. drs."

SYRUP OF PHOSPHATE OF LIME. — Carlo Pavesi, of Mortara, describes (*L'Indipendente*, Feb. 15) a syrup of phosphate of lime made of 1½ part of subphosphate of lime, 1½ part of bicarbonate of soda, a sufficiency of lemon juice, 18 parts of saturated decoction of wheaten bran, and 12 parts of refined sugar. The phosphate of lime and decoction of bran are introduced into a strong glass bottle; the bicarbonate of soda is then added, and after it the lemon juice. The bottle is now tightly closed, and shaken gently; this is repeated from time to time for forty-eight hours, so as to leave a slight excess of lemon juice. The fluid is then filtered through blotting paper: it contains citrate of soda and subphosphate of lime dissolved in the bran decoction, which itself contains phosphates, gluten, etc. The sugar having been added, the fluid is evaporated to the consistence of a thick syrup.—*London Medical Record.*

LINIMENTUM AMMONIÆ IODIDI.—The following is published in the *Druggists' Circular* as the formula of an Iodide of Ammonia Liniment prescribed for many years by medical practitioners in New York, and formerly known under the name of Rourke's Iodine Liniment:—

Iodine . . . . grs. xv
Alcohol . . . . ℥viij
Camphor . . . . ʒij
Oil of Lavender,
Oil of Rosemary, each . ʒj
Solution of Ammonia . ℥j.

The liniment soon becomes of a pale straw colour, and is free from the objections of being either greasy or soapy.

The following journals have been received:—The 'British Medical Journal,' March 22; the 'Medical Times and Gazette,' March 22; the 'Lancet,' March 22; the 'London Medical Record,' March 26; 'Medical Press and Circular,' March 21; 'Nature,' March 20; 'Chemical News,' March 22; 'Gardener's Chronicle,' March 22; the 'Grocer,' March 22; 'Journal of the Society of Arts,' March 22; 'Grocery News,' March 22; 'Produce Markets Review,' March 22; 'Scientific American,' March 22; 'Brewers' Guardian,' March 25; 'Neues Repertorium für Pharmacie,' January and February; Doncaster, Nottingham, and Lincoln Gazette;' 'Manchester Evening News;' 'Philadelphia Press;' 'Goulburn's Courier.'

Correspondence.

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

BENEVOLENT FUND.

Sir,—I, with many others, more particularly country members and chemists, quite agree with J. B. B. in your issue of the 22nd inst., that if some more active steps are not adopted, the subscriptions will be found to fall off very materially. I have heard it frequently expressed, that if I give a guinea it yields only about sixpence to the purpose it was contributed for, the principal being "Consoled" for posterity. What have we to do with them? Sufficient unto the day is the evil thereof. Build schools, provide suitable dwellings for decayed chemists and their widows, relieve orphans, and subscriptions will then come in amply to meet all demands; members of the trade would give then with a willing heart and liberal hand.

CAMDEN.

Greenwich, S.E.

Sir,—I am glad to see some one entertains the same opinion as regards the use of this fund as myself, and I indorse J. B. B.'s ideas and propositions with respect to its distribution. I have often thought of asking the question, What will be done with the principal? I have been a member of the Pharmaceutical Society from its birth, but have never given one penny to this fund, neither shall I as long as the yearly receipts are placed out at only 3½ per cent. What is the object for the accumulation of such a fund? If the PARENT dies, is there any power to will it to A., B., or C., or to whom will it go? How many poor druggists, or their widows, or their orphans, might have been saved from beggary and starvation, and have been placed by its aid in a position to earn their own bread, if the yearly subscriptions and donations were so divided, instead of as now, when only a few candidates are receiving the paltry pittance of £20 or £30 per annum. A shilling will buy six pounds of bread; but what good will a *farthing* be to any one? Let J. B. B.'s proposition be carried out, and the receipts for 1872 be divided in 1873, and so on in each succeeding year, to as many candidates as will give to each £50 per annum, to be paid quarterly with the interest thereon, which will be something more by the time the last quarterly sum be paid. This, in my humble opinion, would be doing some GREAT GOOD, and be an untold relief to hundreds, instead of, as now, to only a few. I cannot help thinking that subscriptions would increase yearly, for many could give a shilling when £1 could not be spared. Poor as I am, I shall be pleased to contribute my mite to the fund that is so yearly distributed, as I feel confident those entrusted with it will see to its being rightly bestowed.

M. J. M.

London, March 26th, 1873.

THE PHARMACY ACT OF 1868.

Sir,—I was very much gratified when I read a few days since in the PHARMACEUTICAL JOURNAL that a different state of things, in a pharmaceutical sense, existed in France to what we have in our famous forward England, both as to the law itself and the carrying out of the same. I refer to the case of some persons being fined for selling cod-liver oil (because it was for medicinal use). I have often wondered what a French pharmacien would think if he came into the town in which I live, and became convinced, as I am, that the druggist is quite as open to competition as any other trader; that drugs still remain a marketable commodity. If he went into almost any shop doing a mixed business in the town, he might purchase articles called paregoric (with no label and without its active ingregient), also tincture of rhubarb (made with cake saffron), and any other tincture except, perhaps, opium, and the thirty articles named in the schedule, the tinctures being supplied at 3*d.* per oz., for which the druggists charge 4*d.* He might also obtain of these dealers bottles of diarrhœa mixture at 6*d*. and 1*s*., bottles of castor and cod-liver oil, and glycerine, and, in point of fact, drugs, feeding-bottles, surgical appliances, and everything that is not contained in the schedules of the late Pharmacy Act, viz. about three dozen things which are not wanted once in a dozen times. Methinks I should hear him express his disgust with such a half law, and say it reminded him of a chair with no legs. However, whatever the Frenchman might say I will not venture to really decide; but of this I am convinced, that the Act has not, under my observation, done much good to either the public or ourselves, and I verily believe that the public are quite as much gulled as they were before the Adulteration Act: and with regard to the Poisons Act, I say that the individual who is bent on destroying his or her life *will* do it, and can, as the present law stands, easily, with laudanum as the Pharmacy Act stands. We qualify ourselves—for what? simply for the sale of a few poisons, and just such other things in the shape of drugs as the *few* sensible public like to purchase, but what is more frequently the case, such things as they cannot get any *cheaper* at the other shops. Losing the sale of our drugs, alas! we lose nearly all; for prescriptions are generally, curious to say, done between half a dozen in each town or city of any size. The natural result follows; we must either starve or sell pickles, sauces, whiting, red ochre, etc. I prefer the latter in self-defence, but I am anxious that this state of things should be ventilated, for in the majority of cases the vendor is not so much to blame as those who stand behind the scenes (I refer to the suppliers of the shopkeepers of pills without poison, Godfrey's without opium, but henbane substituted). Away with such a hollow law! If the public are to be protected, and we are to be remunerated for protecting it, why not compel it to come to us for everything for medicinal use, internal or external. The Pharmacopœia should be our standard; that is, I would restrict the sale of drugs and chemicals, or go further, and say, the contents of the B. P.—with the exception of half a dozen or so articles, as mustard, pepper, the soaps, lard, etc. I do not hesitate to say that, under the last-named circumstances, I might make £100 more annually; and, alas! I am not alone; I am one of hundreds, I fear. We cannot go directly against one particular neighbour and get him fined for infringing the law, when often it is not his fault. Similar things exist in some of the London italian warehouses. There ought to be some means whereby the local secretaries could act in giving information against offenders. The fact is, this state of things is so keenly felt by so many, that no stone ought to be left unturned to put a stop to it, or else we need expect to see very few at Bloomsbury, seeing that they can carry on a business nearly ours without any trouble. It only requires management. I only wish the Council would give this matter the same ventilation as pharmaceutical education has had from them.

GEORGE BEALE.

Holderness Road, Hull.

PHARMACEUTICAL WOMEN.

Sir,—Having read the different letters on the above subject, I must ask you to allow me to add my protest against women receiving any encouragement to enter the profession. Here in France it is very usual for the wife of the pharmacien to sit in the pharmacy to keep the books and take the money. I very much doubt whether any modest Englishwoman would like to be obliged to sit and see many things sold, and afterwards take the money for them, which it is usual for a chemist to keep in stock, and which are sold generally to men of not the highest moral character. Again, there are those customers who take us aside and ask a few minutes' quiet talk with us; would any man like his wife to be a witness of those sort of things?

If women do come amongst us, I should advise all my collaborateurs not to take an appointment in a pharmacy in which there is a woman engaged. For my part I am determined never to take an appointment again in any pharmacy in which there is one, either in England or on the continent.

MAURICE DE LANCY.

2, *Place Vendôme, Paris, March* 16*th*, 1873.

Sir,—There have been a great many opinions with regard to ladies being admitted into our profession. Allow me to give you an instance of faithlessness in taking medicine, where the customer *only thought* a woman had made or helped to make up the mixture. A gentleman took his prescription to be dispensed by a pharmaceutical chemist, in a flourishing seaside town in Kent, where the wife of the chemist was wont to help her husband for some years, in the summer season, behind the counter. He waited for the same, and after some time elapsed, the wife came from behind the scenes (the dispensing department), presented the customer with his mixture and took the money for it; the gentleman, fearing the wife had had something to do with the manipulation thereof, had not the proper confidence in taking it, so went to another chemist to have the contents of the bottle thrown away and the prescription dispensed afresh.

March 12*th*, 1873. J. B.

Sir,—It is probable the new Council will have to decide, for a short period at least, the admission of women. Allow me to suggest, for the guidance of members in filling up the voting papers, that the words "for admission of women" or "not for admission of women" be attached to the name of every candidate for the Council.

If this cannot be done, perhaps you can make room in the Journal for the list with the above remarks.

R. M. ATKINSON.

Leeds, March 24*th*, 1873.

TINCTURE OF QUININE.

Sir,—Although we have heard upon distinguished authority that explanations are generally waste of time, I wish to excuse myself from the superficial error—attributed to me by Mr. Baldock—of so far mistaking the character of the constant deposit in tinct. quinine as not to distinguish between it and that which takes place only at low temperatures, and often after the lapse of many months.

I had long noticed that this first deposition was not bitter and not appreciably soluble in proof or rectified spirit, therefore presumably not quinine; but *after* this has been filtered out a further separation takes place of what I still believe to be sulphate of quinine in the form of feathery crystals of very pretty appearance when the temperature falls sufficiently low. These crystals differ from the first deposit conspicuously in crystalline character and in being easily redissolved at the ordinary temperature of an inhabited room.

Mysterious remarks have been made as to the advantage of using a spirit composed of 5 parts rectified spirit and 3 parts water for preparing tinct. quinine; but as this is the standard strength of proof spirit,—as proof spirit is officially directed for tinct. of orange, and tinct. orange is the basis of tinct. quinine,—the information is somewhat superfluous. Certainly it will not enable us to avoid the objection which in my previous letter I referred to as inherent in *officinal* tinct. quinine.

RICHARD W. GILES.

Clifton, March 25*th*.

T. F. W.—The plant forwarded is *Tussilago Farfara.*

G. W. Taylor.—We are not certain as to the composition of the preparation referred to, but we know that in some parts of the country syrup of white poppies is supplied under the same name.

E. W. B.—(1) Our acquaintance with the multitude of proprietary preparations is not sufficient to enable us to answer your question safely. (2) You would probably obtain the information required from the Trade Mark Protection Society, 18, King Street, Cheapside. (3) We know of no *legal* prohibition to the assumption of such a title by a registered chemist and druggist.

G. Johnson.—We have forwarded to you the PHARMACEUTICAL JOURNAL containing the original communication to which you refer, and you will see that the omission to give you credit for your suggestion occurred in the abstracting of the paper for the work in which it was reproduced.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Ross, Dr. Wilks, Mr. H. J. Lutwyche, Mr. Groves, Mr. Proctor, Mr. Bessant, Mr. Symes, "X. Y. Z.," "Registered Chemist and Druggist," "Ignoratio," "Lux."

A NEW BASIS FOR SUPPOSITORIES AND PESSARIES.*

BY WILLIAM MARTINDALE, F.C.S.,
Dispenser and Teacher of Pharmacy to the University College Hospital.

At our evening meeting in February, Dr. Redwood stated that "some medical men took exception to the present suppositories on account of their greasy basis,"† and at our last meeting several vehicles were suggested in place of the official one. Among others, Dr. Redwood suggested soap—animal soap. The use of this substance for the purpose is by no means novel, in fact, until comparatively recent years, the only suppository in general use was one made of the compound pill of soap. The great disadvantage in using soap as a basis, from a pharmaceutical point of view, is the difficulty in forming the suppositories containing it into a proper shape. It cannot be melted and poured into moulds in the way that we are accustomed to, each suppository would require separate manipulation with the hand and palette-knife, and this could never be done in the quantities in which they are used in our hospitals and sold wholesale by some manufacturers. There is also a therapeutical disadvantage. Soap, even curd soap, is not a pure stearate of soda; it is apt to contain some free alkali and always contains a little chloride of sodium, which has been used to separate it from the excess of water and glycerine formed during its manufacture. I think, therefore, the use of soap ought to be discarded.

We use some quantity of suppositories at University College Hospital; they answer the purpose of both pessary and suppository. The pessary weighing one or two drachms seems to be going out of use, especially if made of a fatty basis,—in liquefying these are apt to discharge and be a source of great inconvenience to the patient. Such is not so much the case, I believe, with suppositories where they are firmly grasped by the sphincter, and little or no inconvenience, from inquiries I have made, is felt by persons who have used those made of oil of theobroma alone, as a basis. Nevertheless, the use of oil of theobroma has its disadvantages. It solidifies very slowly, especially in the summer, it is somewhat difficult to remove from the mould, and being a fatty substance, it impedes the absorption of the medicament the suppositories are impregnated with.

From Professor Marshall's experiments with oleic acid, I was led to try making suppositories of morphia with pure morphia, and a sufficient quantity of this as a solvent, the solution being added to a certain quantity of oil of theobroma and moulded into suppositories in the usual way. The results were so far successful; the suppositories were obtained uniform in strength, as the morphia was dissolved in the basis, not merely suspended in it. Still, I did not consider this was all that was desirable. I, therefore, thought of other fatty acids, the solid ones—stearic acid more particularly, and tried it, but the melting point of this I found much too high—pure stearic acid melts at 69° C. (154° F.). I next tried a mixture of the two, equal parts by weight of oleic and stearic acids, melted together, and with this I was successful beyond my expectations. I have tried it with several substances, and find such a mixture very superior to those in general use, for the following reasons:—

1. *This mixture has a very low fusing point, and readily melts at the temperature of the body.*—It is a curious fact—I quote from Watts' 'Dictionary,'*—that "when stearic acid is melted with more fusible fatty acids, the mixture fuses, not at the medium fusing-point, but mostly at a temperature, even below that of the most fusible acid of the mixture." Thus equal parts of stearic and palmitic acids melt at 56·6° C., stearic acid, as I have said, fuses at 69° C. Equal parts of stearic and oleic acids melt much lower still. I have not had the opportunity of testing the melting-point of the mixture, but it must be below 100° F., the temperature of the blood, as they readily melt when placed in their position; they even do this in the warm hand. This low melting point is of advantage in their manufacture; the heat of a warm composition mortar being all that is required to liquefy the basis, and also to dissolve the medicament when this is soluble, the suppositories can thus be extemporized in a few minutes and prepared for a customer while he waits, as such a basis possesses the advantage of solidifying almost directly.

2. *The suppositories leave the mould without any difficulty.*—Pure stearic acid has another peculiar property, and one which many of you may have noticed in the beautiful crystalline samples of it which are sometimes exhibited by candle manufacturers. It is, that it expands very strongly when heated, especially at the moment of fusion (about 11 per cent.), and contracts the same on solidifying, so much so that cast lumps of it appear porous. This porosity does not appear to such an extent in a mixture of stearic and oleic acids, but the contraction which takes place is even more than 11 per cent. Care therefore must be taken to pour the melted liquid into the mould just before it begins to solidify, and also to fill up the cavity with more fluid immediately after the first contraction has taken place in the mould; it is better then to pour in a little excess and scrape this off with a knife when the suppositories have become solid. This, as I have said, they do very quickly, the mould may then be opened, and owing to the contraction that has taken place, the suppositories are almost quite loose in their cavities, and may be removed with a touch of the finger.

3. *This basis has the advantage besides of being a solvent of such alkaloids as pure morphia and atropia, and of being itself readily absorbed by the epidermis and mucous membrane, at least so far as the oleic acid is concerned.* This may readily be tested by rubbing a little oleic acid upon the back of the hand; it is absorbed in a short time, where an oily layer would have remained for hours unabsorbed.

4. *On account of the partial crystallization of some of the stearic acid, the suppositories are firm and can be placed in their position without difficulty, not being elastic, brittle, or yielding in any way.* This is an advantage, especially for a suppository, not so much for a pessary. Their elasticity is a disadvantage to those made of a solution of gelatine in glycerine for use as a suppository. By pounding in a mortar suppositories made of the basis I suggest, they soon form a soft pasty mass; they cannot, therefore, be made except by liquefying and pouring into moulds in which the stearic acid can partially crystallize and make a firm mass.

* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, April 2, 1873.

† PHARMACEUTICAL JOURNAL, 3rd Ser., Vol. III. p. 639.

* Vol. v. p. 414.

5. *The proportions of stearic and oleic acids can be varied to suit the temperature of summer or winter, and also the other ingredients prescribed with them.* The low melting-point is a disadvantage pertaining to oil of theobroma in the summer, as the suppositories made of it sometimes liquefy spontaneously.

I have had some made of the proposed basis used at the hospital as pessaries, and requested the sister of the ward and the obstetric assistant to make inquiry of the patients if they observed any of the inconveniences and objections raised against those having a fatty basis, and have received replies in the negative—they require a little longer time to dissolve than those made of oil of theobroma I was informed.

I exhibit samples containing three grains of tannic acid in each, and some containing $\frac{3}{4}$-grain precipitated peroxide of mercury dissolved in each; the latter are made by adding to melted stearic acid an equal quantity of 10 per cent. oleate of mercury, care being taken to use as little heat to this as possible, to prevent reduction of the mercury to the metallic state. There are also some containing $\frac{3}{8}$-grain pure morphia, equal to $\frac{1}{2}$-grain of the hydrochlorate. These are semi-transparent, the morphia being in solution in the basis. They all have a neat appearance, and I think are an improvement upon those at present in use.

Official formulæ for suppositories in the Pharmacopœia appear to me to be superfluous. They are rarely, if ever, ordered according to them; *e.g.*, we have of morphia $\frac{1}{4}$, $\frac{1}{3}$, $\frac{2}{3}$, $\frac{3}{4}$, and 1 grain suppositories almost as often used as $\frac{1}{2}$ grain ones. The others also are not adhered to; if a formula for a basis were inserted it is all that is necessary.

At the Hospital for Women in Soho Square, the pessaries used are made by Messrs. Duncan, Flockhart, and Co., Edinburgh. The basis, according to their pharmacopœia, is 1 part of gelatine to 4 parts of glycerine, the gelatine being soaked in water first for a short time, to render it readily soluble in the glycerine on the application of heat. They are made of the ordinary size of suppositories. I exhibit some samples of them, kindly given to me by Mr. Johnson. I am informed by Dr. Squarey that both he and Dr. Meadows have observed them discharged in their original shape undissolved in the morning, when they have been administered as pessaries the night before. The gelatine and glycerine basis is therefore not a good one for a pessary even, besides having the disadvantage of being elastic and not possessing firmness sufficient for use as a suppository. Dr. Squarey thinks that for use as pessaries even these are unnecessarily large, if they were smaller they would have a much better chance of being more readily dissolved and absorbed.

In conclusion, I may state that both stearic and oleic acids can be obtained commercially sufficiently pure for our purpose at prices not above that of oil of theobroma, the basis now in general use for suppositories.

THE MUSTARD OF THE PHARMACOPŒIA.*

BY THOMAS GREENISH, F.C.S.

It might be thought by many persons that this subject is scarcely one suitable for a pharmaceutical meeting, but mustard holds a place in our materia medica, and enters into one of the preparations of the Pharmacopœia, the cataplasma sinapis. It is to mustard, in connection with this preparation, that I shall chiefly confine my remarks.

The mustard cataplasm is a therapeutic agent of great value, resorted to in a period of emergency, and frequently in the absence of medical aid; and if any further justification were necessary, I may add this fact also, that Dr. Redwood has mentioned 'Charta Sinapis' as likely to form part of the forthcoming Appendix to the British Pharmacopœia.

Mustard was first introduced into the Pharmacopœia of 1788, in the formula for cataplasma sinapis, the official mustard was the *Sinapis nigra.*

Cataplasma Sinapeos, 1788.

℞ Seminum Sinapeos pulverum tritorum
Medullæ Panis sing. p. libram dimid.
Aceti quantum satis sit.
Misce ut fiat cataplasma.

In the next Pharmacopœia, that of 1809, the official mustard being still *Sinapis nigra*, the formula was altered.

Cataplasma Sinapis, 1809.

℞ Sinapis Seminum
Lini usitatissimi Sem.
Singulorum contrit. libram dimid.
Aceti Calid. q. s.
Ft. Cataplasma.

It will be observed that linseed is substituted for the bread-crumb, and the vinegar is directed to be boiling.

In the Pharmacopœia of 1824, and the one following, 1836, there was no alteration made either in the official mustard or the formula for the cataplasm; but in the edition of 1851, black and white mustard became official, and the cataplasm was ordered to be made with boiling water instead of vinegar.

Cataplasma Sinapis, 1851.

℞ Aquæ Ferventis, uncias decem
Lini Semin. contrit.
Sinapis contrit. sing. uncias duas cum semisse vel quantum satis sit.
Pulveres prius inter se mixtos, aquæ paulatim adjice movens ut fiat cataplasma.

Mr. Phillips, in his translation of the Pharmacopœia of 1851, remarked, in reference to this preparation, "that the vinegar directed in the former Pharmacopœias was useless, if not injurious, to the excitant effect of the mustard." He also adds some caustic observations on mustard; he says that "both varieties of mustard, black and white, are extensively cultivated in this country for preparing that much used condiment 'flour of mustard,' which is at the best flour of the seed mixed with wheaten flour, powdered capsicums and turmeric, and at the worst wholly destitute of mustard flour, consisting of the damaged flour of the cereals, etc., coloured by turmeric and rendered stinging by capsicum."

I shall at this stage of the subject allude to a preparation introduced into the Pharmacopœia of 1809, and continued to that of 1851, in which mustard played an important part.

Infus. Armoraciæ Comp. 1809 *to* 1851.

℞ Armor. Rad. recent. concis.
Sinapis Sem. contus. sing. unciam
Aquæ Ferventis octavium.
Macera per horas duas in vase leviter clauso et cola, tum adjice
Spt. Armoraciæ Comp. unciam.

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* Read at the Evening Meeting of the Pharmaceutical Society of Great Britain, April 2, 1873.

This infusion was prescribed as a stimulant in paralysis.

In a paper read before this Society in 1845 (PHARM. JOURN. Vol. V. 1st series, p. 62), I directed attention to the fact that if this infusion be made with boiling water, care being taken that the vessel used is of the same temperature, the result will be quite devoid of pungency, and consequently without value as a therapeutic agent. I then stated that "it is of the utmost importance that the laws which govern the formation of this volatile oil should be well understood." This infusion has been omitted since the Pharmacopœia of 1851.

We now arrive at the British Pharmacopœia, and find that both black and white mustard continue official, and that there is a further slight alteration, not in the ingredients or their proportions, but in the directions for making the mustard cataplasm.

Cataplasma Sinapis.

Take of—

Mustard in powder	$2\frac{1}{2}$ oz.
Linseed Meal	$2\frac{1}{2}$ oz.
Boiling Water	10 fluid oz.

Mix the linseed meal gradually with the water, and add the mustard with constant stirring.

The alteration here is, that the linseed meal is first mixed with water and the mustard added afterwards, the temperature being thus reduced. This is another step in the right direction, and I shall have occasion by-and-bye to refer to it again.

Black mustard contains two proximate principles, myrosin and myronic acid, the latteri n combination with potash, and it is to their mutual reaction that the formation of the volatile oil is due. Myrosin is an albuminous substance, soluble in cold and in lukewarm water, but coagulated by heat, alcohol, and acids. Here we have a reason for the successive alterations in the mustard cataplasm.

If black mustard flour be mixed with cold water, or water at a temperature below 100° F., the whole of the volatile oil it is capable of yielding may be obtained from it. If the temperature of the water be 140° or thereabouts, it does not yield more than half the quantity, and at 180° very little oil can be distilled from it. These variations are due to the partial or entire coagulation of the myrosin present. In making the cataplasm of the British Pharmacopœia, I find that when the linseed meal is added to the boiling water the temperature is reduced to 180°, and after the addition of the mustard to 160°. Either of these temperatures is too high for the full development of the volatile oil.

I would suggest here an alteration in the directions. Let the mustard be first mixed with two or three ounces of water under 100° or lukewarm. Boil the remaining part of the water, with which mix the linseed meal, and add this to the mustard, which has had time to develop its pungency. The temperature of the cataplasm will then be about 120°. It will be found at once fully efficient and about double the strength of that made by the present formula; and this, in many instances, may be of the utmost importance.

It is the speedy action which gives to a mustard poultice an advantage over a blister.

Mustard flour has never, I believe, been prepared by the pharmacist for medicinal use, and I may assume that this is never likely to be done in the pharmacy. Its preparation will be left to the manufacturer, who has special appliances for the purpose. In reference to this part of the subject, I cannot do better than quote the concise description of Dr. Pereira:—"The seeds of both black and white mustard are first crushed between rolls, and then pounded in mortars. The pounded seeds are then sifted. The residue in the sieve is called *dressings* or *siftings;* what passes through is *impure flour of mustard.* The latter by a second sifting yields *pure flour of mustard* and a second quantity of dressings. By pressure, the dressings or siftings yield a fixed oil (fixed oil of mustard), which is used for mixing with rape and other oils."

The black and white mustard seeds are crushed separately, and then mixed in definite proportions. There is a special object in this to which I shall have occasion again to allude. The fixed oil has some reputation as an external remedy in rheumatism, due probably to a little volatile oil developed in it; but the demand is very limited, the bulk of it melts away into the rape oils of commerce, and the marc, as a solid cake, is sold for manure, and report says that it sometimes finds its way accidentally (?) into linseed cake. Formerly, when black pepper paid a duty, this mustard bran or dressings was extensively used in its adulteration. Through the courtesy of Messrs. Dewar and Sons, mustard manufacturers, of Newcastle-on-Tyne, I am enabled to place on the table samples of genuine mustard flour. I have here black mustard flour, white mustard flour, brown and white mixed, and another sample of the same from which a further portion of the husk has been sifted,* and also husks to which the name of dressings has been applied, and from which the fixed oil is expressed; a sample of the fixed oil and of the mustard cake are likewise on the table.

The question will naturally occur, why mix white with black seeds? The explanation is this. The quantity of myrosin in the black mustard seed is not sufficient for the decomposition of all the myronate of potassium present, and as the white mustard seed contains a large quantity of myrosin and no myronate of potassium, it is added with advantage and economy. If water be added to pure flour of black mustard seed, the essential oil allowed to form and then removed, a further addition of flour of white mustard seed will again give rise to more essential oil, and thus prove that all the myronate has not been decomposed by the quantity of myrosin naturally present in the black seed; and I believe that by decomposing this excess of myronate of

* In a letter received from Mr. Frazer respecting this latter article he says:—

"It must now be some twenty or twenty-five years since we adopted Dewar of Newcastle's pure brown mustard as the sole article of mustard kept by my firm in Glasgow. For two or three years we had to fight against a widespread prejudice in the public mind against its deeper colour than that of the article commonly in use, as also against the dark specks present in it.

"Finding this prejudice to be so strong as practically to render the sale of it almost impossible, I suggested to Mr. Dewar so to modify, if practicable, his process of manufacture, as to reduce the amount of dark specks to a minimum.

"Mr. Dewar did so, and the result was the production of a mustard at once absolutely genuine, and yet so near to the colour of that in ordinary use, that at length we were able to induce the public to give it a fair trial.

"Since then we have kept nothing but the pure article, and the results are such as amply to compensate us for the patience we had to exercise in its introduction."

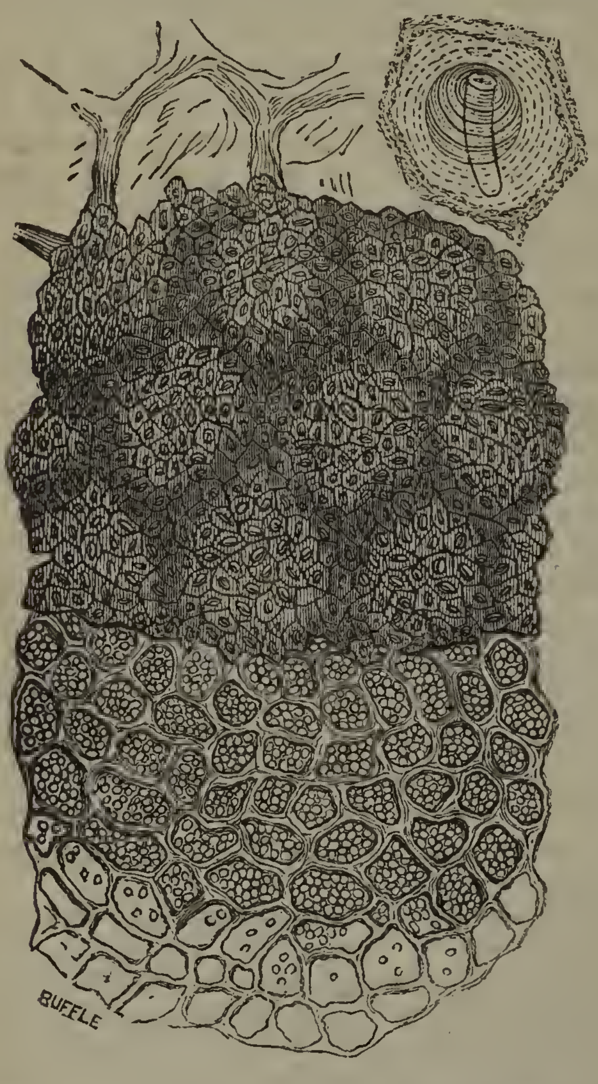
potassium, the bitter taste in the black mustard can be entirely removed, making it more agreeable for table use.

I think it would be an advantage if some certain proportions of the two seeds were given in our materia medica, so as to define absolutely what is to be understood as the official mustard.

Having considered mustard from a pharmaceutical point of view, I will now add a few remarks on the mustards of commerce, neither of which can be called the mustard of the Pharmacopœia.

I have examined a large number of commercial mustards, and find that they are all more or less mixed compounds. I am indebted to Mr. Martindale for several samples obtained in various parts of the metropolis, in one of which there is from 30-50 per cent. of a mixture of wheat and pea flour, the colour of the latter admirably adapting it for this purpose.

I do not know a better or more interesting subject than mustard for the "'prentice hand" of the student using his microscope for the advancement of pharmacy. Let him take a black mustard seed; soak it an hour in cold water, then boil it in a dilute solution of caustic potash (about 1 pt. of Liq. potassæ to 20 of water). He will then be able to separate the three coats of which the integument is composed, and study them under his microscope. I have here several slides of these three coats which may be examined presently, and from which the accompany-



ing woodcut has been made. The middle coat is the characteristic coat of the black mustard seed, and contains the colouring matter; an intimate acquaintance with these coats will teach him what is black mustard when he meets with it under the microscope. In the top right-hand corner is a drawing of the characteristic cell of the white mustard. Then let him take a sample of commercial mustard, place a little of it with a drop of water on his slide, and cover it with a glass, and with a power of 250 to 300 linear he will see starch grains. If his eye has not been accustomed to recognize starch-grains under the microscope let him touch the contents of the slide with a drop of a solution of six drops of tincture of iodine to an ounce of water, when the granule of starch will assume a faint violet colour. And I would here caution him against a mistake he may be likely to commit. If he mixes the mustard with water in a watch-glass, adding a small quantity of this very dilute solution of iodine, the development of the volatile oil will decolorize any starch that may be present before it is examined.

I would recommend to the careful consideration of the student some remarks of Mr. Stoddart on this subject in "Bristol Pharmacology" (PH. JOURNAL, Vol. I., 3rd Series, p. 661).

I am indebted to Mr. Rochfort Connor, of Somerset House, for these very beautiful and accurate drawings which are now exhibited, showing the several coats of the black and white mustard seed, and I am happy to see him amongst us this evening.

It is not my intention on this occasion to consider the dietetic uses of mustard; but I would express this opinion, that there is no necessity for the admixture of any foreign ingredient, such as wheat-flour, turmeric, or capsicum.

Black mustard-flour mixed with one-sixth of its weight of white, will make a condiment acceptable for table use, and at the same time suitable for the Cataplasma sinapis.

The consideration of the Charta sinapis of the future would occupy too much of our time this evening; but I hope on a future occasion to bring this subject specially under your notice.

THE EXTINCTION OF MERCURY IN FATTY BODIES.*

BY M. MAGNES-LAHENS.

Many fatty bodies have been successively vaunted as having a special action upon the extinction of mercury, and this action has been often attributed to their chemical composition; but the author is of opinion that the consistence of these fats exercises a much greater influence upon the extinction of the mercury than their composition. He has, in fact, found,—

(1.) That fats naturally liquid, employed in small quantity, reduce the mercury to a homogeneous and permanent paste with considerable and nearly equal rapidity; the advantage, however, being in favour of those liquid fats which have the most fluidity.

(2.) That fats naturally solid, employed in the same proportions, extinguish the mercury with a difficulty and slowness proportional to their hardness; but that when liquefied completely by heat, they accomplish the extinction nearly as quickly as the naturally liquid fats. This extinction, however, is not permanent, and the mercury reappears in large drops, as, in cooling, the mass hardens and cracks in a thousand places.

M. Lahens therefore concludes from these experiments that the extinction of the mercury is due to a slight layer of fat which envelopes the imperceptible globules of mercury, keeping them separated one from another, and that the extinction continues or

* Abstracted from paper in the *Journal de Pharmacie et de Chimie* [4], vol. xvii. p. 220.

ceases according as this coating preserves its integrity or is broken. The extinction of the mercury would then be the result of a purely mechanical force and not in any way of chemical action. The small quantity of oxide of mercury said to be found in mercurial ointment obtained by long rubbing and prolonged exposure to the air proves nothing contrary to this opinion.

The aptitude which lard acquires by liquefaction for the extinction of mercury, and the revivification of the metal in the mass as it cools, explain why the Paris Codex prescribes that the lard shall be half melted during the preparation of mercurial ointment. But the operation so conducted is very slow, and only accomplished after long manipulation, which predisposes the ointment to rancidity and weakens its consistence, and for this reason apparently the Codex orders the addition of a large proportion of wax.

Led by these considerations, the author has for some time been in the habit of adding a small quantity of oil of sweet almonds, the use of which in the following manner gives satisfactory results:—

Mercury	1000 grams
Oil of Sweet Almonds .	20 "
Lard	980 "

Mix intimately the mercury with the oil in a mortar, or preferably in a wide shallow vessel, by means of a large-headed wooden pestle. After twelve or fifteen minutes the mercury is reduced to a kind of homogeneous paste, in which scarcely any globules are perceptible to the naked eye. Mix this paste with 200 grams of melted lard until the mercury has completely disappeared,—less than an hour will usually obtain this result,—and then incorporate the rest of the lard cold by a few minutes' rubbing. Not more than 200 grams of lard should be added first, as a greater quantity retards a successful result.

Since the adoption in the Codex of benzoated lard for the preparation of mercurial ointment, the author has modified this process in the following manner:—

Mercury	1000 grains
Oil of Sweet Almonds .	20 "
Balsam of Peru. . . .	20 "
Lard	960 "

The mercury disappears with surprising rapidity in the mixture of oil of sweet almonds and balsam of Peru; when a homogeneous paste has been formed, the process should be continued as before.

This method M. Lahens considers preferable to the former. The mercurial ointment so produced he states to be smooth, beautifully bright and of a good colour, having an agreeable odour and easily preserved. The consistence also is good if lard of good quality be used.

THE PREPARATION OF PURE OLEIC ACID.

Some difficulty having been met with in obtaining commercial oleic acid uncontaminated by oxyoleic and stearic acids, the presence of which is detrimental to the preparation of oleates of mercury and morphia, a correspondent of the *American Journal of Pharmacy* publishes the following method of producing a pure oleic acid, from which oleates have been prepared that have not in any instance recipitated, and that are unobjectionable in colour and ppearance.

Any given quantity of almond oil* is taken and saponified by means of potash, care being taken to insure the entire saponification of the oil, which may be easily tested by means of strong alcohol. The soap is then decomposed by means of tartaric acid, carefully washed to free it from bitartrate of potash, etc.; then placed on a water-bath, and heated for several hours with half its weight of finely-powdered oxide of lead; the resulting combination, after cooling, is mixed with about three times its volume of ether, and allowed to settle; the clear ethereal solution is decanted and the residue treated by a fresh portion of ether, and decanted as before. The mixed ethereal solutions are then briskly agitated with an excess of dilute hydrochloric acid, to eliminate the oleic acid, which rises dissolved in the ether to the surface of the water. The solution is next washed with water and distilled to recover the ether, which may be used for a subsequent operation.

The portion remaining in the still consists of oleic acid $C_{36}H_{33}O_3,HO$ contaminated with a certain quantity of oxyoleic acid $C_{36}H_{32}O_4HO+HO$. In order to free it from the latter, the mixture is saturated with solution of ammonia, and the resulting compound, decomposed by means of chloride of barium, which throws down a precipitate of oleate and oxyoleate of baryta. The precipitate is then dried and treated with boiling alcohol, which deposits, on cooling, crystals of oleate of baryta, without any trace of oxyoleate. The oleate is then decomposed by a solution of tartaric acid in *boiled* distilled water, which sets free the pure oleic acid. Care must be taken in washing this acid for the last time, and also in decomposing the oleate of baryta, to avoid contact with the atmosphere.

When thus prepared, oleic acid is nearly colourless and slightly thinner than almond oil; it dissolves readily the binoxides both of mercury and morphia, forming with them solutions varying from almost white (5 per cent.) to the colour of linseed oil (10 and 20 per cent.) without giving rise to precipitates.

In preparing the oleates, the mixture should never be heated to more than 150° F., and the solution should be made in a closed vessel, in which the atmospheric air has been deprived of its oxygen or replaced by pure hydrogen; proper precautions being taken to allow for the expansion of the gas before entirely closing the apparatus.

COD-LIVER OIL AND LACTO-PHOSPHATE OF LIME

BY EDWARD CHILES.

This remedy is being quite extensively prescribed by physicians; and as considerable inquiry has been made as to an eligible mode of prescribing it, I will give my experience in the manufacture of the article.

For a long time I have had demand for a tasteless cod-liver oil, and have been in the habit of preparing it in the form of an emulsion with gum arabic and water, and covering the odour with a few drops of essential oil of bitter almonds.

Over a year ago I found physicians were prescribing cod-liver oil and lacto-phosphate of lime, and I devised a formula for it, based on my experience with the simple emulsion and the syrup of lacto-phosphate of lime, for which a considerable demand had sprung up. The formula I then devised has been followed by me up to the present time, and has invariably given satisfaction, and produces an article which does not separate or become rancid.

I think, however, it should be prepared extemporaneously as prescribed by physicians, and I have not kept it on hand, but prepare it as wanted, thus always giving a perfectly sweet article.

* Preference is given to this oil on account of its lesser liability to sophistication.

† From the *American Journal of Pharmacy*.

Take of	Gum arabic	℥ij ʒij
	Water	f℥ij
	Syr. lacto-phosphate of lime	f℥vi
	Cod-liver oil	f℥viij
	Essential oil bitter almonds	6 drops.

Rub the gum, water, and syrup together, until a smooth mucilage is made, then add the oil gradually with constant stirring, and, lastly, the oil of bitter almonds.

Thus made, each tablespoonful of cod-liver oil and lacto-phosphate of lime contains four (4) grains lacto-phosphate of lime and 50 per cent. of cod-liver oil. The gum in the above should be selected, ground, and passed through a sieve of 60 meshes to the inch. Cod-liver oil and lacto-phosphate of lime prepared in this manner forms a preparation free from unpleasant taste and odour, and enables the practitioner to administer these valuable remedies without repugnance on the part of the patient.

COMPETITIVE EXAMINATIONS IN CHINA.

The following description of the method of conducting the grand examination in China, is from the special correspondent of the *Illustrated London News*:—

"Mr. Simpson, while at Pekin, visited the Wen-Miao, or Temple of the ethical religion bequeathed to the Chinese nation by their great philosopher Confucius, or Kung-Fu-Tzse, who lived five centuries before Jesus Christ. In this temple is the place for the grand examinations. There are other Examination Courts in every provincial capital, where the first two degrees can be given; but the two higher degrees can only be competed for at Pekin. The Chwang-Yuen is the fourth degree, and is equivalent to our Senior Wrangler. He who gains this degree is also called 'One of the Ten Thousand.' The place where the examination is held contains ten thousand, and hence the name, for there is only one man out of that number who can receive the honour once in three years. Examination after examination, men come up to compete, till they grow old and grey; such is the desire to achieve this high distinction. It is told of one man that he competed every three years till he was eighty. When men persevere till this great age the Emperor generally confers some honour upon them. The competition at Pekin is a hard trial. It lasts nine days, and is divided into three 'goes.' For three days and three nights the 'ten thousand' are confined in pens, each man being imprisoned, so that he is totally separated from his neighbours, and there he has to write his essay or paper on the subject given out by the judges, which he does not know till he is in his cell. Paper, with an official stamp, is given out for him to write upon, and all depends upon his memory of the classics. Miniature copies have been produced, so that they could be smuggled in, but it is a crime to print or sell such copies now. 'I have read,' says Mr. Simpson, 'some of the efforts produced. They remind one much of early school essays, or essays for young men's associations for mental cultivation at home, but they are embellished with endless quotations from the classics, and the style may be described as the sign-board style; a flowery phraseology largely predominates."

"The examination court at Pekin is usually spoken of by the English residents there as a "hall of examination," but it is difficult to see how the word "hall" can be applied to it. A hundred and twenty rows of small, low, badly-built sheds, with a watch-tower in the centre, would not resemble what we should term a hall. For each student there is a small cell, little more than a yard square, and with height only for a man to stand up in. These cells are built in rows of about forty-five in the row, each row being separated from the next by a narrow passage just wide enough for a person to pass. There are about 120 of these rows, the whole number of cells being 9999. At the north-west corner a number of new cells are being constructed to afford more accommodation. There is a set of houses at the northern part for the examiners or judges to lodge in; for these persons are kept there the whole time, so that they cannot be communicated with by friends of the competitors. The tower in the centre is occupied during the whole time by watchers, to see that there is no communication between the students themselves or with anyone without the place. There are smaller towers at the corners for the same purpose, and guards walk along on the inside of the walls to prevent anything passing close by. There is a central passage up the middle of this place, and on each side of it are boilers for preparing food, and large earthen jars to keep a supply of water for drink.

"Each cell has two grooves in it, and boards are let into them—one for a seat, the other for a desk. The lower one, which serves as a seat, has to serve also as a bed. Each student is allowed to bring in some article of clothing to wrap himself in when he goes to sleep, which must be done in a sitting posture or doubled up on the board. Stamped paper is supplied to each man, as stated above, in order to prevent tricks; he has an ink-slab with pens, a teapot and teacup—such are the conditions under which a Chinese student has to compete for honours. It has been remarked that the competitiors here are not boys or all young men. Men of all ages come from every part of the country; but the Chinese student is seldom a lean, worn-out man, as our ideas of such a character might picture him. The degree of Sieu-Tsai is equivalent to Bachelor of Arts, Chü-Jen is equal to M.A., and Chin-Shü corresponds to our Doctor. Chang-Yuen, as was stated, is the highest honour, the degree exclusively conferred at Pekin, and is only awarded to one person every three years. All the other competitive examination courts in China may be understood from this one at Pekin. At Canton the court has 7500 cells, each 3 ft. by 4 ft. in dimensions. 'When a man,' says Mr. Simpson, 'gains any of the degrees of these examinations, his name is placed on the front of his father's house, and the village or town is proud of the distinction. Place and preferment are before him. He may rise to the highest dignities of the State. If he attains to great renown as a literary man, there are Confucian temples where tablets are erected to celebrities, and his name may be handed down to posterity.'"

PROFESSOR TYNDALL ON LIGHT.*

(*Continued from p.* 770.)

We shall study this subject of the polarization of light with great ease and profit by means of a crystal of tourmaline. And let us start with a clear conception of an ordinary beam of light. It has been already explained that the vibrations of the individual ether-particles are executed across the line of propagation. In the case of ordinary light we are to figure the ether-particles as vibrating in all directions, or azimuths, as it is sometimes expressed, across this line. Now, in a plate of tourmaline cut parallel to the axis of the crystal, the beam of incident light is divided into two, one vibrating parallel to the axis of the crystal, the other at right angles to the axis. The grouping of the molecules, and of the ether associated with the molecules, reduces all the vibrations incident upon the crystal to these two directions. One of these beams, namely, that one whose vibrations are perpendicular to the axis, is quenched with exceeding rapidity by the crystal, so that, after having passed through a very small thickness of the crystal, the light emerges with all its vibrations reduced to a single plane. In this condition it is what we call a beam of plane polarized light.

A moment's reflection will show, if what has been stated be correct, that, on placing a second plate of tourmaline with its axis parallel to the first, the light will pass through both; but that if the axes be crossed, the light that passes

* Abstract of a series of lectures delivered in the Cooper Institute, New York, and reported in the *New York Tribune*.

through the one plate will be quenched by the other, a total interception of the light being the consequence. The experiment is now before you: the image of a plate of tourmaline is upon the screen. I place parallel to it another plate: the green of the crystal is a little deepened, nothing more. By means of an endless screw, I now turn one of the crystals gradually round; as long as the two plates are oblique to each other a certain portion of light gets through; but when they are at right angles to each other the space common to both is a space of darkness.

It is on the green light which has been transmitted by the tourmaline that you are now to fix your attention, and now we may illustrate the two-sidedness of that green light. The light surrounding the green image being ordinary light is reflected in all directions; the green light, on the contrary, is not so reflected. The image of the tourmaline is now horizontal; I reflect it upward, and you see it still to be green. I reflect it sideways; the image is reduced to blackness because of the incompetency of the green light to be reflected in this direction. Making the plate vertical and reflecting it as before, in the upper image the light is quenched; in the side image you have now the green. Picture the thing clearly. In the one case the mirror receives the impact of the edges of the waves, and the green light is quenched. In the other case the sides of the waves strike the mirror, and the green light is reflected. To render the extinction complete, the light must be received upon the mirror at a special angle. What this angle is we shall learn presently.

The quality of two-sidedness conferred upon light by Iceland spar may also be conferred upon it by ordinary reflection. Malus made this discovery in 1808, while looking through Iceland spar at the light of the sun reflected from the windows of the Luxembourg Palace in Paris. I receive upon a plate of window-glass the beam from our lamp; a great portion of the light reflected from the glass is polarized; the vibrations of this beam are executed, for the most part, parallel to the surface of the glass, and if I hold the glass so that the beam shall make an angle of 58 degrees with the perpendicular to the glass, the whole of the reflected beam is polarized. It was at this angle that the image of the tourmaline was completely quenched in our former experiments. It is called the polarizing angle.

And now let us try to make substantially the experiment of Malus. I receive the beam from the lamp upon this plate of glass and reflect it through the spar. Instead of two images, you see but one. So that the light, when polarized as it now is, can only get through the spar in one direction, and consequently produce but one image. Why is this? In the Iceland spar, as in the tourmaline, all the vibrations of the ordinary light are reduced to two planes at right angles to each other; but, unlike the tourmaline, both beams are transmitted with equal facility by the spar. The two beams, in short, emergent from the spar, are polarized, their directions of vibration being at right angles to each other. When, therefore, the light was polarized by reflection, the direction of vibration in the spar which corresponded to the direction of vibration of the polarized beam transmitted it, and that direction only. But one image, therefore, was possible under the conditions.

And now you have it in your power to check many of my statements, and you will observe that such logic as connects our experiments is simply a transcript of the logic of Nature. On the screen before you are the two disks of light produced by the double refraction of the spar. They are, as you know, two images of the aperture through which the light issues from the camera. Placing the tourmaline in front of the aperture, two images of the crystal will be obtained; but now let us reason out what is to be expected from this experiment. The light emergent from the tourmaline is polarized. Placing the crystal with its axis horizontal, the vibrations of the transmitted light will be horizontal. Now the spar has two perpendicular directions of vibration, one of which at the present moment is vertical, the other horizontal. What are we to conclude? Why, that the green light will be transmitted along the latter, which is parallel to the tourmaline, and not along the former, which is perpendicular to it. Hence we infer that one image of the tourmaline will show the ordinary green light of the crystal, while the other image will be black. Let us test our reasoning. You see it is verified to the letter. By means of an endless screw I can turn the crystal 90 degrees round. The black image becomes gradually brighter, and the bright one gradually darker; at an angle of 45 degrees both images are equally bright; while, where 90 degrees have been obtained, the axis of the crystal being then vertical, the bright and black images have changed places.

Given, two beams transmitted through Iceland spar, it is perfectly manifest that we have it in our power to determine instantly, by means of a plate of tourmaline, the directions in which the ether-particles vibrate in the two beams. I might place the double-refracting spar in any position whatever. A minute's trial with the tourmaline would enable you to determine the position which yields a black and a bright image, and from these you would at once infer the directions of vibration.

Further, the two beams from the spar being thus polarized, if they be received upon a plate of glass at the polarizing angle, one of them will be reflected, the other not. This is the conclusion of reason from our previous knowledge.

I have said that the whole of the beam reflected from the glass at the polarizing angle is polarized; a word must now be added regarding the larger portion of the light which is *transmitted* by the glass. The transmitted beam contains a quantity of polarized light equal to that of the reflected beam; but this quantity is only a fraction of the whole transmitted light. By taking two plates of glass instead of one, we augment the quantity of the *transmitted* polarized light; and by taking a bundle of plates, we so increase the quantity as to render the transmitted beam, for all practical purposes, perfectly polarized. Indeed, bundles of glass plates are often employed as a means of furnishing polarized light.

Let us push our reasoning still further. When the tourmalines are crossed, the space where they cross each other is black. But we have seen that the least obliquity on the part of the crystals permits light to get through both. Now suppose, when the two plates are crossed, that we interpose a third plate of tourmaline between them, with its axis oblique to both. A portion of the light transmitted by the first plate will get through this intermediate one. But after it has got through, its plane of vibration is changed; it is no longer perpendicular to the axis of the crystal in front. Hence it will get through that crystal. Thus, by reasoning, we infer that the interposition of a third plate of tourmaline will in part abolish the darkness produced by the crossing of the other two plates. I have not a third plate of tourmaline; but the talc or mica which you employ in your stoves is a more convenient substance, which acts in the same way. Between the crossed tourmalines, I introduce a film of this crystal. You see the edge of the film slowly descending, and as it descends between the tourmalines, light takes the place of darkness. The darkness, in fact, seems scraped away as if it were something material.

We now stand upon the threshold of a new and splendid optical domain. We have to examine the chromatic phenomena produced by the action of crystals, and double-refracting bodies generally, upon polarized light. For a long time investigators were compelled to employ plates of tourmaline for this purpose, and the progress that they made with so defective a means of inquiry is astonishing. But these men had their hearts in their work, and were on this account enabled to extract great results from small instrumental appliances. But we have better apparatus now. You have seen the two beams emergent from Iceland spar, and have proved them to be polarized. If we could abolish one of these beams, we might employ the other for experiments on polarized lights. These beams, as you know, are refracted differently, and from this we are able to infer that under some circumstances the one may be totally reflected, and the other not. An optician, named Nicol, cut a crystal of Iceland spar in two in a certain direction. He polished the severed surfaces, and reunited them by Canada balsam, the surface of union being so inclined to the beam traversing the spar that the ordinary ray, which is the most highly refracted, was totally reflected by the balsam, while the extraordinary ray was permitted to pass on. The invention of the Nicol's prism was a great step in practical optics, and quite recently such prisms have been constructed of a size which enables audiences like the present to witness the chromatic phenomena of polarized light to a degree altogether unattainable a short time ago. The two prisms here before you belong to my excellent friend Mr. Wm. Spottiswoode, and they were manufactured by Mr. Ladd. I have with me another pair of very noble prisms, still larger than these, manufactured for me by Mr. Browning, who has gained so high and well-merited a reputation in the construction of spectroscopes.

These two Nicol's prisms play the same part as the crystals of tourmaline. Placed with their directions of vibration parallel, the light passes through both. When these directions are crossed, the light is quenched. Introducing a film of mica between the prisms, the light is in part restored. But notice, when the film of mica is thin, you have not only light, but coloured light. Our work for some time to come will be the examination of these colours. With this view, I will take a representative crystal, one easily dealt with; that is, the crystal gypsum, or selenite, which is crystallized sulphate of lime. Between the crossed Nicol's I place a thick plate of this crystal; like the mica, it restores the light, but it produces no colour. With my penknife I take a thin splinter from this crystal and place it between the prisms; its image on the screen glows with the richest colours. Turning the prism in front these colours gradually fade, disappear, but by continuing the rotation until the vibrating sections of the prisms are parallel, vivid colours again appear, but these colours are complementary to the former ones.

Some patches of the splinter appear of one colour, some of another; these differences being due to the different thicknesses of the film. If the thickness be uniform the colour is uniform. Here, for instance, is a stellar shape, every lozenge of the star being a film of gypsum of uniform thickness. Each lozenge, you observe, shows a brilliant uniform colour. Of course it is easy, by shaping our films so as to represent flowers or other objects, to exhibit such objects in colours unattainable by art. Here, for example, is a specimen of heartsease, the colours of which you might safely defy the artist to reproduce. By turning the front Nicol 90° round, we pass through a colourless phase to a series of colours complementary to the former ones. Here, for example, is a rose on a twig; a red flower and green leaves; turning the prism 90° round, we obtain a green flower and red leaves.

All these wonderful chromatic effects have definite mechanical causes in the motions of the ether; the principle of interference, duly applied and interpreted, explains them all; and if you give me your patience, we shall, as far as it is necessary, develop the causes of these effects in our next lecture.

THE DETERMINATION OF THE MELTING AND SOLIDIFYING POINTS OF FATS.*

BY F. RUEDORFF.

On testing all the usual methods for determining the melting points of fats, the author obtained the most concordant results by covering a thermometer-bulb with a layer of fat, about 3 mm. thick, immersing it in hot water, and observing the temperatures at which the fat began to separate from the bulb and to ascend through the water. Although some fats, and more particularly nutmeg-butter, did not rise from the thermometer even at temperatures considerably above those at which they are perfectly fluid, the author prefers his method to Wimmel's, to which the same cause of inaccuracy, namely, adhesion to the glass, attaches in a still greater degree.

The solidifying points of some fats were determined by observing the temperatures at which they became solid whilst they were violently agitated; but with the glycerides and some other fats which exhibit a rise of temperature during solidification, it was found best to take as solidifying point that temperature to which the thermometer rises during solidifying, as this maximum temperature appeared to be more constant than the turning-point, which has been determined and given as the natural solidifying point by Wimmel.

The following table exhibits the author's results:—

	Melts at	Solidifies at
	°C.	°C
Yellow bees-wax ...	63·4	61·5 62·6 62·3
White bees-wax......	61·8	61·6
Paraffin	49·6 52·5 to 54 53 52·7 to 53·2	49·6 53 52·9 52·7
Spermaceti	43·5 44·1 to 44·3	43·4 44·2
Stearic acid	55·3 56·2 to 56·6 56·0 to 54·4	55·2 55·8 55·7
Japan wax	50·4 to 51·0	...
Cacao butter	33·5	...
Nutmeg butter	70 to 80	...
Mutton suet	46·5 to 47·4	32 to 36
Beef suet	43·5 to 45·0	27 to 35

The remarkable phenomenon of a rise of temperature during solidification was also observed in artificial mixtures of fats; for instance, of spermaceti and stearic acid, and of paraffin and stearic acid, and is probably due to the constantly varying composition of the liquid remaining behind during partial solidification. A change in composition as solidification goes on, may possibly also explain the great interval of temperature during which beef and mutton suet pass from the liquid into the solid state.

DETECTION OF WATER IN ESSENTIAL OILS.*

BY G. LEUCHS.

All essential oils obtained by distillation with water contain water even when they appear quite clear. The author finds that when such oils are mixed with several times their volume of petroleum-ether (the so-called benzin), a turbidity is produced, owing to the separation of globules of water, the turbidity being the more marked the greater the quantity of water present. By this means he found water in the oils of lavender, cloves, spike, cinnamon, rosemary, sassafras, and juniper; the oils of lemon and bergamot likewise contained traces of water, as did also Portugal oil and the oil of *Gaultheria procumbens*: on the other hand, the oils of turpentine, cedar, lemon, rue, and amber were found free from water.

* Pogg. Ann. cxlv., 279—290, and from the *Journal of the Chemical Society*.

* J. pr. Chem. [2], vi. 159, and from the *Journal of the Chemical Society*.

The Pharmaceutical Journal.

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OUR ANNIVERSARY.

IT is now within six weeks of a year since it was our pleasing duty to record an event which then for the first time constituted a feature of the Society's annual gathering, though novelty was far from having been the only attraction it presented. We refer to the dinner at the Crystal Palace. At the time we ventured to apply to it the name "annual," on account of the very great satisfaction it gave to those who were present, and the generally expressed desire that it should be kept up as a periodical reunion of all those engaged in the drug trade who are able to be in London at the Society's Anniversary Meeting.

We are induced to draw attention to this matter now, since the time is close at hand, and also because we have recently heard many inquiries as to what is being done in arranging for the annual dinner. We think, therefore, that it would be opportune to suggest that those who entertain the desire to see the annual dinner successfully carried out this year should at once enter into communication on the subject and take decisive action to that end. A considerable amount of work is involved in making the arrangements necessary for the purpose, and it will doubtless be in the memory of those who shared in last year's festivity, that this work was on that occasion generously undertaken single-handed. To that circumstance, indeed, is to be ascribed, not only the success then achieved, but also the inauguration of the annual dinner; and, remembering this, the thought may naturally occur to many, that this year's arrangements cannot be left in better hands than those of the HONORARY SECRETARY of last year. But a second thought will as surely suggest that such an opinion can only be regarded as an instinctive compliment, and that it would be unreasonable, as well as ungrateful, to expect a repetition of the services rendered on that occasion by Mr. CARTEIGHE.

Probably the most convenient course would be for those desirous of co-operating in the matter, to communicate with Mr. BREMRIDGE, with the view of holding a meeting for the appointment of a committee, and we would especially urge upon the London members of the trade to embrace this opportunity of reciprocating the cordiality, so universally shown by their provincial brethren, at the various meetings of the Pharmaceutical Conference.

THE GENERAL MEDICAL COUNCIL.

THE medical parliament has met, and has occupied a whole week with discussion rather than business. We shall try and estimate the results of its deliberations presently, but we cannot help drawing attention to the extreme verbosity and wanton interruption indulged in by its speakers. To read the reports of its meetings in our medical contemporaries one would almost fancy oneself perusing the rhetorical encounters of a debating society, so crude is the language, so confused the tenor of debate, so petulant the recrimination. Some three-quarters of an hour, for instance, were wasted over Sir WILLIAM GULL'S expression of astonishment "at the course taken by Dr. ALEXANDER WOOD and Dr. ANDREW WOOD who, he thought, must have some *arrière pensée*." The unfortunate imputation at once brought the Drs. WOOD to their feet; indignant reclamations followed. Sir DOMINICK CORRIGAN, with a truly Milesian pugnacity, joined in the fray, which, by the time he sat down, had acquired the proportions of a regular "Donnybrook." Meanwhile the PRESIDENT sat as helpless as his counterpart in the French Chamber during an "interpellation" by GAMBETTA. Unless the "medical parliament" mend its ways, it will achieve an unenviable notoriety, and its meetings will have the same sort of attraction for the public as a Fenian demonstration in Hyde Park, or the Zoological Gardens at feeding time.

Sed haec hactenus. The subject of most interest to our readers in the Medical Council's transactions was its adoption of the report of the Pharmacopœia Committee, recommending, first, a reprint of the present Pharmacopœia, with such improvements as may be requisite; and, second, an Appendix embodying information as to medicines, whether newly-introduced or newly-prepared. We have already expressed our conviction that the Pharmacopœia should not be recast, or even modified, at too rapidly recurring intervals—a reprint, supplemented by an Appendix, being all that is required for the pharmacist and practitioner alike. Meanwhile the Committee might do worse than reconsider the doses of the more potent medicines as they are laid down in the present Pharmacopœia. A medical contemporary remarks, with apparent justice, that in the case of solution of strychnia and tincture of nux vomica, for instance, less than the largest doses prescribed by the Pharmacopœia do certainly produce decided physiological effects.

Of smaller interest to our readers, was the prolonged discussion on the so-called "Conjoint Scheme," by which a fusion of the various, and often competing, examining boards is sought to be effected. The Scotch members, it seems, consider their examining bodies as nearly perfect, and see no necessity for "levelling-down," to England and Ireland by passing under the roller of uniformity. They have no objection, however, to England and Ireland uniting on whatever basis of fusion they please, or for separately making conjoint Boards in either kingdom. Their policy is characteristically cunning. The higher standard of examination which such conjoint Boards would establish in England and Ireland, would scare all the less competent candidates into the hospitable arms of the northern schools, which would demand but half the diploma-fee of their rivals, and not quite so much preliminary and professional science. On petitioning the Government, however, to pass an enabling bill to bring about a conjoint scheme for England, the diplomacy of the northern contingent was frustrated,—the Government declining to introduce such an enabling bill. So while they gained in principle, they lost in profit. Cold water was thrown on conjoint schemes generally; but the sacrifice of England and Ireland to that principle was a pleasure that was denied them.

A tedious debate on the report of the Committee on the medical qualification of women, ended in the Committee being empowered to enter into communication with any public institution, in which provision is made for the education and examination of women, as midwives, as dispensers, and as superintendents of nurses or of medical institutions, as well as to consider and report on how a register of all persons obtaining qualifications from such bodies might be kept, on conditions similar to those for registering medical and surgical diplomas. The discussion embodied not a little that is of interest to pharmacists, and we shall return to the subject next week.

THE SURVIVAL OF THE FITTEST (?).

The struggle for existence which, according to the fashionable scientific theory of the day, has shaped the career of all creatures, from governments to gooseberries inclusive, has many evils to answer for. Not that the survival of the fittest is so much to be regretted, as that sometimes circumstances have been so untoward as to allow—at least in the human *mêlée*—that which is not fittest to survive. The weakest, but not always the worst, have gone to the wall; for in the struggle deceit, cunning, and impudence have always been appreciable powers, notwithstanding that the greatest intellects in all ages of the world have been bent to the task of modifying and counteracting their influence. In this country we have arrived at a stage when an efficient examination is looked upon theoretically as a panacea for all shams; but there exists considerable difference of opinion as to what constitutes an efficient examination. On the one hand prospective examinees remonstrate piteously against examinations lasting two or three hours; on the other a relentless examiner cries out, "I want days; I want weeks, before I should say that a man was fit to pass." Moreover, no more is required from the man who has enjoyed years of neglected opportunities, than from one who has made the most of as many months. Added to these elements of disturbance in the testing of shams is the introduction of the greatest sham of the whole, the system of studying a subject in order to meet the examiners' questions rather than for its own sake, known popularly as "cramming," or as it has been termed "getting up to the boiling point" in regard to the subjects of an examination. This phase of the competition between sham and anti-sham has recently been described by a writer in *All the Year Round* as follows:—

"The contest of the crammers and the examiners has been almost as interesting, and probably as arduous, as the perennial duel between ships and guns. Just as it is all but impossible to construct a lock which some other cunning artificer cannot pick, so it appears hopeless to devise a system of questions that shall test the sterling stuff of which competitors are made, without reference to the cut and-dried information with which they have been supplied. Change after change may be made, surprise after surprise attempted, but the ingenuity of the scholastic wire-pullers is equal to the occasion. The disgusted examiner, confident in his precautions, gradually recognizes the truth that he is not conversing with George Griffin, junior, but with Doctor or Mr. Varnish, M.A., who has a string of honorary capitals appended to the name that heads his prospectus, who speaks all languages, knows something of everything, and is growing rich apace by preparing young gentlemen for the civil and military service of their country. Mr. Griffin is there in the body, certainly, with his pink ears and heated forehead, and his preceptor is as undoubtedly absent, but, nevertheless, Mr. Examiner cannot but feel that all his well-meant efforts are as thoroughly baffled as if the young man were a medium, and Mr. Varnish held him under some as yet unknown mesmeric influence. There is no getting at the lad's real brain, no finding out what he will be when he shall at no distant date have forgotten Varnish and all his works. As it is, that subtle instructor of youth has armed him at all points. He is a pattern pupil, and has absorbed exactly such information—and no more—as will help him well through the ordeal that lies before him. If caught tripping on one subject, he is comfortably bolstered up on all the rest, and as the defeated examiner grudgingly sends in his name at the top of the list, he is forced to acknowledge with a sigh that Varnish is a very clever fellow. So he is, but services like his are very costly luxuries, and if any class of men derive direct benefits from competition, there is little doubt that Mr. Varnish and his compeers are of the number."

But *magna est veritas et prævalebit*, and with the lapse of time this difficulty may be overcome. In what way, it might be bootless to speculate; but there is a country which is reported to have had a thousand years or more start of us in civilization, and it is interesting to find that these examinations are still an institution. We are indebted to the *Illustrated London News* for an account from its special correspondent of how these things are managed in China; which has been printed on another page. Is this a foreshadowing of the finally surviving form of examination in this country? *Absit omen!*

THE CHALLENGER EXPEDITION.

THE first report of the proceedings on board H.M.S. "Challenger," from the pen of Professor WYVILLE THOMSON, has appeared in the pages of *Nature*, notwithstanding an intimation by Dr. CARPENTER that the narrative would see the light in *Good Words*. Rough weather appears to have been experienced during the first two or three weeks, which, if it were an unpromising commencement to a voyage round the world, also furnished a sharp test as to the stowing of the scientific apparatus. It is satisfactory to learn, therefore, that although the ship rolled considerably not a single instrument shifted, neither was there a glass broken either in the zoological workroom or the chemical laboratory.

On board the "Challenger" the more peaceful sciences appear to have the upper hand of the science of war; for sixteen out of the eighteen sixty-eight pounders which formed the ship's armament have been removed, and the main-deck has been almost entirely set aside for their rivals in the shape of dredging and sounding gear, hydraulic pump, aquarium, photometric and thermometric apparatus, zoological workroom, dark room for photographers, physical and chemical laboratory, etc.

Although the work done up to the date of the report must be regarded as tentative, successful soundings had been taken at great depths, and the trawl had been used at 2125 fathoms. Many interesting animal forms have been obtained, several of them new to science and others of extreme rarity and beauty. One especially, a molluscoid, a drawing of which is given in *Nature*, is extremely interesting; slender graceful branches, recurved at the extremity, springing from a transparent smooth quill-like stem between two and three inches high, and forming the outline of an elegant cup. Sea-peas and *Gorgoniæ*, always remarkable for their brilliant phosphorescence, have occurred frequently, and to these Captain MACLEAR is giving special attention in the hope of gaining fresh information respecting the beautiful though little understood phenomenon manifested by them. One, a *Mopsea*, which shone very brilliantly, gave a spectrum extending from the green well on into the red; another gave a very restricted spectrum sharply included between the lines *b* and D. All the fishes brought up presented a peculiar appearance from the expansion of the air contained in their bodies; their eyes, even when they were relieved from the extreme pressure, protruding considerably.

Further intelligence has since been received from St. Thomas, where the "Challenger" arrived on the 16th of March. The operations had been regularly continued, a dredging taking place every other day, or sometimes oftener; each dredging taking about twelve hours. At the deepest spots both on the east and west side of the Atlantic a quantity of dark red clay was brought up, containing just sufficient animal life to show that life existed at all depths. In depths of over two miles little has been found, but that little is new.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

April 2nd, 1873.

MR. A. F. HASELDEN, F.L.S., PRESIDENT, IN THE CHAIR.

Present—Messrs. Atherton, Baynes, Betty, Bottle, Fraser, Greenish, Hampson, Hills, Owen, Radley, Sandford, Savage, Schacht, Shaw, Sutton, Urwick, and Williams.

The minutes of the last meeting were read and confirmed.

BENEVOLENT FUND.

Legacy of £100 from the late Mr. George Waugh.

Mr. HILLS reported that he had had some correspondence with Mrs. Waugh, the executrix of the late Mr. George Waugh, of Regent Street. It had commenced, at the beginning of last month, by a letter of inquiry from Mrs. Waugh as to the usefulness and management of the fund. This information having been given, Mrs. Waugh wrote saying that, by a codicil to her late husband's will, the sum of £25 had been bequeathed to the Fund, but that in a private letter to her of much later date, the testator had suggested, that if convenient and in her judgment fit, the bequest should be raised to £100. In compliance with this suggestion, Mrs. Waugh generously enclosed a cheque for that amount.

It was then moved by the PRESIDENT, seconded by the TREASURER, and resolved:—

"That the President and Council of the Pharmaceutical Society beg to express their warmest thanks to Mrs. Waugh for the cheque for £100 sent by her, as executrix of their late much esteemed and respected friend, George Waugh, whose constant, generous, and large-hearted support of the Benevolent Fund was so conspicuous from its first establishment to the day of his lamented decease."

CONVERSAZIONE.

The SECRETARY reported that he had received a letter from the authorities of the South Kensington Museum, granting permission to hold the Society's Annual Conversazione at the Museum on the 21st of May.

A Committee was appointed to make and carry out the necessary arrangements.

NOMINATIONS FOR ELECTION TO THE COUNCIL IN MAY NEXT.

The Secretary reported that forty-two Members of the Society had been nominated for election on the Council in May next, and that the following twenty had declared their willingness to accept office, if elected:—

ATHERTON, JOHN HENRY, Long Row, Nottingham.
BALDOCK, JOHN HENRY, 3, High Street, South Norwood, Surrey.
BAYNES, JAMES, 24, Waterworks Street, Hull.
BETTY, SAMUEL CHAPMAN, 6, Park Street, Camden Town, N.W.
BOTTLE, ALEXANDER, 37, Townwall Street, Dover.
BROWN, WILLIAM SCOTT, 113, Market Street, Manchester.
GREENISH, THOMAS, 20, New Street, Dorset Square, N.W.
GUYER, JAMES BRETT, 11, Strand, Torquay.
HAMPSON, ROBERT, 205, St. John Street Road, E.C.
HILLS, THOMAS HYDE, 338, Oxford Street, W.
MACKAY, JOHN, 119, George Street, Edinburgh.
PALMER, ROBERT, 35, Ovington Square, S.W.
RADLEY, WILLIAM VALENTINE, 74, Market Place, Sheffield.

Robbins, John, 372, Oxford Street, W.
Sandford, George Webb, 47, Piccadilly, W.
Savage, William Dawson, 30, Upper Bedford Street, Brighton.
Turner, Charles Ernest, 63, Great Russell Street, W.C.
Whitfield, Henry, 45, High Street, Worcester.
Williams, John, 16, Cross Street, Hatton Garden, E.C.
Wright, George Henry, 103, Borough High Street, S.E.

The following twenty-two Members declined to accept office, if elected :—

Andrews, Frederick, 23, Leinster Terrace, W.
Burden, Edward, 38, Duke Street, Grosvenor Sq., W.
Bostock, William, 241, Stamford Street, Ashton-under-Lyne.
Carr, John, 171, High Holborn, W.C.
Churchill, John, New Street, Birmingham.
Darby, Stephen, 140, Leadenhall Street, E.C.
Deane, Henry, 17, Pavement, Clapham.
Dymond, George, Birmingham.
Groves, Thomas B., 80, St. Mary Street, Weymouth.
Haselden, Adolphus Frederick, 18, Conduit Street, Bond Street, W.
Hanbury, Cornelius, Plough Court, Lombard Street, E.C.
Hanbury, Daniel, Clapham Common, S.W.
Hodgkinson, William, 127, Aldersgate Street, E.C.
Huskisson, Henry Owen, 322, Gray's Inn Road, W.C.
Howden, Robert, 78, Gracechurch Street, E.C.
Morson, Thomas N. R., 38, Queen Square, Bloomsbury.
Randall, William B., 143, High Street, Southampton.
Reynolds, Richard, 13, Briggate, Leeds.
Savory, C. H., 143, New Bond Street, W.
Smith, Edward, 8, Strand, Torquay.
Stacey, Samuel, 300, High Holborn, W.C.
Vizer, Edward B., 63, Lupus Street, S.W.

Nomination of Auditors.

The Secretary reported that

Mr. Frederick Andrews, of Leinster Terrace, Hyde Park, W.,

had been nominated for election as an Auditor for the ensuing year.

The Council then nominated the following gentlemen for election as Auditors, in order to complete the list of five :—

Frederick Barron, Bush Lane, Cannon Street, E.C.
William Hodgkinson, 127, Aldersgate Street, E.C.
Edward Horner, 20, Bucklersbury, E.C.
William Squire, 5, Coleman Street, E.C.

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

Botterill, George Thomas ......Boston.
Colling, Robert ....Stockton-on-Tees.
Dunn, Henry...........................Shipley.

Two persons having paid arrears of subscriptions, together with the subscription for the current year, were restored to their original status in the Society.

Elections.

Honorary Member.

The following gentleman was nominated for election as an "Honorary and Corresponding Member of the Society :"—

Watts, Henry, B.A., F.R.S.

Members.

Pharmaceutical Chemists.

The following Pharmaceutical Chemists were elected Members :—

Barker, Matthew Mark ....Masham.
Barrett, Frederick John ....Wolverhampton.
Botterill, George Thomas.........Boston.
Churchyard, Robert Leman......London.
Colling, Robert ....Stockton-on-Tees.
Cotterill, Samuel ....London.
Dunn, Henry.............................Shipley.
Finlay, James ....Edinburgh.
Hardy, Samuel Croft ....London.
Holmes, Walter Murton ....London.
Jones, William ....Lyth Hill, Shrewsbury.
Little, Arthur Nicholas ....Upper Norwood.
Mason, Robert William ....Putney.
Nuthall, Edwin........................Norwich.
Overton, Charles Arthur ....Horncastle.
Paton, James...........................Edinburgh.
Wretts, John Robert ....London.

Associates.

The following, having passed their respective examinations, and being in business, were elected "Associates in Business of the Society :"—

Minor.

Loveless, Edward William ......Twerton.
Matthews, Ernest...................Royston.
Smith, Fuller..........................London.
Turner, Joseph Kitchin ....Cleator Moor.

Modified.

Morris, William Watkin ....Talgarth.
Parker, Alfred ....Uttoxeter.
Plaister, William James ....London.
Sansom, Henry ....Leamington.
Simms, Robert John...............Scarborough.
Thomson, William ....Exeter.

The following, having passed their respective examinations, were elected "Associates of the Society :"—

Minor.

Aris, George Henry ....Wellingborough.
Barnes, William James ....Dover.
Basker, John Anthony ....Grantham.
Cartwright, William Adam......Hyde.
Clement, Joseph ....Coleford.
Cooke, William Kendle ....Brighton.
Cox, William Dennis ....Grantham.
Dixon, Daniel ....Preston.
Elmitt, John Henry ....Horncastle.
Fingland, William ....Liverpool.
Gibbs, Henry..........................Aylesbury.
Gould, Robert George ....Poole.
Lawson, Edward James ....Whitstable.
Marin, Ferdinand Baptist ......London.
Marshall, Eli..........................London.
Mellor, John Gilbert ....Southport.
Prettejohn, Robert Froude ......Torquay.
Roach, Herbert William ....London.
Roberts, William ....London.
Short, William ....March.
Smith, Nathan ....King's Lynn.
Stephens, Henry Isaac............Bristol.
Symons, William Henry ....Barnstaple.
Taylor, George William ....Louth.
Thorp, John ....Manchester.
Tripp, Zeno ....Plymouth.
Walker, William ....Stockport.
Walton, Thomas ....Bishopswearmouth.

Modified.

Anderson, Charles William......Southampton.
Bratley, William ....Gainsborough.

Society of Great B[illegible]in,

17, Bloomsbury Square, W.C.

The Chemist's Annual, 1917.

Receipt
enclosed with
Compliments &
Thanks.

Hudson, Thomas Frederick......Birkenhead.
Jagg, John Henry ....New Cross.
Mayo, Robert William...........Chelmsford.
Strickland, Absalom Whitehouse.Bognor.
Westlake, John......................Brixton.

APPRENTICES OR STUDENTS.

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

Agger, Joseph Edward...........King's Lynn.
Berry, John Bright ....Northampton.
Bond, Frederick John ....Tiverton.
Clarke, Herbert ....Lowestoft.
Cotterell, Edward..................Weymouth.
Crane, William Clifton ....Market Harborough.
Gregory, Walter ....Taunton.
Haworth, Edwin ....Oswaldtwistle.
Holt, George Alfred...............Douglas.
Jackson, Henry Lawson ....Crediton.
MacFarlane, Peter ....London.
Maynard, Henry Robert ....Brandon.
Munday, John ....Bridgnorth.
Paul, William Edmund ....Scarborough.
Thomas, Thomas Gratton ......Bagillt.
Wardle, William Stephens ......London.
Withycombe, George ....Hele, Tavistock.

FINANCE.

The Report of the Finance Committee was received and adopted; and sundry payments for accounts, salaries, etc., were ordered to be made.

ANNUAL STATEMENT.

The Financial Statement for the year 1872, with balance sheet and special statements, prepared, as suggested, by a professional accountant, was presented, and, after consideration, was adopted with a few alterations.

BENEVOLENT FUND.

On the report and recommendation of the Benevolent Fund Committee the following grants were made :—

To a Registered Chemist and Druggist, late of Torquay	£10
To the Widow of a late Member of the Society, residing at Nottingham	20
To the Widow of a Registered Chemist and Druggist, late of Louth	10
To a Registered Chemist and Druggist, late of Manchester	10
To a Registered Chemist and Druggist, late of Cardiff	10
To the Widow of a Chemist and Druggist, late of Wigan	10
To the Widow of a Chemist and Druggist, Member of the Society for three years, late of Dover	20
To a late Member of the Society, residing in London	10
To the Daughter of a late Member of the Society, late of Southampton	10

The Widow of the late John Beaton, London, a Member of the Society for twenty-one years, was placed upon the list of candidates for annuities.

The Widow of the late William Moss, London, a Member of the Society for twenty-three years, and late Local Secretary, was placed upon the list of approved candidates for annuities.

Other applications for aid were received, but were deferred for further consideration and inquiry.

The TREASURER suggested that the Secretary might be disposed to aid these cases from his private "Casual Fund" pending inquiries.

The SECRETARY said that he would be glad to assist as far as the circumstances of the individual cases would seem to warrant and the fund at his disposal would permit.

The Treasurer was requested to purchase £500 Consols on the Benevolent Fund account.

LIBRARY, MUSEUM, AND LABORATORY.

The Report of the Committee was received and adopted, and the Committee were authorized to purchase a balance for the use of the Students if necessary.

ANNUAL REPORT OF THE COUNCIL.

The preparation of the Annual Report was referred to the Library, Museum, and Laboratory Committee.

HOUSE.

The Report of the Committee was received and adopted.

PARLIAMENTARY.

The Report of the Committee was received and adopted.

BYE-LAWS.

It was moved by Mr. GREENISH, seconded by Mr. RADLEY :—

"That the bye-laws now read a second time be confirmed."

Mr. HAMPSON moved the following amendment :—

"That the Solicitor of the Society in the following explicit terms, having deliberately disapproved of the proposed amended bye-law, section 10, clause 16, as agreed to by the *Parliamentary Committee*—viz. 'this appears to us to vary from the intention that the examinations shall be freely open to all the world, and we recommend its erasure,' and Mr. Flux having likewise stated that the same was 'contrary to law,' and as the same amended bye-law, slightly modified, and now proposed to be confirmed a second time, contains the particular restrictions of time to which Mr. Flux took special legal exception, this Council, whilst accepting the other amended bye-laws, declines to accept the same—viz. section 10, clause 16, beginning at the word 'after the 31st of December, 1876, no person shall,' etc., to the end of the paragraph."

He felt some hesitation in bringing forward the question as to the legality or illegality of their proceeding with respect to the proposed bye-laws; but he felt it a matter of duty to fight out the question until it was fairly settled. Going back to Mr. Schacht's resolution, proposing the new regulations for the Board of Examiners, he considered it a very fair one, because it simply pledged the Council to the principle. But there was such a strong feeling prevailing at the Council in support of the amended regulations, that the question of legality was ignored. That was the first false step taken by the Council. Outside the Council there was a doubt as to the legality of the test proposed for candidates; and in the minds of many members of the Council there was a doubt existing as to the three years' test. He opposed the three years' test on principle. He maintained it was illegal. Therefore, he was not surprised to find the solicitor taking exception to the proposed bye-law. Before the parliamentary committee Mr. Flux expressed a strong opinion that the proposed bye-law was contrary to law. He would like to know whether Mr. Flux had changed his views upon that subject. He (Mr. Hampson) maintained that nothing would damage the Society so much as that a notion should get abroad that, for the sake of any particular purpose this year, or the next, an illegal step had been taken.

Mr. URWICK seconded the amendment. It seemed to him that they were going in a direction contrary to the spirit of the Act. They were stepping out of their sphere in an endeavour to make bye-laws inconsistent with the Acts of Parliament.

Mr. SHAW supported the original resolution. The matter had been discussed and affirmed over and over again. But Mr. Hampson had now raised the question of the legality or illegality of the course proposed; and from that point the matter must be decided. As far as he was capable of interpreting the law, he believed they were perfectly competent to make the suggested bye-law. It was not repugnant to the ordinary laws of the realm, and no doubt members of parliament, if individually canvassed, would say it was extremely desirable that every person who engaged in the dispensing of poisons should have three years' previous training. Moreover, it must not be forgotten that the Examiners supported the proposed bye-law; and much attention should be paid to their opinions.

Mr. Flux, who had been requested to attend, said the words "apprentice or student" had appeared in the bye-laws submitted to him, and his quoted memorandum had applied to them. Those words had been erased, and consequently his objection on that ground was removed. Then came the question whether the Council had, under the charter and statutes, power to test persons as to their competent skill and knowledge, and prescribe the mode of testing that. No doubt the Council were competent to prescribe reasonable regulations for testing skill and knowledge, and to prescribe that a test should be a proper period of actual experience; whether that period should be three years or a less period was a little out of his province. But if the Council in the *bonâ fide* exercise of their judgment thought three years a necessary period, it seemed to him that that was authorized by the Act, and a bye-law providing for it would be good.

Mr. Owen inquired whether it was necessary a person should be in one establishment three years.

Mr. Flux replied in the negative.

Mr. Urwick asked whether the Court of Chancery could, by injunction, compel the Examiners to examine a man who had not had three years' experience.

Mr. Flux replied that it was not a question for the Court of Chancery, but for *mandamus* in the Court of Queen's Bench. They had found the Court reasonable on each occasion when they had had recourse to it, and he believed he would only have to show the unanimity of opinion which prevailed at the Council and Board of Examiners, to carry the bye-law through.

Mr. Frazer would support the amendment, and wished he had Mr. Hampson's courage, in which case he would have moved a reduction of the fees.

Mr. Hampson, in reply, said the opinion of Mr. Flux as that day expressed, differed from his opinion as expressed before the parliamentary committee. He (Mr. Hampson) thought they should take counsel's opinion upon the subject. Mr. Flux seemed to think the difficulty had been removed by the alteration made in the bye-law; but he (Mr. Hampson) was not of that opinion.

The amendment was then put, with the following result:—

For (4) Messrs. Hampson, Urwick, Frazer, and Owen.

Against (14) Messrs. Atherton, Baynes, Betty, Bottle, Greenish, Haselden, Hills, Radley, Sandford, Savage, Schacht, Shaw, Sutton, and Williams.

The amendment was therefore lost, and the original motion was subsequently carried.

It was moved by Mr. Hills, and seconded by Mr. Sandford—

"That the bye-laws shall be altered in the Clause No. 7 of the Section numbered 10, by erasing therefrom the word 'twelve,' and substituting for the said word 'twelve' the word 'fourteen.'"

Mr. Williams suggested that the number should be sixteen, and an arrangement made for the payment of a fixed sum, to be distributed by the Examiners amongst themselves.

Mr. Hampson thought the proposition that there should be sixteen examiners a good one.

Mr. Bottle said the Council had power to appoint such number as they thought proper from time to time.

Mr. Sandford thought they had better fix upon such a number as they thought they could carry; and there was reason to believe that they would obtain the approval of the addition now proposed—fourteen.

Mr. Schacht considered the proposition so reasonable that those representing the Privy Council would not object to it.

Mr. Shaw said if they wished for sixteen, the President and Vice-President would make up eighteen.

Mr. Baynes said the Board of Examiners were overworked; and thought they should ask for eighteen at once.

Mr. Hampson said they must have a proper staff to do the work efficiently. He proposed that the number should be eighteen.

Mr. Urwick seconded the amendment, which was negatived.

Mr. Williams moved that the number be sixteen.

Mr. Baynes seconded the amendment, which was negatived.

The original motion was then put and carried.

Report of Examinations.

March, 1873.

ENGLAND AND WALES.

Examinations.	Candidates. Examined.	Passed.	Failed.
Major	4	3	1
Minor	60	39	21
	64	42	22

Certificates received in lieu of the Preliminary examination:—

College of Preceptors	1
Royal College of Surgeons	1
University of Cambridge	4
" " Durham	1
" " Oxford	4
	11

BOTANICAL PRIZE FOR 1874.

A Silver Council Medal is offered for the best Herbarium, collected in any part of the United Kingdom between the first day of May, 1873, and the first day of June, 1874; and should there be more than one collection possessing such an amount of merit as to entitle the collector to reward, a second prize, consisting of a Bronze Medal, and also Certificates of Honour and Merit, will be given at the discretion of the Council. In the event of none of the collections possessing such an amount of merit as to warrant the Council in awarding Medals or Certificates, none will be given.

The collections to consist of Flowering Plants and Ferns, arranged according to the Natural System, and to be accompanied by lists, arranged according to the same system, with the species numbered.

The collector to follow some work on British Botany (such as that of Babington, Hooker, or Bentham), and to state the work which he adopts. The name of each plant, its habitat and the date of collection, to be stated on the paper on which it is preserved.

Each collection to be accompanied by a note, containing a declaration, signed by the collector, and certified by his employer, or a Pharmaceutical Chemist to whom the collector is known, to the following effect:—The plants which accompany this note were collected by myself, between the first day of May, 1873, and the first day of June, 1874, and were named and arranged without any assistance but that derived from books.

In estimating the merits of the collections, not only will the number of species be taken into account, but also their rarity or otherwise, and the manner in which they are preserved; and should a specimen be wrongly named, it will be erased from the list.

The collections to be forwarded to the Secretary of the Pharmaceutical Society, 17, Bloomsbury Square, on or before the first day of July, 1874, indorsed "Herbarium for Competition for the Botanical Prizes." After the announcement of the award, they will be retained one month, under the care of the Curator of the Museum, for the inspection of persons connected with the Society, and then returned to the collectors, if required.

No candidate will be allowed to compete, unless he be an Associate, Registered Apprentice, or Student of the Society, or if his age exceed twenty-one years.

PHARMACEUTICAL MEETING.

Wednesday, April 2, 1873.

MR. A. F. HASELDEN, F.L.S., PRESIDENT, IN THE CHAIR.

The minutes of the last meeting were read and approved.

The following donations to the library and museum were announced, and the thanks of the Society were voted to the donors:—

'London University Calendar,' 1873, from the University; 'Durham University Calendar,' 1873, from the University; 'Guy's Hospital Reports,' 1872–3, from the Hospital; 'Bulletin des travaux de la Société de Pharmacie de Bordeaux,' Janvier, 1873, from the Society; 'The Origin, Extension, and Prevention of Fires, and the relation of Mineral and Vegetable Oils, and other Materials to Fire,' from Professor Attfield; 'Grundlagen der Pharmaceutischen Waarenkunde,' 'Inventaire d'une Pharmacie de Dijon en 1439,' and 'Die Frankfurter Liste,' from Professor Flückiger; Obituary notice of Dr. Robert Wight, F.R.S., from Dr. Cleghorn; Notes on a new form of Percolator, the triplex Pill, Rhubarb, Aconite Root, Citrate of Bismuth and Ammonia, and Aloes, from Dr. Squibb. Specimen of African Ammoniacum; Dried specimens of the following plants:—*Richardsonia scabra*, *Lavandula spica*, *Coriandrum sativum*, and some Italian Cereals, from Mr. D. Hanbury; Specimens of Sulphate of Lanthanum, Niobic Acid, Titanic Acid, Bibromide of Mercury, Benzoate of Zinc, Bromide of Ammonium, Chloride of Zinc, Acetate of Calcium, Phosphide of Calcium, from Messrs. Hopkin and Williams; Fresh specimens of *Daphne laureola*, for the herbarium.

On the table were a fine specimen of Caffeine, exhibited by Messrs. Hopkin and Williams; various specimens of Pareira brava root, by Mr. Francis, jun.; some suppositories to illustrate Mr. Martindale's paper; and some beautiful Drawings, by Mr. Rochfort Connor, of Microscopic Sections of Mustard Seeds, lent to illustrate Mr. Greenish's paper by the Inland Revenue authorities.

THE PROPOSED APPENDIX TO THE PHARMACOPŒIA.

The CHAIRMAN then called upon Mr. Martindale to resume the discussion upon the proposed Appendix to the Pharmacopœia.

Mr. MARTINDALE prefaced his remarks on the general subject by reading a paper on a "New Basis for Suppositories and Pessaries," which is printed at p. 781. He then referred to the proposed insertion into the Appendix of the acetum ipecacuanhæ and the oxymel ipecacuanhæ. He said he could not think that these were preparations that had met with sufficient favour to be inserted in the Pharmacopœia. In using solvents for these drugs they should attempt to get such as were both therapeutically and chemically as inert as possible, and acetic acid was not so. There was the nitrite of amyl, too, about which Professor Redwood had made some remarks. At University Hospital they had used quantities of it, in doses of from one-sixth to half a minim. It was readily soluble in spirit, and also suspended by mucilage in a mixture. He could not think the aqua chloroformi which Professor Redwood suggested would be a useful preparation. The amount of chloroform it contained would vary according to the amount of shaking it received, and there would be a tendency towards indefiniteness which would be undesirable. The oxide of bismuth would be a good preparation. Professor Redwood had also suggested the admission of precipitated oxide of mercury, which, as most of them were aware, had been used to make the oleates of mercury of various strengths, and he thought Mr. Williams could verify to what extent they were used at the present time. The oleates were most worthy of insertion—much more so even than many of the preparations which Professor Redwood had named. With regard to phosphorated oil, the phosphorus could be made to dissolve in almond oil to the extent of 1 per cent. without much difficulty. He had some on the table so dissolved, and the almond oil was not treated in the manner Professor Redwood had thought necessary. The specimen was prepared some four months ago in the same bottle, and there had scarcely been any trace of deposit in it. The preparation of the almond oil in the manner which Professor Redwood had mentioned would be almost an unnecessary refinement. The almond oil would, he thought, be so decomposed that it would yield a worse preparation than that which could be obtained tolerably pure, commercially, in England. The phosphorus and oil required to be heated to about 180° F. or 200° F. in a water-bath to dissolve the phosphorous at all readily, and the mixture should not be exposed to the air whilst this was being done. The bottle should be kept tolerably closely corked, and shaken frequently during the process of making the solution. There was, too, the pulvis elaterii compositus, which, he thought, would be a good preparation The active substance was so difficult to divide into small doses: with the compound powder they obtained an accurate preparation for giving it in small doses. With regard to tincture of fresh orange peel, he believed he suggested that in the first instance at one of their meetings two years ago. But he thought they should wait until they had a new edition of the Pharmacopœia rather than have the two tinctures, which would create a good deal of confusion.

Mr. WILLIAMS said that with respect to the oleate of mercury, he certainly thought it had even now arrived at sufficient importance, and was in itself so scientifically correct that it might be introduced into the Supplement of the Pharmacopœia. He did not think they ought always to wait until a thing was ten years old before they should notice it. The oleate of mercury had been introduced by an eminent scientific man, who had taken quite two years to investigate it and verify the experiments. From his (Mr. Williams's) own knowledge, he could assert that when the materials used in its preparation were sufficiently pure and heat was avoided, the oleates of various strengths appeared to be very perfect and very permanent. It was an extraordinary thing that they should introduce the precipitated oxide of mercury into a new edition of the Pharmacopœia and not the oleate, which, he fancied, was the only preparation for which the precipitated oxide of mercury was at present actually required. It was therefore open to question whether it would not be wise to go a step further, and put in the oleates. With regard to phosphorated oil, to which Mr. Martindale had referred, he could only say there was an objection to the use of oil for medicinal purposes. Practically, he found that phosphorated ether was much more in demand, and seemed to be preferred by medical men. He quite admitted, however, that ether had many disadvantages, and that oil, if it were not objectionable as a medicine, was perhaps a better form. The preparations of bismuth also was a very important question, and he quite agreed that the Pharmacopœia ought to contain in its supplement the oxide of bismuth. But he ventured to suggest that there was even a better compound than the oxide of bismuth, and which would, he believed, practically be found to supersede it, and be even more valuable as a medicine, than the trisnitrate, so-called, or the carbonate, and that was the citrate. The citrate of bismuth was easily formed; the solution of nitrate of bismuth and citrate of soda mixed together in proper proportions—gave a precipitate, insoluble in water, which could be washed and dried, and was a permanent and beautiful body. It was a substance which would in the human system have all the effect of a carbonate or any other organic salt of bismuth,—that was to say, it would be decomposed by the action of the stomach; and there was also this great advantage that the ammoniacal solution could at once be produced, as the citrate of bismuth dissolved in ammonia solution as freely as sugar in water. It struck him that that would be a better form to have introduced into the Pharmacopœia than the oxide of bismuth, for it was a definite and beautiful salt deserving the attention of pharmacists generally.

Upon being asked to explain how he got the citrate of bismuth,—

Mr. WILLIAMS said he diluted the solution of nitrate of bismuth with as much water as it would bear, then added to that a solution of citrate of soda, taking care not to employ an excess as the precipitate would then be redissolved; the precipitate formed could be well washed, and any copper present was thus, together with free acid, got rid of entirely; so that although the bismuth might contain copper, that objectionable impurity could be entirely got rid of. He had for a long time made liquor bismuthi by taking five grains of the citrate, which represented, if he remembered rightly, three of oxide of bismuth, and about $\frac{1}{3}$ of liquor ammoniæ to each fluid dram of water. No citrate of ammonia was produced; the preparation never decomposed or grew mothery, and the solution was practically as perfect as it could be. Of course this preparation required the addition of a new substance into the Pharmacopœia, for citrate of bismuth must be an individual entity. But he thought that was not objectionable, and it would be, he considered, of great value as a medicine. He had made a note about compound powder of elaterium. It was a valuable suggestion that they should reduce the strength of a powerful medicine by means of sugar of milk; but would every pharmacist promise to make his own powder, and prepare it from the true English elaterium? If pharmacists would do that, he quite agreed that such a preparation would be an improvement upon the use of the crude drug.

Mr. GERRARD said that since the last meeting he had made a number of experiments with regard to suppositories, and the result of his investigations was to have been brought that evening before the Obstetrical Society by Dr. Phillips, but he was prevented from doing so through indisposition. The basis he (Mr. Gerrard) had decided upon for giving the best result was a mixture of oleic acid, lard, and paraffin. Paraffin had this advantage,—it had a melting point 20 degrees lower than stearin, and was much nearer the temperature of the human body. It was also possessed of much better keeping properties, and had not that rancid or unpleasant odour which stearin or oleic acid had. When combined in proper proportion with paraffin, it formed an unctuous substance, spreading itself over the surface of the body with which it was brought in contact, and was absorbed in that manner. He had some specimens of the paraffin there. It was a most harmless substance, remarkable for its want of chemical properties, and it was, moreover, only about one half the price of cacao butter, and formed an elegant suppository.

Professor BENTLEY presumed that this was not the time to refer to the general construction of the Pharmacopœia. At the same time perhaps he might be allowed to suggest that, in any future Pharmacopœia they should follow in some respects, the example furnished by the United States' Pharmacopœia, and have a secondary list of the materia medica. It would save a great deal of trouble and be advantageous in a variety of ways, if they had such a list compiled. He thought it must be evident to everyone that there were several substances in the present Pharmacopœia, which were to a certain extent, upon their trial, and which therefore should be placed in a secondary list. He would mention one substance particularly as being on its trial at the present time, and that was *guarana*. If a new Pharmacopœia were about to be published at the present moment, it would be difficult to exclude this substance, although it had not by any means yet had a sufficient trial in this country to warrant its insertion. Then, there was another substance, podophyllum, which, if twenty years ago they had had a Pharmacopœia with a secondary list, would never have been left till 1864 before it was put into the Pharmacopœia. This was a substance which had been in the United States' Pharmacopœia ever since the year 1820, and yet its use had been almost ignored in this country until lately, simply because it had not been sufficiently brought forward. He thought that in future Pharmacopœias it would be very desirable to omit all descriptions of materia medica,—all botanical descriptions, for instance,—unless they were perfect descriptions. The descriptions given of elder flower and aconite, for example, were no descriptions at all. A chemical test was a test, and on that account was extremely valuable; and in the same way a description of a flower or leaf that was not a test, or not one by which they could readily distinguish that flower or leaf, was better out of the Pharmacopœia altogether. The Pharmacopœia was not a materia medica book, but it was a book that ought to give descriptions of drugs, so far as those descriptions were requisite, in order to indicate adulterations. With regard to the proposed introduction of a compound elaterium powder into the proposed appendix, he should like to ask Professor Redwood what was the great objection to using in the composition of the powder, instead of the present uncertain elaterium, its active principle elaterin, it appeared to him that such a compound powder would be a very desirable introduction into the Pharmacopœia.

Professor REDWOOD could not conceive that it would be at all out of order to discuss the question of a secondary list in the Pharmacopœia on the present occasion. The proposed appendix was a sort of secondary list, and it was quite open to the consideration of the Pharmacopœia Committee of the Medical Council as to whether a secondary list, in addition to the appendix, might not be introduced at the present time.

Mr. WILLIAMS said that, if that were the case, he should like to suggest that some compounds which were now in great use, and which were of great value, might be added to such a secondary list, such, for instance, as the sulphocarbolates. These articles were largely consumed, and the consumption was constantly increasing. He had been told that the effect of both sulphocarbolate of zinc and of sodium was very beneficial medicinally. Another series of bodies which ought to receive the earnest attention of those drawing up a secondary list were the preparations adopted for hypodermic injection. That seemed to him to be the mode of administering medicines in the future; but at present there was a difficulty in making satisfactory hypodermic solutions. They must be quite neutral, or they would cause intense pain in their administration; and they must be very concentrated. He thought this matter was well worthy of the attention of the Pharmacopœia Committee and of the Medical Council, to see whether it were not possible to introduce preparations somewhat different from those now used for hypodermic injection. The sulphovinate of quinine, as lately mentioned in the PHARMACEUTICAL JOURNAL, was a very valuable salt for that purpose. He had prepared some and found it was soluble—although a di-salt, and therefore perfectly neutral—in its own weight of water. Such salts were evidently indicated as valuable for the purpose of hypodermic injection.

Mr. MARTINDALE remarked, with reference to the use of paraffin in pessaries and suppositories, that he could not conceive that it would be absorbed in such a ready manner as the preparation he had suggested, or even as the cacao butter. He thought that, when mixed with other fatty oil, it would have a tendency to separate, and would be apt to exude from the parts to which it was applied.

Mr. GERRARD said he had been trying the melting points of various mixtures of fatty oils, and he found in the case of stearin and oil, when heated to a certain temperature, that the oil separated out, leaving the solid substance in a mass. Supposing they had a mixture of paraffin, which melted at 110° F., and theobroma, which had a melting point at about 82° F., although the Pharmacopœia gave it at 122° F., when the thermometer reached 82° F. the oil of theobroma gradually melted out, and the paraffin floated about in small particles on the surface, and it was the same with stearin and oil. Stearin would not melt under 140° F. or 145° F., and therefore the same objection could not be urged against paraffin as against stearin, or, at least, not to the same extent.

Mr. MARTINDALE observed that a mixture of stearic acid with oleic acid had a melting point which was not the mean of the two, but lower than either of them.

Mr. BLAND wished to make a single observation with regard to tinctura aurantii recentis mentioned by Professor Redwood as proposed to be inserted in the appendix to the Pharmacopœia. The objection to that was the difficulty at certain times of getting the proper orange peel to make it with. When it was made with the proper "bigarade" orange peel, it was a most valuable preparation—not perhaps altogether in a pharmaceutical point of view, but for various purposes. If gentlemen wished to make this preparation, now was the time of year when they should try their experiments, because the oranges were tolerably plentiful, and were to be had at moderate prices. Without presuming to anticipate what Professor Redwood's formula would be, he would mention the method he had adopted, and that was to take a sharp knife and pare off the outer coating of the orange, so as to cut off the whole of the vessels containing the oil, putting it into a wide-mouthed bottle, and adding a sufficient quantity of rectified spirit to cover it; let it macerate a few days, then pour off the tincture and express in the usual way. That method furnished a tincture which he had found by experience to be most valuable.

The PRESIDENT then read the following letter which had been addressed to Professor Redwood by Professor Attfield:—

"MY DEAR REDWOOD,

"For almost the first time for eleven years I must be absent from the evening meeting. By letter, therefore, I will venture to ask you whether or not in the appendix, or in the preface of the forthcoming reprint of the Pharmacopœia, some reference can be made to the proposed slight alterations in the chemical nomenclature of the work. Similar alterations have already been made in the case of the American Pharmacopœia, and up to the present time have been cordially accepted by the medical and pharmaceutical practitioners of the United States. This method of bringing pharmacopœial names into harmony with the nomenclature of all the modern chemical text-books, and therefore with the present state of chemical science, has also been fully discussed in this country by the leading medical and pharmaceutical authorities, and the opinions of all seem united in its favour. Under these circumstances would it not be desirable to give a list (it is very short) of the proposed alterations, and thus prepare all parties for the change—slight though that change will be?

"Yours faithfully,

"JOHN ATTFIELD."

Professor REDWOOD asked Mr. Bland whether, in making the tincture of orange peel, it was not necessary to macerate the peel for an unusually long time? He had just stated that it was macerated for a few days.

Mr. BLAND believed a week was quite sufficient for the purpose, provided the peel was shaved off into small portions with a sharp knife, which was the way he had always done it.

Mr. GREENISH could not help thinking that it would be very embarrassing to have two tinctures of orange peel in the Pharmacopœia. Some medical gentlemen would prescribe the tincture, thinking the old form would be dispensed, and others would prescribe, thinking the new tincture would be dispensed. He hoped they might arrive at some definite conclusion on this subject. If the fresh orange peel was best, by all means let them have it, and omit the old tincture.

Professor REDWOOD thought it would be within the experience of most of those who had had anything to do with pharmacy, that many medical men would continue to prescribe the old tincture for many years after that made from fresh orange peel was introduced into the Pharmacopœia. It appeared to him that opinions were pretty equally balanced as to which of these tinctures was best. He, therefore, thought that the most simple plan was to have both introduced into the Pharmacopœia, with a difference in name that would enable the prescriber to indicate one from the other. They ought to be more cautious in striking articles out of the Pharmacopœia than in putting in new ones. The great difficulty experienced in reference to the B. P. of 1864, arose from a number of preparations having been struck out, which medical men were not at all prepared to relinquish the use of, and which had to be introduced again. The great object of the Pharmacopœia was to define preparations that were in use; and as long as they continued to be used to any appreciable extent, he could not see that any harm resulted from the definition being retained in the Pharmacopœia. If there were other preparations of similar descriptions which were thought to be, and by many were found to be, superior to them, let them be put in competition, and ultimately those which were proved to be the best would replace the others, and when that replacement had taken place in practice, the old preparation which it superseded might then be struck out. That was the principle which had been adopted in the United States' Pharmacopœia, which had just been published. The ground upon which he should propose to strike any article out of the Pharmacopœia, would be that of some serious objection attaching to it, or some grave defect in it. There were one or two preparations in the present Pharmacopœia which were subject to that objection. For instance the green iodide of mercury was a very defective and unstable preparation, and could not be administered because it could not be kept for administration in the state in which it was described in the Pharmacopœia; and that was a sufficient ground for discarding it. But a mere ordinary galenical preparation which might in some respects present similar but superior characters, ought not too hastily to displace the one that had been long established in use. He was not at all strong in the opinion that there was any great necessity or requirement for the introduction of the tincture of fresh orange peel, but he thought it would satisfy many who very strongly advocated its use. Mr. Martindale wished to know upon what ground the new preparations of ipecacuanha—namely, the vinegar and the oxymel—were introduced into the Pharmacopœia, leaving the present preparations of ipecacuanha as they existed. Now he thought the vinum ipecacuanhæ was not a preparation which was devoid of objection. Although it was an efficient preparation, it was very doubtful whether it was one that was constant in its efficacy, for it underwent changes in keeping. Moreover, wine was a questionable vehicle to use, because there were probably no two pharmacists making ipecacuanha wine who would use exactly the same wine in the preparation, and that of itself was an objection. Still ipecacuanha wine would continue to be used, and therefore he would leave it in the Pharmacopœia; but as ipecacuanha was such an important medical agent, it became a question whether they ought not to introduce some preparation that was more reliable, more constant, and which presented other characters which the vinegar did. The cheapness was an element that was not to be altogether overlooked. Acetic acid was one of the cheapest and at the same time one of the most efficient vehicles which could be used for the administration of the active principle of ipecacuanha, and the experience that they had hitherto had of this vinegar of ipecacuanha had proved it to be constant in its character. It did not change its colour, and threw down no precipitate, but retained permanently the whole active principle of ipecacuanha. Therefore taking into account the facility with which it was made, its cheapness, great constancy, and admitted efficacy, he thought nothing could be urged against its introduction into the Pharmacopœia. The oxymel again was a preparation made of the acetate, and would, he believed, prove to be a most acceptable addition to the preparations of the Pharmacopœia. Then with regard to the nitrite of amyl, he confessed he was not very strong as to the necessity of introducing it into the Pharmacopœia. But he must say that he considered it to be a very powerful and valuable therapeutical agent, possessing an action which no other preparation could replace. Being a very powerful as well as efficacious remedy, and being moreover a preparation which was not always, as met with in commerce, uniform in its characters and properties, it was just one of those substances which it was most desirable to have defined in the Pharmacopœia, because here again the object of the Pharmacopœia was definition. When nitrite of amyl was ordered there should be no question as to what the preparation was that should be used. If there were a secondary list in the Pharmacopœia, this would probably be one of the things that would in the first instance be put into it. He had heard a secondary list strongly advocated on many occasions, but he had never yet been a convert to the propriety of having such a list in the Pharmacopœia. The question that would be most difficult to solve was this: Who was to define what was to go into the secondary list, and what into the primary list? This led him to speak of the United States' Pharmacopœia, in which a secondary list had been inserted. He had been engaged in studying that work and in testing some of the formulæ for preparations which were introduced into it; and he must say that he had been struck with what appeared to him to be many inconsistencies in it. There was one other preparation to which he wished to refer, and to which reference had been made by Mr. Martindale, and that was the oleum phosphoratum. Mr. Martindale seemed to think that the instructions which he (Professor Redwood) proposed to give for its preparation, consisting of the purification of the oil of almonds before its use, was an unnecessary refinement. It might be so for some samples of oil; but he was quite certain that much, if not most, of the oil of almonds met with in commerce, if it be used simply as a solvent for the phosphorus, gave rise in a short time to a precipitate in the oil. The oleum phosphoratum as ordered in the Paris Codex, for instance, was found to undergo change. Some of the phosphorus seemed to be acted upon by some resinous or organic matter in the oil, and that was got rid of and decomposed by subjecting the oil to a high temperature; and if the temperature were carefully observed, no material alteration in the oil, so as to alter its general character, took place. The oil became colourless, but it did not acquire any disagreeable odour if heated up to 400° Fahr. He believed that the operation, although it might not be absolutely necessary, was a desirable precaution to take so as to ensure uniformity in the result, and to guard against defects which otherwise would be likely to occur. The object he had in view in introducing this discussion was to call forth the opinions of pharmacists, and he felt greatly indebted to those gentlemen who had come forward and favoured the Society with their opinions and experience. Referring, in conclusion, to the letter of Professor Attfield, as to the nomenclature which might be looked forward to in future Pharmacopœias, he (Professor Redwood) said he could not hold out much hope or expectation of anything being stated in the proposed appendix that would tie the authors of the Pharmacopœia to the nomenclature which they should adopt four or five years hence. He thought the prevailing opinion of the Pharmaceutical Committee and of the Medical Council would be "Sufficient unto the day is the evil thereof." When the time came for bringing out a new Pharmacopœia they would then consider what the nomenclature should be that it was advisable to adopt. At the same time he had no hesitation in saying he had every confidence that when that time came, the nomenclature which Professor Attfield would like to see adopted would be introduced.

The Mustard of the Pharmacopœia.

Mr. Greenish then read a paper on "The Mustard of the Pharmacopœia." The Paper is printed at p. 782, and gave rise to the following discussion:—

Mr. Martindale said he had tried at several places, but had failed to get the mustard of the Pharmacopœia, except at one establishment in London. Powdered white mustard seed alone, he thought, was generally supplied; this was very different from that which was used in the north of England, and supplied by Dewar, of Newcastle-on-Tyne.

Professor Bentley said that his experience did not accord with what Mr. Martindale had stated with reference to white mustard seed, for all the mustard he (Professor Bentley) had examined certainly contained a notable proportion of black mustard seed. He did not think that white mustard seed would in itself at all meet the desire of those who used mustard; and at the same time the use of black mustard by itself would be so powerful, so pungent, that unless a certain agreeable character was imparted to it the mass of the people would not use it; but if they mixed with it white mustard seed they got an agreeable flavour. It was for that reason especially that white mustard was used, and used advantageously. The admixture of other substances was a question which he would not go into at the present moment, as it would raise the whole inquiry with respect to what was commercial mustard, and the still further subject of its adulteration.

Mr. Bland believed that exaggerated notions prevailed with regard to the adulteration of mustard, and that the principal obstacle in the way of getting the genuine article had been the unwillingness to pay a decent price for it. For several years past he had been supplied with mustard which was stated by the manufacturer to be genuine, and he believed that that representation was perfectly correct. There was no starchy matter mixed with it, but it was purely a mixture of white and black mustard, and there was an entire absence of any foreign colouring matter. He was sorry to say that, generally speaking, the public were not good judges of mustard, preferring that which was sold by the oilmen and grocers at from 8*d*. to 1*s*. per lb. He had had some experience with regard to the fixed oil that had been recommended as a remedy for rheumatism, but he was not inclined to attribute to it any great value.

Parliamentary and Law Proceedings.

Alleged Death through the Use of Adulterated Vinegar.

In charging the grand jury at the Liverpool Spring Assizes, on the 27th March, Mr. Baron Pollock called attention to a charge of manslaughter against a woman named M'Grath, for causing the death of her infant child, eight weeks old, by negligence in administering an overdose of cough medicine. The child was delicate almost from its birth, and the prisoner applied to a medical man, who advised her to go to the union for medical aid. Instead of doing so, however, she bought a two ounce bottle of cough medicine from a chemist. The medicine was administered three times a day, according to directions, but on one occasion the remaining contents of the bottle, about an ounce and a half, were administered, and the child died. There was the evidence of the chemist to the effect that he made up as much as two gallons of this medicine at a time, and that he used laudanum, vinegar, and other ingredients. He sold large quantities of it, with directions upon the bottle. The chemist stated that the quantity of laudanum in the bottle would not amount to more than eight drops, and that if the whole contents of the bottle had been taken at once that would not have been sufficient to cause death. The vinegar was subsequently analysed, and it was then found that the vinegar was largely adulterated with hydrochloric acid. The chemist stated that he had bought the vinegar from a wholesale dealer, and that he was not aware of any adulteration. The bottle was examined, and instead of containing only a few drops of laudanum, it contained a much larger quantity of laudanum, and half the quantity would have been sufficient to cause death. The charge on the depositions was that the prisoner was guilty of negligence in administering an over-dose of the medicine, and that question involved to some extent the question of her knowledge. If the chemist who sold the medicine was under the impression that the ingredients were not adulterated, or that it did not contain more than eight drops of laudanum, one could hardly imagine how the prisoner could have had a greater knowledge, and therefore it was difficult to say how reckless negligence could be made out against her. However, if, after examining the witnesses, the grand jury should be of opinion that she intentionally administered a large dose of the mixture, so as in any way to affect the health of the child, then the offence would be *primâ facie* one of manslaughter. But some one was exceedingly culpable in adulterating the vinegar. He had not heard that any steps had been taken in reference to that matter.

When the grand jury had concluded their labours the foreman, addressing his lordship, said in the case of Mary M'Grath, charged with the manslaughter of her infant child on the 5th February, the grand jury had not been able to find a true bill. From the evidence which was placed before the jury, however, they felt that there was culpable negligence somewhere. There was a chemist who mixed a certain cough medicine, which on analysis, was found to be of the most dangerous and poisonous character. There was no doubt but death had resulted from the administration of the mixture. Vinegar had been used in its preparation, which was found to be highly adulterated and a most dangerous compound. The grand jury felt that they could not be discharged without first bringing these facts before the court in the hope that an investigation would take place. This vinegar had been sold to the chemist, and was in all probability being extensively sold elsewhere, and the grand jury felt it would be impossible to estimate the amount of injury which might be sustained through its use. They hoped, therefore, that some investigation would take place, and if culpable negligence was found some steps should be taken in the matter.

The judge remarked that he agreed with the jury in what they thought. Adulteration with hydrochloric acid was a most serious matter, and he hoped the opinion expressed by the grand jury would lead to an investigation. —*Liverpool Daily Post and Daily Albion.*

⁂ This case appears from the report to be somewhat obscure, for though the presence of hydrochloric acid in vinegar must be regarded as an aduleration, it could scarcely be poisonous or even dangerous.—Ed. Ph. Journ.

Action against a Druggist for a Mistake.

On Wednesday, March 26, an action to recover the sum of £200 was brought in the Record Court, Belfast, against Mr. Gibson a druggist, for selling the plaintiff a quantity of extract of belladonna in the place of extract of dandelion, whereby injury was caused to the plaintiff.

From the evidence, it appeared that Miss Doherty the plaintiff's sister, went to Mr. Gibson's shop to purchase some extract of dandelion, and was supplied with a box containing what was represented to be that substance. She and her brother having taken a portion of it were seized with illness, the man especially being delirious. A medical man was called in who pronounced the illness to be caused by belladonna poisoning, an opinion that was confirmed upon an examination of the residue in the box.

For the defendant it was urged that the drug had been supplied in his absence, and that there had been no negligence on his part, as the jar in his shop containing belladonna, was distinctly labelled "poison;" also that the plaintiff had suffered no permanent injury.

The jury, after some deliberation, returned a verdict for the plaintiff of £5 damages and 6*d.* costs.—*Belfast News-Letter and Telegraph.*

Prosecution under the Adulteration Act.

On Friday last, at the Clerkenwell Police Court, the case of prosecution for the sale of adulterated tea came on for hearing. As reported on p. 755, this case was adjourned for a fortnight, in order to allow the magistrate to consider an objection to a conviction on the ground that the analyst had not stated in his certificate whether the adulteration was injurious to health; Mr. Barker said he had come to the conclusion that he had the power to convict, and he imposed a fine of £10 and costs.

BOOKS RECEIVED.

Contrasts. Dedicated to the Ratepayers of London. London: Strahan and Co. 1873. From the Publishers.

Geological Stories: A Series of Autobiographies, in Chronological Order. By J. E. Taylor, F.G.S. London: Hardwicke. 1873. From the Publisher.

The Action of Heat upon Hydrated Salts. By C. R. C. Tichborne, F.C.S., M.R.I.A. From the Author.

The Expression of the Emotions in Man and Animals. By Charles Darwin, M.A., F.R.S., etc. With Photographic and other Illustrations. London: John Murray. 1873. From the Publisher.

Notes and Queries.

ANALYSIS OF AGARICUS FŒTENS.—M. Sace contributes to the *Comptes Rendus* of the French Academy the following analysis of this fungus:—

Water	67·20	per cent.
Mannite	·60	,,
Pectic Acid	·09	,,
Fibrin	4·66	,,
Bassorin	1·55	,,
Woody matter	20·09	,,
Colouring and odoriferous substances	·68	,,
Ash	5·18	,,
	100·05	,,

Correspondence.

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

The Benevolent Fund.

Sir,—It is with great pleasure that I note the Benevolent Fund is at last exciting some attention. In common with some other chemists of this locality, I have long since resolved to withhold my mite, until the whole amount subscribed annually is at once devoted to charitable purposes. Whilst so many noble societies are calling out loudly for help, and are bravely casting their bread upon the waters, the Pharmaceutical Society, deaf to the voices around, is hoarding up money for the relief of the poor in some age that may never appear.

Pharmacists of past days doubted the generosity of the men of to-day, and we, forsooth, must needs copy them, fearful lest charity should be dead after the departure of her present patrons.

In conclusion, I would ask in the name of all that is right and charitable, that members in each town should unite their subscriptions, taken away from the Benevolent Fund, to relieve the destitute of their own neighbourhood; or that a different policy be pursued by our Council, when I doubt not that subscriptions would quickly be almost as numerous as members of the Society.

Walter B. Clark.

Leicester, March 29th, 1873.

Pharmacy Act, 1868.

Sir,—I quite agree with Mr. Beale in last week's Journal, that the Pharmacy Act has not proved to be of much benefit to chemists, inasmuch as the outside trade goes on much as usual, notwithstanding the prohibitory clauses. It is plain that if the public are not strictly protected against themselves by further legislation, the Act will be a positive injury to many of us; because, so long as the public can obtain drugs under certain names to which they have been accustomed, the quality will not be inquired into, the price being a more material question.

Tincture of rhubarb, made with English rhubarb and turmeric, is commonly vended in this locality, as well as the other things spoken of by Mr. Beale: and the result of the whole is, that though I have been established some thirty years here, and have two places of business amongst a population of 14,000, the profits afford but a moderate living. If a person can manage to get half a dozen red herrings, a few bits of pipeclay, and a bath brick, into the window, there is sure to be some wholesale (?) druggist to the fore, to provide everything that he can persuade the enterprising party to deal in. And I have about fifty or sixty of these to contend with, who treat the Poisons Act as a nullity, besides a considerable assortment of old women, who vend breast ointment, lotions, infallible embrocations, life pills, etc. Apart from the mere honour of the thing, there is nothing in the present regulations, so far as I can see, to prevent thoroughly incompetent persons from reaping, in such localities as mine, the principal benefit by a little ingenuity. I have a competitor who calls himself an "oilman," with a shop fitted up like a druggist's shop, who sells what he likes, and prepares prescriptions as if properly qualified. He has a better excuse than many, because he has been with a druggist; but there are numbers who take our legitimate trade, who can barely write their own names, and certainly cannot spell a sentence with a fair approach to correctness. Such persons as these are supplied with the veriest trash for sale, and unless I choose to compete with them, which I will not descend to do, I am undersold.

As regards prescriptions, this is not a neighbourhood for many, the local medical gentlemen being in the habit of making up their own, as well as making their blisters, lending clyster-pipes, etc. The consequence is that I am thrown back on prescribing for more than mere simple matters; whereas, if a proper Pharmacy Act protected me, I should find plenty to do in carrying out the ordinary branches that pertain to our business. I trust that now that the Council has gone so far as they have done, they will go a little further, and thoroughly detach us from the suckers who make it impossible for a great many of us to succeed, and who are standing examples of the superiority of impudence and cunning manœuvres to skill and education in obtaining a share of this world's goods.

Pudsey, near Leeds. Joseph Walker.

Early Closing.

Sir,—I am glad to notice that *one* at least of the Sunderland chemists (viz. John Aslin and Co.) has joined the early closing movement in that town, by adopting the practice of closing precisely at seven o'clock. This is a good example, and it might be advantageously followed.

A Registered Chemist and Druggist.

Sunderland, March 22nd, 1873.

Pharmaceutical Women.—Mr. H. J. Lutwyche writes that he would strongly advise those women who have an idea that they can become chemists to stay at home and learn to cook, for that not one out of twenty knows how to cook, and not one out of double that number knows how to boil a potato properly. His experience is that there are many occurrences which take place in a chemist and druggist's shop that render it an unfit place for a woman. He also states that out of eighty-three chemists and druggists who have been called upon by a friend of his, eighty-two have signed a "paper for women to be rejected," and most of them "expressed their regret that the Pharmaceutical Council did not reject female students long ago, which would have ended the matter at once." Whether or not it be desirable to exclude women from the practice of pharmacy, we do not think they are to be disposed of so readily as our correspondent seems to believe, and we think the better course would be to give them full opportunity to enter into any competition they please.

Mr. F. M. Bessant says that nearly all the correspondence on this topic has revolved itself round such questions as "the fitness of women for the work," "the fairness" as regards salary, competition, the advisability of exposing women to the chance of moral contamination, etc., and though he most heartily concurs with what "*H. L.*" says on the subject, and only thinks he has put the matter far too lightly in this respect, it seems to him that, until Mr. Saunders' letter appeared, no one had properly realized the full depth and importance of the question. The real question he considers to be—Was woman made for herself or for man? and that its bearing with regard to pharmacy is only one peculiar phase of it. He thinks that a branch of "trade," which is now endeavouring to show "the world" what a high place in "intellectual rank" it is entitled to, should not be one of the very first to give way to one of the most degrading innovations of these modern times. With reference to the fact mentioned in the Journal some little time back, as to female students being admitted into some French medical or chemical society, he is of opinion that we have not made such miserable progress in civilization in the last few years, that the French have now passed us, and stand as a pattern and example to us in anything.

"*Ignoratio.*"—The two quantities are mentioned to show the range of the doses. It is wrong to assume that it would be advisable or even safe to give an adult the higher dose in all cases.

J. Stather.—Your letter has been handed to the Secretary.

"*Verus.*"—We are unable to aid you; the two are completely incompatible.

J. F. Brown.—We believe this oil is to be met with in the London market. Try your wholesale druggist.

"*Look Out.*"—Your letter, which should have been accompanied by your address, has been handed to the Secretary, with whom you had better communicate on the subject.

"*Nemo.*"—We believe such a collection as you require is supplied by Mr. Siebold, of Manchester.

Communications, Letters, etc., have been received from Mr. Pocklington, Mr. Bennett, Mr. J. Abraham, Mr. Halawell, Mr. J. F. Brown, Dr. Fraser, Mr. Mackay, Mr. Anderson, Mr. Walker, Mr. Symes, Mr. Bladon, "Registered Student," "Jurisprudentia." W. A. C.

NOTES ON INDIAN SIMARUBEÆ.

BY ALFRED W. BENNETT, M.A., B.SC., F.L.S.,

Lecturer on Botany, St. Thomas's Hospital.

The Simarubeæ are an order of plants of considerable interest from a medicinal point of view, in consequence of the intensely bitter properties displayed by their bark and some other parts of the plant. The best known genus of the order, Quassia, belongs to the New World; but in Tropical Asia there are also a considerable number of species sharing in the same medicinal properties; and from the great and growing interest taken in the natural productions of our Indian possessions, I have thought it might be of interest to put together what is known about the species that are natives of those countries, which I am the better able to do from having had the opportunity recently of verifying, and in some cases correcting, the diagnoses of previous writers, while preparing a monograph of the order for Dr. Hooker's 'Flora of British India.'

The Simarubeæ are placed by Bentham and Hooker in their "cohort" Geraniales of Thalamifloræ; by Lindley in his "alliance" Rutales of Hypogynous Exogens: they are all trees or shrubs, often of a very great size, with usually inconspicuous, often very crowded and mostly unisexual flowers; the leaves often remarkably large and almost always compound; the fruit consisting, in nearly all the genera, of a number of distinct indehiscent drupes or samaræ, arranged, and often stalked, on a common receptacle. The species mostly inhabit the tropical and subtropical regions of both hemispheres, especially South America and Tropical Africa, and number about 120, arranged in 30 genera. The only representative of the order in Europe is the *Cneorum tricoccum* of the South of France; but it is well known in shrubberies, from its Asian representative *Ailanthus glandulosa*, extensively cultivated on account of its rapid growth, its magnificently large pinnate leaves, and as food for a species of silkworm, the *Bombyx Cynthia*. The diagnosis of the order may be stated as follows:—

Order SIMARUBEÆ, *Rich.*, *DC.*

Trees or shrubs, often with bitter bark. Leaves alternate, rarely opposite, pinnate or rarely simple, without stipules. Inflorescence axillary, racemose, or panicled, rarely spicate; flowers regular, usually unisexual, and generally small. Calyx 3-5-lobed. Petals 3–5, very rarely 0, valvate or imbricate. Disc annular, capsular, or elongated, simple or lobed, rarely absent. Stamens equalling or twice as many as petals, rarely indefinite, inserted at the base of the disc; filaments free, often scaly at the base; anthers oblong, usually introrse, bilocular, dehiscing longitudinally. Ovary free, 1–6-celled, usually deeply lobed, less often entire; styles 2–5, more or less united or free; stigmas capitate; ovules usually solitary in each cell, rarely more numerous, erect or pendulous. Fruit drupaceous, capsular, or frequently samaroid, of 1–6 distinct carpels, rarely syncarpous. Seeds usually pendulous; albumen present or absent; embryo straight or curved; radicle superior.

With regard to the general properties of the Order, and especially of those species which are not Indian, the following remarks are made by Lindley, Bentley, Royle, and others. The species are intensely bitter. A plant called "Paraiba" in Brazil, *Simaruba versicolor*, St. Hil., possesses such excessive bitterness that no insects will attack it. Specimens of it, placed among dried plants which were entirely devoured by the larvæ of a species of Ptinus, remained untouched. The Brazilians use an infusion in brandy as a specific against the bite of serpents, and also employ it with great success as a cure of maladies occasioned by parasitic insects. The wood of *Quassia amara*, a native of Surinam and the adjacent countries, is intensely bitter, and was the original Quassia of commerce, formerly much used as a febrifuge and tonic, and the flowers infused in wine or water, as a stomachic. It contains a principle called Quassin. The officinal Quassia-wood of the materia medica is now, however, yielded entirely by a Jamaican plant of the order, *Picræna* or *Picrasma excelsa.* It is much used as a tonic, febrifuge, and stomachic, and it also possesses anthelmintic properties. An infusion sweetened with sugar acts as a powerful narcotic poison on flies and other insects; its infusion may also be employed to preserve animal matters from decay. It is sometimes used by brewers as a substitute for hops, although prohibited under severe penalties. Quassin, the intensely bitter crystalline substance characteristic of the Order, is found here also. In Jamaica the plant is known under the name of Bitter Ash or Bitter Wood, and the wood was at one time used for the manufacture of small goblets, known as "bitter-cups." *Simaruba amara* is a native of South America and the West Indies, especially Jamaica, where it is known under the name of Mountain Damson. The bark acts as a tonic, and has been used in diarrhœa, dysentery, etc., and exported to Europe. In Cayenne the decoction, which is bitter, purgative, and even emetic, is used in fevers and diarrhœa. The timber is described by Sir R. Schomburgk as resembling white pine, both in colour and quality. The seeds of another species of the order, *Simaba Cedron*, or "Cedron," are highly esteemed throughout Central America, where they are used as a febrifuge, and are thought to be a specific against the bites of venomous snakes and other noxious animals. The active principle of this plant has been termed Cedrin. Purdie states that the tree grows in profusion on the Magdalena, near the village of San Pablo. In the Isthmus it is generally found on the outskirts of forests in almost every part of the country, but in greater abundance in Darien and Veraguas than in Panama. According to Dr. Seemann the natives hold it in high esteem, and always carry a piece of the seed about with them. When a person is bitten, a little mixed with water is applied to the wound, and about two grains, scraped into brandy, or, in the absence of it, into water, are administered internally. By following this treatment, the bites of the most venomous snakes, scorpions, centipedes, and other noxious animals have been unattended by dangerous consequences. Doses of it have also proved highly beneficial in cases of intermittent fever. Dr. Royle has no doubt that, from the similarity of the climate to that of their native country, all the Quassias and Simarubas would succeed well in Bengal. *Brucea antidysenterica* of Tropical Africa possesses similar properties to the species already named.

A. and Th. Husemann, in their 'Pflanzenstoffe in chemischer, physiologischer, und toxicologischer Hinsicht,' give the following account of the preparation and properties of these two substances:—Quassin is an indifferent substance, with the composition $C_{10}H_{12}O_3$, and was discovered by Winckler in 1835;

it occurs in the wood and bark of *Quassia amara*, L., and *Picræna excelsa*, Lindl., and perhaps also in the bark of *Simaruba amara*, Heyne. Winckler extracted the wood with alcohol of 80 per cent., evaporated, dissolved the residue in water, filtered, again evaporated, and extracted with a small quantity of absolute alcohol, again evaporated the extract almost to dryness, dissolved it in hot water, and decolorized the filtered solution by animal charcoal at a gentle temperature. Wiggers extracted the wood with boiling water, agitated the concentrated solution with lime, filtered, evaporated almost to dryness, boiled the residue with alcohol of 80 to 90 per cent., again dried, dissolved in a small quantity of absolute alcohol, precipitated the brown colouring substance from the solution by ether, repeated this treatment until, on drying, an almost colourless residue remained, and poured the alcohol-ether solution into water, when the quassin immediately crystallized out. When crystallized according to Wiggers's method from alcohol-ether, or from hot water or hot weak alcohol, quassin forms white, semitransparent, shining columns, persistent in air, without any smell, with an extremely bitter taste, and neutral reaction. It melts with a little more difficulty than colophonium, and hardens into a transparent yellow mass. At 12°C. it requires for solution 222 parts of water, dissolves readily in alcohol, but very slowly in ether. When strongly heated in air, quassin burns like a resin. Cold moderately concentrated nitric acid changes it, on heating, into oxalic acid; cold concentrated sulphuric acid dissolves it without colour, and water precipitates it apparently unchanged; tannic acid precipitates it from solution in alcohol in thick, white flakes. We still want a series of exact physiological experiments on the poisonous action of this substance on other animals besides flies and other insects. The usual statement with reference to quassin is, that Härtl observed that an application of ·06 to ·12 gram to a wound in the case of a rabbit caused faintness and want of appetite, and death ultimately in 30–36 hours; an alcoholic solution was here employed. With other experimenters, palsy resulted, but ultimate recovery. If the seeds of *Simaba Cedron*, Planch., which are used on the Magdalena river in South America as a remedy against intermittent fever, rheumatism, and poison, are heated with ether so as to remove the fat, and then extracted with alcohol, there shoot out of the solution on evaporation silky glancing needles of cedrin (composition not given), with a taste as bitter as strychnine. In large doses, this substance is poisonous.

(*To be continued.*)

SOLUTIONS FOR HYPODERMIC INJECTIONS.*

BY M. CONSTANTIN PAUL.

In the early period of the employment of the subcutaneous method of administering medicines, the substances most ordinarily so used were morphia and atropia,—or rather the hydrochlorate of morphia and the sulphate of atropia,—which were dissolved simply in water. These solutions, once prepared, sometimes remained on hand a considerable time, in consequence of the small quantity used at each operation, but it was soon noticed that they easily underwent change. Dr. Bourdon found that a solution of hydrochlorate of morphia, which had been kept for some time, had lost so much of its activity that he was able to inject equal to four centigrams of the hydrochlorate without producing the physiological effects to be expected from such a dose. The solution was therefore analysed by M. Delpech who found that it had lost one half of its proportion of morphia. In point of fact, the solution had become turbid through a confervoid growth, necessitating filtration. In a solution of sulphate of quinine also the growth had appeared, and M. Delpech found that a portion of the salt had disappeared. Dr. Bourdon attributed the weakening of the solutions to two causes:—(1) that the confervoid filaments act a similar part to threads placed in supersaturated solutions in influencing the formation of crystals, and this especially, as these solutions are usually concentrated and so predisposed to crystallization; (2) that the confervoid growth has the property of decomposing to a certain extent the medicaments under such circumstances. M. Gubler has recognized the confervæ present in a sulphate of atropia solution as belonging to the genera *Leptomitus* and *Hygrococis*.

Since water, distilled and undistilled, proved a bad medium for preserving solutions intended for hypodermic injection, it became necessary to seek a liquid less liable to change, and Messrs. Gubler and Delpech tried the distilled eucalyptus water. This preparation could be preserved much longer, but did not give complete satisfaction. The author has employed a liquid prepared by M. Adrian, consisting of—

Water	85 parts
Alcohol	10 „
Glycerine	5 „

This liquid he has found to be not more irritating than simple water, and capable of being kept for a moderate time, but still it permits the development of the confervæ. It is also necessary to remark that this vegetation shows itself with a variable intensity, according to the salt used, even when the vehicle is the same.

The solution which changes most readily is that containing hydrochlorate of narceia; a layer of confervæ develops on the surface, causing the formation of very small crystals appearing like a powder. The same solution acidified by hydrochloric acid precipitates fine crystalline needles, but the confervæ are not developed. The solution next in order of stability is that of bisulphate of quinine, in the lower part of which float large flocks of mould. Then follow the solutions of sulphate of atropia and hydrochlorate of morphia, which only develop a small proportion. Acetate of aconitia is scarcely altered. Solutions of hydrochlorate of quinine, sulphovinate of quinine, sulphate of strychnia, and nitrate of veratria remain without change.

Digitaline dissolved in alcohol is perfectly preserved, as is also sulphate of morphia dissolved in glycerine. The author, therefore, adopts by preference glycerine as a solvent, as being a neutral liquid and easily preserved without change. He also considers it to be of all the liquids that which approaches nearest in composition to the subcutaneous cellular tissue.

Experience has proved to M. Paul that it is necessary to use great precision in apportioning the

* Abstracted from papers in 'L'Union Pharmaceutique,' vol. xiv. p. 48, and the 'Répertoire de Pharmacie [N.S.],' vol. i. p. 91.

quantities for subcutaneous injections; neglect of this precaution he has known to lead to several accidents calculated to bring discredit upon this method of administering medicines. One difficulty occurs in the varying sizes of the syringes used. The plan adopted by him for securing his object is to weigh the syringe when full of the solvent and again when empty, the difference showing the capacity of the syringe. The number of half-turns of the piston necessary to empty the syringe is then counted, and the same number of milligrams, or other definite quantity, of the drug added to the quantity of solvent representing the capacity of the syringe. Each half-turn of the piston will then represent a definite quantity, only limited by the solubility, of the drug. For instance, suppose that the syringe contains 1·17 grams of water, and the piston requires twenty-one half-turns. If twenty-one milligrams of the drug be added to 1·17 grams of water, each half-turn will represent one milligram of the medicament. The formula will then be to put into the quantity of solvent representing the capacity of the syringe as many milligrams or other definite quantity of the drug as there are half-turns of the piston.

The strengths of the solutions used by M. Constantin Paul are as follows:—

Sulphate of atropia .	½ millgr.	to the half-turn.
Hydrochlorate of narceia	1 ,,	,,
Hydrochlorate of codeia .	1 ,,	,,
Sulphate of strychnia . .	1 ,,	,,
Hydrochlorate of morphia	2 ,,	,,

PERFUMES PHYSIOLOGICALLY AND COMMERCIALLY CONSIDERED.*

BY JAMES PATON.

The art of the perfumer is to the human nose what the art of the sculptor or the painter is to the eye, or the art of the composer to the ear. The perfumer's function is more purely æsthetic than that of the cook, whose art is inseparably combined with the most purely utilitarian and necessary of all offices. The eye, the ear, and the nose, besides all having the most important functions of direct utility to discharge, have each a separate æsthetic side, and although we cannot lay claim to the same lofty, wide, and ennobling range of influence on behalf of the nose as are fairly due to the other two organs, still, in its humble and limited way, it contributes to the pure sensuous pleasures of mankind. And just as the function of the nose as a minister of pleasurable sensation is thus comparatively humble, so the perfumer, as artist, must be regarded as very low in the scale of nobility compared with a Titian or a Canova, a Handel or a Rossini. Nevertheless, the æsthetic functions of the nose deserve something better than the contempt with which that much-abused organ and its functions are generally treated, and it is about as unreasonable to call a young gentleman who smells very sweetly the hard names which are usually directed against him, as it is to scoff at the old lady whose soul delights in the mechanical strains of a musical-box. The taste in both cases is simple in its nature; it requires little cultivation for its development, and it affords a real if not very profound gratification.

The art of the perfumer can lay claim to the most venerable antiquity. In a certain sense, of course, the enjoyment of perfume is coeval with the existence of the human race, as the flowers which bloomed in Eden must have ministered to the gratification of the senses of the progenitors of our race. But beyond this the collection and preparation of substances, on account of their odoriferous properties, must have existed almost from the dawn of human time. Perfumes occupied a prominent place in all religious services from the earliest ages, and to the present day the burning of incense forms a feature in the devotional exercises of nearly every system of worship under the sun. It would be an endless and useless task to quote authorities for such usages from our own Scriptures, or from the writings of the pagan authors, as they all teem with allusions to the habit, and are perfectly familiar to every one of us. The source of the word "perfume"—*per fumum*, by or through smoke,—at once points to the origin of the practice, and tells us that the art which combines the delicate and refreshing odours of the fashionable perfumer had its remote springs in the incense burnt on the altars of the patriarchs of mankind.

To trace the development of the art from these rude beginnings, the strange part it has played among the usages and superstitious practices of mankind, the important place that odoriferous substances have occupied in the commerce of nations, and the progress and extension of the art till it has arrived at the dimensions it possesses at the present day, would be a task of much interest and importance. But at present we content ourselves with some preliminary observations on the nature of the sensation we term an odour, the organs concerned in its experience, and the relation of perfumes or pleasing odours to pungent and other disagreeable smells; and having thus arrived at a conception of the position and relations of perfumes, I propose to make a few remarks on the chief sources from which the perfumer draws his scent-yielding substances.

It may be doubted whether anything is really known regarding the actual composition and nature of the substance of most of the pleasing odours. We know perfectly well the bodies which yield odours, and chemists can tell with absolute precision what is their chemical structure; but although they can further tell the conditions essential to the sensation of smell, the subtle essence which gives rise to it appears to be too ethereal for human detection or manipulation. A grain of musk will perfume millions of cubic feet of atmospheric air, and still it continues apparently a grain of musk. The following minute quantities of different substances spread out on the surface of smell cause a distinct sensation:

Phosphoretted hydrogen . .	$\frac{1}{3000}$ grain.
Sulphuretted ,, . .	$\frac{1}{30000}$,,
Bromine	$\frac{1}{40000}$,,
Oil of resin	$\frac{1}{1300000}$,,

A still smaller quantity of musk than the last given smells strongly, but the actual measure has not been ascertained.

It is assumed that, for the perception of an odour, it is necessary that the body to be smelt must be in a gaseous condition, just as it is required that before we experience a taste, the substance must be dissolved, and for the sensation of touch a resisting solid is necessary. Odorous gases are such as are readily and energetically acted on by oxygen, and the presence of oxygen is therefore a necessary condition of smell. Such gases as mix freely without uniting with oxygen—as hydrogen and nitrogen—are inodorous. In order also to experience the sensation of smell it is necessary that the odoriferous particles impinge with some violence upon the surface of the sensitive membrane in the nose which corresponds with the olfactory nerve, therefore, when we wish to experience a strong sensation of smell we sniff strongly, and when a disagreeable odour is to be avoided we hold our breath, and breathe out when we think we are beyond its influence.

Odours, we all know, are divided into two great and most easily distinguished classes, the pleasant—which usually monopolize the term odours—and the unpleasant, to which we give the brief but expressive name stinks. The mental phenomena, however, to which the excitement of the olfactory organ gives rise, admit of a more detailed classification; and I quote from Professor Bain's work on the 'Senses and the Intellect' the classes into which that philosopher arranges the sensations or peculiar states

* Read at a meeting of the North British Branch of the Pharmaceutical Society, March 28, 1873.

of consciousness which come to us through the nose. One class of odours, according to Bain, owe their character to sympathy of the nose with the lungs, or other vital organs connected with the nose; a second class appeals to the purely olfactory sensibility, that is the influence of the substances which come into this class goes directly from the olfactory nerve to our consciousness, and a third class involves an excitation of the nerves of touch. Under the first head,—smells which owe their character to sympathy between nose and lungs or other vital organs,—he places:

1st. *Fresh Odours.*—These are such as have a restorative action, and act chiefly on the respiratory organs, stimulating them to increased action. Fresh odours are, therefore, essentially the refreshing odours, and are comparable in their influence to the exhilarating effect of the pure cool air after exposure to the stifling effect of a close heated room. 2nd. The converse of fresh odours, or *close* or *suffocating* smells, such as those of overcrowded and ill-ventilated rooms, etc. The third class of such odours are the *nauseous* or *disgusting* smells, of which sulphuretted hydrogen is the type, and which depend for their influence on some antipathetic action on the stomach, which tends to cause nausea and vomiting. In these three are comprised the odours which depend for their character on a sympathetic action between the nose and other vital organs. Under the second head,—odours which depend for their character on an influence exerted on the olfactory nerves alone,—are odours which are classed as *sweet* or *fragrant*, and which convey to the mind purely pleasurable sensations. The odour of violets is quoted as an instance; but it is the art of the perfumer so to combine his materials, that this sensation is usually mixed up with the fresh odours to which we have alluded, and thus pure pleasure and refreshing stimulus are combined. The opposite of the pure, sweet, or fragrant odours are described as the *mal-odours* or *stinks*, of which the smell of assafœtida is a perfect if not pure example. These two—the fragrant odours and stinks—are thus, even according to Professor Bain, the only two real divisions of odours uncomplicated with other effects which do not belong to the functions of the nose. Regarding them he says, "As sweetness is the proper pleasure of smell, the effect of a stink is the proper pain of the organ, the influence originating the peculiar form of misery that we are adapted to receive by means of this sense. The sensation may be specified as the nose pain. Of an intense rather than a massive character, we are stunned and discomposed, but not necessarily depressed by it. It resembles in this respect a bitter taste, and is contrasted with the massive pains of chillness, indigestion, or disgust. The expression is in accordance with the acuteness of the sensation, being an intense contortion of the features chiefly about the nose." Of the third class of odours—those that excite the organs of touch, the sensation of *pungency* is the type, and is produced by the taking of snuff, the inhaling of ammoniacal vapours, or of vinegar, and it is sometimes experienced in an excessive degree by an unfortunate miscalculation of the amount of mustard it is safe and pleasant to trust into the mouth. It is properly independent of the sense of smell, the effect arising through an influence on nerves leading from near the nasal orifices, which, besides being excited by pungency, also are affected by cold, etc. *Ethereal* odours, such as the odour of alcohol and ether, are a combination of pungency with fragrance, and *acrid* odours are regarded as being compounds of pungency and stinks. Under the head of *appetizing* smells are included those with which hungry people are familiar during the *mauvais quart-d'heure* which precedes dinner, and also those to which are referable the sexual feeling excited in animals, and to the possession of which, in the case of two animals, we owe the existence of our most highly valued perfumes, musk and civet. Finally, under the head of *flavours* are included these odours which are developed through the process of mastication, of which cinnamon gives an example, it being a substance having little taste, and depending for its relish on the odour developed in the nostrils in the process of breathing during the swallowing of the fragrant bark.

Of all these varieties of smells, the perfumer has properly only to deal with the sweet or fragrant class which appeal directly from the nose to the mind, and yield unmixed pleasure. Other influences such as restorative or refreshing action may be mixed up with them, but these are the accidents of the classes; the perfumer having to do solely with the nose and its sensations. The series of substances which chiefly minister to the pure gratification of the olfactory sense are hydrocarbons of the terbene or turpentine series, or very slightly oxygenated volatile oils, of which the oil of cinnamon may be taken as an example. The converse series which the perfumer has to avoid, are usually found to owe their bad smell to the presence of sulphur in their composition; and the worst of all smelling substances owe their evil odour to the presence of arsenic.

For the elaboration of powerful odours in the great laboratory of nature bright light and strong heat are required. Therefore it is that to tropical countries which possess both these requisites we must look for our chief supplies of the materials of perfumery. The faint odours which are begotten among us children of the cold grey north, effectually prevent our cultivation of the materials of perfumery, and the only two substances of native growth in which our island excels—lavender and peppermint—owe their superiority to the fact of the less rank growth of these plants with us; which in warmer climates yield odours more powerful than pleasant. And as it is in warmer climates that the perfume-yielding substances are most freely produced, so it is in the same regions that their influence is most beneficially felt, and their pleasures most eagerly sought. Evil odours are of course as pronounced in hot climates as are the fragrant influences of sweet-smelling flowers, and with smells it is as with deeds, the best way to avoid the evil is to cultivate the good.

The sources from which the perfumer draws his raw materials are very numerous and varied. Besides several substances drawn from the animal kingdom which are staples of his art, he ranges over the entire limits of the vegetable world, and lays nearly all orders of plants under contribution to him; and of the individual plants he makes use of every part in turn. It may be the entire plant which serves his purpose, as in the case of many labiates, or it may be the roots, as in the khus-khus, the root-stocks in ginger, the bark in the cinnamon series, etc.; the wood, as in the Virginian cedar or in sandal-wood; the leaves, as in the case of patchouli, or the various parts of the flower, as is most commonly the case. Besides these, there are the numerous instances of fragrant balsams, gum-resins, and resins which exude from the plants, as balsam of tolu, myrrh, and a great variety of similar substances. The laboratory of the chemist is also laid under contribution for the benefit of the art of the perfumer; and some of the most wonderful triumphs of modern chemistry are found in the synthetical elaboration of odours and fruit essences, which, however, are more valued by the cook and confectioner than the perfumer.

The list of raw materials of perfumery, which includes only three substances from the animal kingdom,—ambergris, civet, and musk,—contains between 60 and 70 separate substances from the vegetable kingdom, and is capable of classification in various ways according to the natural affinities of the animals or plants yielding them, the form and condition under which they are presented in commerce, or the nature and similarity of the odours they yield. Thus the materials could be arranged zoologically and botanically, or separated into resins, balsams, roots, wood, barks, leaves, flowers, and fruits; or, taking as a basis of classification the nature of the odours, we should have so many possessed of the rose odour, the violet odour, the citrine or orange odour, or the balsamic odour, etc. Only one substance the perfumer places in his list as produced in the laboratory of the chemist, and that, under the name of mirbane, is the artificial oil of almonds, which is very largely employed in the preparation of almond soap.

It is now upwards of twenty years since Professor Hofmann and Mr. Warren De La Rue, in reporting upon the chemical section of the Great Exhibition of 1851, called public attention prominently to the artificial preparation of fruit essences and perfumes by the skill of the chemist; and it is to Hofmann himself that we owe the discovery of one of the chief sources of the body benzol, which is the basis from which artificial essential oil of almonds is prepared. Nitrobenzol, which in the hands of the perfumer is re-baptized with the sweet-sounding and meaningless name Essence de Mirbane, was discovered by the chemist Misterlich in 1834, and at that time described by him as strongly resembling in odour the essential oil of bitter almonds; but as it could then only be prepared from benzoic acid, there was no hope of manufacturing it at a cost which would enable the artificial to compete with the natural product in the market. In 1845, Hofmann discovered that benzol could be easily prepared in enormous quantities at a cheap rate from coal tar; and the series of investigations this eminent chemist then carried out gave us, in the first place, the artificial oil of almonds as a commercial product, and later, the infinitely more valuable series of coal-tar colours which have now revolutionized the art of the dyer and the industries concerned in supplying the raw materials of the dye-vat. Regarding these artificial odours and perfumes, Dr. Lyon Playfair, in his lecture on the results of the Great Exhibition of 1851, says:—

"An ingenious application of the science of chemistry has of late years been made in the manufacture of artificial essences of pears, pine-apples, and other fruits. In the concentrated form the smell is rather acrid, but when diluted, the resemblance to the fruit is recognized. The best imitations are the pine-apple and the Jargonelle pear; the green-gage, apricot, black currant, and mulberry, when properly mixed, are fair imitations. They are quite innocuous in the proportions used, namely, a drop and a half to the ounce; the cheap ices are flavoured with these essences. Their introduction originated in the discovery of the fact, that the peculiar flavour of "pine-apple rum" was due to butyric ether, which has since been obtained from the fruit itself.

"The jury in the Great Exhibition of 1851, or rather two distinguished chemists of that jury, Dr. Hofmann and Mr. De La Rue, ascertained that some of the most delicate perfumes were made by chemical artifice, and not, as of old, by distilling them from flowers. The perfume of flowers often consists of oils and ethers, which the chemist can compound artificially in his laboratory. Commercial enterprise availed itself of this fact, and sent to the Exhibition, in the form of essences, perfumes thus prepared. Singularly enough, they are generally derived from substances of intensely disgusting odour. A peculiar fetid oil, termed "fusel oil," is formed in making brandy and whisky. This fusel oil, distilled with sulphuric acid and acetate of potash, gives the oil of pears. The oil of apples is made from the same fusel oil by distillation with sulphuric acid and bichromate of potash. The oil of pine-apples is obtained from a product of the action of putrid cheese on sugar, or by making a soap with butter and distilling it with alcohol and sulphuric acid, and is now largely employed in England in the preparation of pine-apple ale. Oil of grapes and oil of cognac, used to impart the flavour of French cognac to British brandy, are little else than fusel oil. The artificial oil of bitter almonds, now so largely employed in perfuming soap and for flavouring confectionery, is prepared by the action of nitric acid on the fetid oil of gas tar. Many a fair forehead is damped with eau de millefleurs without knowing that its essential ingredient is derived from the draining of cow-houses."

(To be continued.)

PROFESSOR TYNDALL ON LIGHT.*

(Continued from p. 788.)

You have already learned that the word "light" may be used in two different senses: it may mean the impression made upon consciousness, or it may mean the physical agent which makes the impression. It is with the agent solely that we have to occupy ourselves at present. That agent is the motion of a substance which fills all space, and surrounds the atoms and molecules of bodies. The phenomena to be explained suggest the assumption, and the next process is to ascertain whether the assumption is competent to explain the phenomena. To this interstellar and interatomic medium certain definite mechanical properties are ascribed, and we deal with it as a body possessed of these properties. In mechanics we have the composition and resolution of forces, and of motions, extending to the composition and resolution of vibrations. We deal with the luminiferous ether in accordance with the rigid laws of mechanics, and from the composition, resolution, and interference of its vibrations, deduce all the phenomena displayed by crystals or polarized light.

Take, as an example, the crystal of tourmaline. Let a vibration cross this crystal oblique to its axis; we have seen by experiment that a portion of the light will pass through. How much we determine in this way: Draw a straight line representing the amplitude of the vibration before it reaches the tourmaline, and from the two ends of this line draw two perpendiculars to the axis of the crystal, the distance between the feet of these two perpendiculars will represent the amplitude of the transmitted vibration.

Follow me now while I endeavour to make clear to you what occurs when a film of gypsum is placed between the Nicol prisms. But at the outset, let us establish still further the analogy between the action of the prisms and that of two plates of tourmaline. The plates are now crossed, and you see that, by turning the film round, I place it in a position where it has no power to abolish the darkness. Why is this? The answer is, that in the gypsum there are two directions at right angles to each other which the waves of light are constrained to follow, and that now one of these directions is parallel to one of the axes of the tourmaline and the other parallel to the other axis. When this is the case the film exercises no sensible action upon the light. But now I turn the film so as to render its direction of vibration oblique to the axis; then you see it has the power demonstrated in the last lecture of partially restoring the light.

Let us now mount our Nicol prisms, and cross them as we crossed the tourmaline. Introducing our film of gypsum between them, you notice that in one particular position the film has no power whatever over the light. But turn the film a little way round, you notice instantly that the light passes. We have now to understand the mechanism by which this is effected.

First, then, we have this prism which receives the light emergent from the electric lamp, and which is called the polarizer. Then we have the plate of gypsum, and then the prism in front, which is called the analyzer. On its emergence from the first prism, the light is polarized; and, in this particular case, its vibrations are executed in a horizontal plane. The two directions of vibration of the gypsum are now oblique to the horizon. Draw a rectangular cross upon paper to represent the two directions of vibration within the gypsum. Draw a line to represent the amplitude of the vibration where it reaches the gypsum. Let fall from the two ends of this line two perpendiculars on each of the arms of the cross; then the distance between the feet of these perpendiculars represents the amplitudes of two rectangular vibrations which are the exact equivalents of the first single vibration. The polar-

* Abstract of a series of lectures delivered in the Cooper Institute, New York, and reported in the *New York Tribune*.

ized ray where it enters the gypsum, is resolved into two ethers, vibrating at right angles to each other.

In one of those directions of vibration the ether is more sluggish than in the other; and, as a consequence, the waves that follow this direction are more retarded than the others. You can readily imagine that in this way the system of waves may get half a wave-length, or indeed any number of half wave-lengths, in advance of the other. The possibility of interference here flashes upon the mind. A little consideration, however, renders it evident that, as long as the vibrations are executed at right angles to each other, they cannot quench each other, no matter what the retardation may be. This brings us at once to the part played by the analyzer. Its sole function is to recompound the two vibrations emergent from the gypsum. It reduces them to a single plane, where, if one of them be retarded by the proper amount, extinction can occur. But here, as in the case of their films, the different lengths of the waves of light come into play. Red will require a greater thickness to produce the retardation necessary for extinction than blue; consequently, when the longer waves have been withdrawn by interference, the shorter ones remain and confer their colours on the film of gypsum. Conversely, when the shorter waves have been withdrawn, the thickness is such that the longer waves remain. An elementary consideration suffices to show that where the direction of vibration of prisms and gypsum incloses an angle of 45 degrees, the colours are at their maximum brilliancy. When the film is turned from this direction, the colours gradually fade, until at the point where the directions of vibration of prisms and plate are parallel, they disappear altogether.

A knowledge of these phenomena is best obtained by means of a model of wood or pasteboard representing the planes of vibration of the polarizer and analyzer, and the plane of vibration of the plate of gypsum between them. On these planes the waves may be drawn, showing the resolution of the first polarized ray into two others, and then the reduction of the two vibrations to a common plane. Following out rigidly the interaction of the two systems of waves, we are taught by such a model that all the phenomena of colours obtained when the planes of vibration of the two Nicols are parallel, are displaced by the complementary phenomena when the Nicols are perpendicular to each other.

In considering the next point, for the sake of simplicity, we will operate with monocromatic light—with red light, for example. Supposing that a certain thickness of the gypsum produces a retardation of half a wave-length, twice this thickness will produce a retardation of two half wave-lengths; three times this thickness a retardation of three half wave-lengths, and so on. Now, where the Nicols are parallel, the retardation of half a wave-length, or of any odd number of half wave-lengths, with it produces extinction; in all thicknesses, on the other hand, which correspond to a retardation of an even number of half wave-lengths, the two beams support each other when they are brought to a common plane by the analyzer. Supposing, then, that we take a plate of dark ones. Here is a wedge-shaped film of crystal that shows these bands; but they are far better shown by this circular film, which is so worked as to be thinnest at the centre, and gradually increases in thickness from the centre outward. These splendid rings of light and darkness are thus produced.

Some of the chromatic effects of an irregular crystallization are beautiful in the extreme. Could I introduce between our Nicols a pane of glass covered by those frost-ferns, which the cold weather renders now so frequent, rich colours would be the result. The cases of irregular crystallization on glass plates, now to be presented to you, illustrate what you might expect from the frosted window-pane. And not only do crystalline bodies act thus upon light, but almost all bodies that possess a definite structure do the same. As a general rule, organic bodies act in this way; for this architecture involves an arrangement of the ether which involves double refraction. A film of horn, or the section of a shell, for example, yields very beautiful colours in polarized light. In a tree, the ether certainly possesses different degrees of elasticity, along and across the fibre; and were wood transparent, this peculiarity of molecular structure would infallibly reveal itself by chromatic phenomena like those that you have seen. But not only do bodies built permanent by nature behave in this way, but it is possible to confer, by strain or by pressure, a temporary double-refracting structure upon non-crystalline bodies, such as common glass.

When I place this bar of wood across my knee and seek to break it, what is the mechanical condition of the bar? It bends, and its convex surface is strained longitudinally; its concave surface, that next my knee, is longitudinally pressed. Both in the strained portion and in the pressed portion the ether is thrown into a condition which would render the wood, were it transparent, double-refracting. Let us repeat the experiment with a bar of glass. Between the crossed Nicols I introduce such a bar. By the dim residue of light lingering upon the screen, you see the image of the glass, but it has no effect upon the light. I simply bend the glass bar with my finger and thumb, keeping its length oblique to the direction of vibration in the Nicols. Instantly light flashes out upon the screen. The two sides of the bar are illuminated, the edges most, for here the strain and pressure are greatest. In passing from strain to pressure, we cross a portion of the glass where neither is exerted. This is the so called neutral axis of the bar of glass, and along it you see a dark band, indicating that the glass along this axis exercises no action upon the light. By employing the force of a press, instead of the force of my finger and thumb, the brilliancy of the light is augmented.

Again, I have here a square of glass which can be inserted into a press of another kind. Introducing the square between the prisms, its neutrality is declared; but I can hardly hold it sufficiently loosely to prevent its action from manifesting itself. Already, though the pressure is infinitesimal, you see spots of light at the points where the press is in contact with the glass. I now turn this screen. Instantly the image of the square of glass flashes out upon the screen. You see luminous spaces separated from each other by dark bands. Every pair of adjacent luminous spaces is in opposite mechanical conditions. On one side of the dark band we have strain, on the other side pressure; while the dark band marks the neutral axis between both. I now tighten the vice, and you see colour; tighten still more, and the colours appear as rich as those presented by crystals. Releasing the vice suddenly the colours vanish; tightening suddenly, they reappear. From the colours of a soap-bubble Newton was able to infer the thickness of the bubble; thus uniting by the bond of thought apparently incongruous things. From the colours here presented to you, the magnitude of the pressure employed might be inferred. Indeed, the late M. Wertheim of Paris invented an instrument for the determination of strains and pressures by the colours of polarized light, which exceeded in accuracy all other instruments of the kind.

You know that bodies are expanded by heat and contracted by cold. If the heat be applied with perfect uniformity, no local strains or pressures come into play; but, if one portion of a solid be heated and others not, the expansion of the heated portion introduces strains and pressures which reveal themselves under the scrutiny of polarized light. I place this square of common window-glass between the Nicols; you see its dim outline, but it exerts no action on the polarized light. I hold it for a moment over the flame of a spirit-lamp; on reintroducing it between the Nicols, light flashes out upon the screen. Here, as in the case of mechanical action, you have spaces of strains divided by neutral axes from spaces of pressure. Let us apply the heat more symmetrically. This small square of glass is perforated at the centre, and into the orifice a bit of copper wire is introduced. Placing the square between the prisms and heating the copper, the heat passes by conduction along the wire to the glass, through which it spreads from the centre outwards. You see a beautiful black cross inclosing four luminous quadrants growing up and becoming gradually black by comparison upon the screen. And, as in the case of pressure, we produced colours, so here also, by the proper application of heat, gorgeous chromatic effects may be produced. And they may be rendered permanent by first heating the glass sufficiently, and then cooling it, so that the chilled mass shall remain in a state of strain and pressure. Two or three examples will illustrate this point. The colours, you observe, are quite as rich as those obtained in the case of crystals.

(*To be continued.*)

THE USE OF GELATIN IN NUTRITION.*

BY CARL VOIT.

The author begins this paper by a discussion of the experiments made by previous observers on the use of gelatin as food. He considers that those of Edwards and Balzac and of Magendie were vitiated by the fact that they allowed the animals on which they experimented to eat their food instead of administering it to them by force. Disgust at the gelatin prevented the dogs from eating it, and they preferred to die of hunger. Voit, however, has noticed some dogs do the same with raw meat, and others with bread. His own experiments were made by feeding dogs on gelatin and flesh, or gelatin alone, on gelatin and fat, on flesh and fat, or flesh, gelatin and fat, and observing how much flesh underwent transformation in the organism as indicated by the nitrogen excreted, and how much was lost or gained by the body. The results showed that gelatin always saves albumin, and does so to a much greater extent than fat or carbohydrates. In a large dog 168 parts of dry gelatin supplied 84 of dry flesh or albumin. An increase in the quantity of gelatin in the food was followed by a greater saving of albumin; but the saving cannot be carried beyond a certain limit, for even when the greatest possible quantity of gelatin is administered and much fat in addition, some albumin from the body or the food still undergoes decomposition. The saving effect of gelatin is greater when fat is given along with it. No permanent deposition of gelatin in the organism takes place; but the whole of it undergoes rapid decomposition. The nitrogen of all the gelatin given could be found in the urine and fæces within twenty-four hours, and only in one large dog were there indications that a small portion of the gelatin remained after this time, but was decomposed on the following day. This is possibly connected with the simultaneous administration of much fat, which may perhaps hinder the rapid decomposition of large quantities of gelatin. It cannot be that gelatin spares albumin by supplying the waste of gelatigenous tissues instead of letting this be done by albumin, because we must then assume that the gelatin is not completely decomposed; and if this be the case, the amount of nitrogen excreted would show that there is no saving of albumin, and no advantage would be gained. Gelatigenous tissues cannot be formed from gelatin, but, as their development shows, only from albuminous bodies. The author then gives a full account of his opinions regarding albumin in the organism. When a dog is allowed to fast for several days, the amount of albumin daily destroyed in the body will be *e.g.*, 0·8 per cent. of that contained in it. When well fed with albumin, the same dog will daily decompose 9 per cent. of albumin. This clearly shows that the relations of the albumin in the body to decomposing agencies are very different. Voit therefore divides it into (1) *circulating albumin*, or albumin in the circulating plasma or lymph; (2) *organ-albumin*. The first sort undergoes rapid decomposition. It might have been called *plasma-albumin*, but the name of circulating albumin was chosen in order to indicate that it is during circulation through the tissues that this albumin comes under the conditions of decomposition. The albumin of blood-plasma is plasma-albumin; but only a small part of it is decomposed, because the greater part of it is in a state of firmer combination as organ-albumin of the blood. Organ-albumin is not decomposed as such, for it is not subjected to the conditions of decomposition until it has undergone conversion into circulating albumin. When the equilibrium between the organ-albumin and circulating albumin is suddenly disturbed, so that the proportion of the former is increased *e.g.*, by venesection, the excess of organ-albumin is not retained by the organism, but is converted into circulating albumin and decomposed. The author does not agree with Fick in his supposition that it is not albumin but peptones that are rapidly decomposed in the organism. Fick compares the rapid decomposition in the body which occurs after albuminous food has been taken to the blaze which occurs when a rapidly combustible body like gunpowder (to which he compares peptones) is mixed with a slowly combustible one like charcoal (which would represent albumin). Voit would rather compare it to a blaze on the addition of fine chips of wood to a burning log of the same kind. He considers the notion to be an unfortunate one that absorption in the intestine takes place by osmosis, and that albuminous bodies must, therefore, be converted into peptones before they can be absorbed. He is unable to see why it should be supposed that albuminous substances cannot pass through the intestinal walls when they readily do so through every possible membrane and organ. The albumin in the food is chiefly decomposed in the plasma current, but part of it serves to replace organ-albumin which has been destroyed, or as a deposit. According to the doctrine of luxus-consumption also, a small quantity only of albumin is decomposed in the organs, but the replacement of this only is necessary, and any additional supply is luxus, and undergoes combustion in the blood as a surplus. According to Voit, very little albumin is decomposed during fasting, but every supply of albumin in the food increases the stream of plasma to the organs, and so much albumin is thereby subjected to the conditions of decomposition. The rich supply is not luxury (luxus), but a necessity if the body is to retain a definite amount of albumin.

The simplest explanation of the fact that gelatin, like fat and carbo-hydrates, cannot entirely arrest the transformation of albumin in the body is, that it cannot replace the decomposed organ-albumin or construct new organs or tissues, not even gelatigenous tissues. In this respect it behaves exactly like peptones. It lessens the conversion of organ-albumin into circulating albumin; when given alone it diminishes the loss of albumin from the organism; and when given along with albumin in food, it lessens the proportion of albumin which undergoes decomposition, so that a much smaller quantity suffices to supply the needs of the body.

Gelatin differs from other nutriments inasmuch as it cannot replace any of them; fat and carbohydrates can completely prevent the loss of fat from the body, and each inorganic constituent the loss of a similar one, but gelatin does not totally prevent the loss of albumin, but only of a part of it. Gelatin does not lessen the loss of fat from the body to the same extent as carbohydrates, the amount of carbonic acid excreted remaining nearly the same.

When gelatin is given along with meat, it not only lessens the consumption of albumin, but also diminishes that of fat, though only to a small extent; it does not economise fat by taking up the oxygen which would otherwise oxidize it, since 200 parts of gelatin do not economise 74 parts of fat which on this supposition it ought to do, since these proportions of gelatin and fat require the same amount of oxygen for their complete oxidation.

Voit criticizes Liebig's division of food into plastic and respiratory, which he considers to be quite erroneous.

* Zeitschrift für Biologie, viii. 297—388, and from the *Journal of the Chemical Society.*

There is no more reason to regard albumin as plastic than water, fat and salts, for these are quite as indispensable as albumin to the constitution of a cell. Moreover, the greater part of the albumin taken into the body undergoes decomposition without even having formed part of any organ. Fat and carbohydrates, too, are not specially destined to produce heat, and they undergo decomposition quite independently of the thermal necessities of the body. It is quite a mistake to suppose that the oxygen taken in during respiration is the cause of the decomposition of the tissues, for it is in reality a consequence. The tissues split up into simple compounds quite independently of oxygen, and it is these compounds which take up the oxygen. A proper division of food can only be based on a consideration of the constituents of the body, and of what is necessary to replace the waste of these.

The constituents are water, inorganic materials, fats and albumin and its derivatives. Of water there is generally no lack, and inorganic constituents are generally found in abundance in any diet which contains a sufficient quantity of albuminous and non-nitrogenous materials, and therefore they do not require any special consideration. Fat can be supplied by giving it directly in the food. Animals in general, and especially herbivora, cannot take a sufficient quantity in this way, and it is therefore necessary to give carbohydrates in addition, which probably do not themselves form fat, but economize it. It can also be supplied by a diet of flesh, which by decomposition in the organism yields fat.

To replace the waste of albumin, a certain quantity of it must under any circumstances be contained in the food; at least as much as will replace the waste of organ-albumin. Generally much more than this is necessary, in order to keep up the stock of circulating albumin. A large quantity of albumin is required for this purpose when it is given alone, but much less suffices when fats and carbohydrates are given along with it, although they can never become transformed into albumin. This most important use of these articles of food was not sufficiently noticed under the old classification into plastic and respiratory. It is impossible to give gelatin a place in this classification at all, for it cannot assist in the formation of tissues, and is therefore not plastic, nor has it any greater value as respiratory food than albumin, and consequently cannot be ranked as such. Under Voit's new classification, it falls into its place at once. It economizes circulating albumin, like fats and carbohydrates, but much more powerfully, in this respect resembling peptones, which are not again converted into albumin. Besides this, it economizes fat to a slight extent.

THE ACTION OF HEAT ON SOLUTIONS OF HYDRATED SALTS.*

BY C. R. C. TICHBORNE, F.C.S., M.R.I.A.

While investigating the dissociative action of heat upon water of hydration, the author's attention was naturally turned to salts,—such as those of cobalt, copper, and nickel,—which present a change of colour when passing from the dry to the hydrated state. It is a general characteristic of neutral solutions of the chlorides of such bodies that they do not change colour on boiling at ordinary atmospheric pressure, neither does dilution affect their tint except by attenuating it; but Mr. Tichborne has never failed in their obtaining dehydration in solution by using extraordinary pressure. The laws of such chromatic change were found to differ from those produced by a basic condition of the salt.

For instance, the dehydration of the salts of cobalt is evinced by change of colour from light rose to dark pure blue. But no amount of boiling at ordinary pressure will convert a pink solution of cobalt into a blue one, unless the solution be extremely concentrated. Prout stated many years ago, that by concentrating a strongly acid solution of a cobalt salt by evaporation, he got a permanently blue solution, a result which he attributed to the abstraction of the water of hydration by the acid. He also reported that he had obtained from such a solution blue crystals, supposed to be the anhydrous salt. This experiment of Prout showed that the introduction into a neutral solution of any substance capable of exerting an affinity for the water of hydration—such as sulphuric and other acids, chloride of calcium, and other hygroscopic salts, or even sugar—has the effect of lowering the thermanalytic point of the salt. The quantity, however, of these dehydrants required to affect the cobalt solution being considerable, pure absolute alcohol was used to lower the thermanalytic point.

A solution of chloride of cobalt,† which has dried at 100° C. in pure absolute alcohol, is of a magnificent pure blue colour, free from any tinge of purple. If such a solution be placed in a deep beaker, and water poured cautiously down the side of the vessel, two layers are formed, the upper of which is blue, and contains the anhydrous salt; the lower pink, containing the salt hydrated by the direct action of the water. These layers will retain their positions a considerable time, by virtue of their different specific gravities.

Alcoholic solution which has been thus hydrated is peculiarly sensitive to heat, passing, as the temperature rises, through all the shades of pink and purple to a pure blue, giving the same absorption spectrum as that obtained from the anhydrous salt. The thermanalytic point is so lowered by the alcohol present that the water of hydration of the cobalt salt is gradually but perfectly dissociated. If the vessel containing it be now submerged halfway into a freezing mixture, the two differently coloured layers are again formed, the upper one, as before, being blue, and containing the anhydrous salt in the presence of the dissociated water of hydration.

Such is the result when, through the addition of another body, the thermanalytic point is brought below 100° C. at ordinary pressure. Similar effects are obtained when a weak solution of cobalt is boiled in a sealed glass tube one-third full of the liquid, the colour passing gradually through all shades of purple to a pure blue. Thus, by extraordinary pressure, the temperature necessary for the separation of the water may be obtained in an aqueous solution.

Aqueous solution of chloride of copper, heated in a sealed tube, from a beautiful blue, the colour of the hydrate, becomes gradually green, yellow, and ultimately a dark brown nearly opaque liquid. As it cools and gradually re-associates the water of hydration, it passes again through all these shades, becoming slightly opalescent through the formation of a bluish white basic precipitate. The addition of a little acid to this solution prevents this precipitation, makes the solution even more sensitive to heat, and allows the experiment to be made *ad infinitum*. Solution of sulphate of copper gives similar results as to dehydration, but a basic precipitate is determined even in an acidulated solution.

Caution should be used in these experiments, as explosions frequently occur. The plan recommended by the author is to take a strong white glass tube, draw it out until it has a diameter of $\frac{1}{50}$ or $\frac{1}{25}$ of an inch, and enclose this, when sealed, inside another much larger one before heating it.

The author points out that the effect of dilution on colour changes attending dehydration is, as might be expected, the reverse of that upon colour changes attending the basic condition due to the basic action of the water. In the first case, the increase of the relative volume of water retards the dissociation of water of hydration; in the second, the increase in the volume of water will assist the dissociation.

* Abstract of a paper read before the Royal Irish Academy.

† According to Marignac, the composition of the hydrated salt is $CoCl_2, 6H_2O$.

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Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

DR. MACDONNELL ON DISINFECTANTS.

ON Saturday the 5th inst., Dr. ROBERT MACDONNELL, F.R.S., delivered before the Dublin Royal Society an able and instructive lecture on "Antiseptics and Disinfectants." There was a large attendance—many of the audience being public officers of health, *in esse* or *in posse*, anxious to be informed as to the most effective means of preventing such terrible epidemics as that of the small-pox, which ravaged the city in 1870-71. Dr. MACDONNELL passed in review the various causes of epidemic disease, dividing them into a perceptible and a non-perceptible class—the former being those which could be detected by any of the organs of special sense, the latter including such as were discoverable only by analysis. The next stage in his lecture was a rapid survey of the great controversy which has for some years been waged between M. PASTEUR of Paris and the late Dr. F. A. POUCHET of Rouen. M. PASTEUR, as our readers are aware, is a staunch adherent of HARVEY'S doctrine, *omne vivum ex ovo;* while Dr. POUCHET is equally strenuous in maintaining the thesis of "spontaneous generation." This controversy, so important to the investigation of the genesis of epidemic disease, whether its source be animal or vegetable, found an impartial critic in Dr. MACDONNELL, who, though deprecating a premature summing-up, inclined on the whole to the view of PASTEUR. Professor TYNDALL'S mode of testing the existence of germs in a given atmospheric area was next exemplified and estimated—more favourably than we should be inclined to do; and the lecturer concluded by a high tribute of praise to Mr. JOSEPH LISTER, Professor of Surgery in the University of Edinburgh, not only for the antiseptic ligature which had superseded the traditional modes of arresting hæmorrage, and such new devices as acupressure, but also for the application of the antiseptic treatment to tumours and exposed surfaces in the human subject generally. The discourse was in all respects worthy of the Dublin school; and taken in connexion with the lectures of STOKES, the Regius Professor of Medicine, and Dr. E. D. MAPOTHER, Professor of Physiology and Public Hygiène, it affords ample proof of the vigour and intelligence with which the u bject of sanitary reform is being prosecuted in the Irish metropolis. We hope Dr. MACDONNELL will be prevailed upon to make his lecture *publici juris.*

ANNUAL DINNER.

WE are gratified to learn that there is already a very cordial response to the suggestion put forward last week in reference to the Annual Dinner at the Crystal Palace. We understand that a number of gentlemen have already expressed their willingness to act as stewards, and we hope next week to be able to publish a complete list, together with other particulars. Meanwhile we would state that gentlemen who are desirous of having their names placed on this list should apply at once to Mr. CARTEIGHE, 172, New Bond Street, or to Mr. RICHARD BREMRIDGE, 17 Bloomsbury Square, who are acting as joint honorary secretaries.

NEW DICTIONARY OF MEDICO-SCIENTIFIC TERMS.

OUR readers will be happy to learn that a desideratum long felt by every student of the medical sciences,—that of a dictionary in which the terminology of these sciences is explained and illustrated,—will shortly be supplied. The New Sydenham Society has purchased the copyright of the well-known but extremely inaccurate and imperfect work of MAYNE, and is about to re-issue it, under competent editorship, in a new if not in an absolutely re-written form. The plan adopted will be, first, to give the etymology of the words met with in the literature of medicine and the cognate sciences; next, to supply an intelligible and complete definition of the same, with an illustrative extract or extracts from the authors who employ them in a special or restricted sense; third, to give the French and German equivalents of the English; and, lastly, to mark the quantity of the words, as a guide to the pronunciation. We hope that the work will be worthy of English medicine, and that the student will be able to find at home and in the vernacular what he has hitherto either done without or made shift to glean from such dictionaries as those of LITTRÉ and ROBIN, or the later editions of the 'Conversazions-Lexicon.' The Society, very properly as we think, invites the co-operation of the medical or scientific *savant* in suggesting, criticizing, or otherwise contributing to the speedy and effective completion of its onerous undertaking.

THE CHALLENGER EXPEDITION.

One of the lions of the cruise is a new species of lobster, perfectly transparent. Besides obtaining animals with eyes so fully developed that the body may be said to be an appendage to the eyes rather than the eyes to the body, the "Challenger" has dredged up a new crustacean in which the body has cut itself clear of the eyes altogether; the animal being totally blind, and not even having the trace of an eye. To make up this deficiency it is supplied with the most delicate beautifully developed claws it is possible to conceive. Near the West Indies, in a depth of only half a mile, some similar creatures were brought up, having claws longer than the body armed throughout with a multitude of spike-like teeth. At a short distance from Teneriffe, in a depth of a mile and a half, a rich and extremely interesting haul of sponges and coral was obtained, but the latter was unfortunately dead. It is a white species, as large and heavy as the pink coral of the Mediterranean.

A NEW POTATO DISEASE.

PROFESSOR HALLIER, in the *Zeitschrift für Parasitenkunde* for 1873 (vol. iv. heft 1), describes a new potato disease as having made its appearance at Apolda, near Jena, in the course of last autumn, the preceding summer having been remarkably dry in that locality. The disease differs from the one which has been so fatal during recent years, in attacking at once the tuber and not the leaves. The tuber in the diseased plants is found to be covered beneath the skin by a purple felt, composed of the mycelium of a fungus, which, on close microscopical examination, is found to perforate the skin, on the surface of which are a number of black spots having the appearance of the perithecia of a pyrenomycetous fungus. Soon after these spots make their appearance the potato becomes completely destroyed by a cancerous disease, the disease being always accompanied by the production of the fungus, which probably belongs to the genus Sclerotium. Professor HALLIER thinks that the same remedies or preventatives may be applied as in the case of the more prevalent disease, the selection of early varieties and of suitable soils, and the use of mineral to the exclusion of animal or vegetable manures. The geological formation at Apolda is the keuper.

JUST as we are going to press, to our great regret we hear of the death of another of the Founders of the Pharmaceutical Society, Mr. JOHN GARLE, who has so long been associated with its Board of Examiners.

WE are requested to state that the name of Mr. HENRY WHITFIELD, of Worcester, should not have been included in the list of names of gentlemen who, having been nominated for election to the Council of the Pharmaceutical Society in May next, have expressed their willingness to serve if elected. Mr. WHITFIELD has declined to accept office, if elected.

WE are informed that the old and well-known establishment of BUTLER, McCULLOCH, and Co., Covent Garden Market, has lately changed hands, and is now conducted (in partnership) by Messrs. FREDERICK McCULLOCH, A. MACDONALD, and SYDNEY G. HART.

Transactions of the Pharmaceutical Society.

BENEVOLENT FUND.

SUBSCRIPTIONS RECEIVED DURING MARCH, 1873.

LONDON.

	£	s	d.
Allchin, Alfred, England House, Primrose Hill Road	0	10	6
Allgood, Edmund John, Belle Vue Terrace, Seven Sisters Road, Holloway ...	0	5	0
Anderson, Charles, 23, Lower Belgrave Street, S.W.... ...	1	1	0
Attwood, Alfred, 147, Cannon Street, E.C. ...	1	1	0
Bacon, J. T., Esq., per Mr. Mould, 21, Moorgate Street ...	1	1	0
Baker, Alfred Philip, 33, Norfolk Terrace, W. ...	0	10	6
Barnes, James Benjamin, 1, Trevor Terrace, Knightsbridge	1	1	0
Barron, Frederick, Bush Lane ...	2	2	0
Bartlett, William, Bretten Terrace, Chelsea, S.W. ...	0	10	6
Bate, Henry, 44, Thorne Road, Clapham Road ...	0	10	6
Bell, William Henderson, 96, Albany Street, N.W. ...	0	10	6
Bentley, Robert, 91, Alexandra Road, South Hampstead, N.W.	1	1	0
Binge, Thomas, 23, Stockbridge Terrace, Pimlico, S.W. ...	0	10	6
Bird, Augustus, Wood Lane, Shepherd's Bush ...	2	2	0
Bolton, Thomas, 98, Queen's Road, Dalston, E. ...	0	5	0
Bourdas, Isaiah, 7, Pont Street, S.W. ...	1	1	0
Bourdas, Isaiah, jun., 48, Belgrave Road, S.W. ...	1	1	0
Bourdas, John, 7, Pont Street, S.W. ...	1	1	0
Bradley, John, 5, Brondesbury Terrace, Kilburn... ...	1	1	0
Bromley, Richard Martin, 3, Beckenham Place, Denmark Hill ...	0	10	6
Brooks, Charles, 355, Wandsworth Road, S.W. ...	0	10	6
Brown, Alfred James, 2, Trafalgar Terrace, Greenwich ...	0	10	6
Buck, Thomas, 552, Kingsland Road, E. ...	0	10	6
Burden, Thomas, 6, Store Street, Bedford Square ...	0	10	6
Burgoyne, Burbidges, and Co., Coleman Street, E.C. ...	2	2	0
Byles, James Hodge, 311, Hackney Road, E. ...	0	10	6
Chard, Frederick James, 39, Warwick Street, Pimlico, S.W.	0	10	6
Charity, William, 7, Fen Court, Fenchurch Street, E.C. ...	0	10	6
Cheetham, William Henry, 22, Commerce Place, North Brixton... ...	0	10	6
Cocksedge, Henry Barry, 20, Bucklersbury, E.C.... ...	0	10	6
Coles, John William, 197, Camberwell New Road ...	0	10	6
Constance, Edward, 37, Leadenhall Street, E.C. ...	0	10	6
Cooper, Albert, 87, Abingdon Road, Kensington	1	1	0
Cooper, William Whirledge, 20, Amherst Road West, Stoke Newington ...	0	10	6
Crosby, James, New Wandsworth ...	0	10	6
Curtis, Frederick, 48, Baker Street, W. ...	2	2	0
Darby and Gosden, Leadenhall Street, E.C. ...	2	2	0
Deane, Henry, 17, Pavement, Clapham, S.W. ...	1	1	0
Deane, James, 17, Pavement, Clapham, S.W. ...	0	10	6
Dyson, William Bedford, 4, Gloucester Road, South Kensington ...	0	10	6
Edwards, William Staples, 4, Etham Place, Old Kent Road, S.E. ...	0	5	0
Ellis, George Henry, 4, Finsbury Pavement, E.C. ...	0	10	6
Elvey, Thomas, 8, Halkin Street, S.W. ...	1	1	0
Epps, James, 48, Threadneedle Street, E.C. ...	1	1	0
Evans, Henry Sugden, 60, Bartholomew Close, E.C. ...	1	1	0
Eve, Charles, Plough Court, E.C. ...	1	1	0
Fincham, Robert, 57, Baker Street, W. ...	1	1	0
Fitch, Robert Owen, 200, Well Street, Hackney	0	10	6
Foott, Richard Rogers, 8, Stockbridge Terrace, Pimlico, S.W.	0	10	6
Fowler, Stanley, 36, Elgin Crescent, Notting Hill, W. ...	1	1	0
Fox, William, 109, Bethnal Green Road, E.... ...	1	1	0
Francis, George Baggett, 5, Coleman Street, E.C. ...	1	1	0
Fripp, Percival Kossuth, 133, Fenchurch Street, E.C. ...	1	1	0
Gadd, Charles, 1, Harleyford Road, Vauxhall ...	0	10	6
Gadd, Robert, 1, Harleyford Road, Vauxhall ...	0	10	6
Gale, Henry, 3, Milbrook Place, Camden Town ...	0	10	6
Gedge, William Stedman, 90, St. John Street, E.C. ...	0	10	6
Granger, Edwin John, High Road, Upper Clapton ...	1	1	0
Gulliver, William, 33, Lower Belgrave Street, S.W. ...	0	10	6
Hanbury, Cornelius, Plough Court, E.C.... ...	1	1	0
Henty, Henry Martin, 19, High Street, St. John's Wood ...	0	5	0
Hill, Arthur Bowdler, 11, Little Britain, E.C. ...	1	1	0
Hill, Arthur Stephen, 11, Little Britain, E.C. ...	1	1	0
Hodgkinson, Stead, and Treacher, 127, Aldersgate Street, E.C.	2	2	0
Hodgkinson, Charles, 127, Aldersgate Street, E.C. ...	0	10	6
Hooper, Bartlett, 43, King William Street, E.C. ...	1	1	0
Hooper, Leonard, 43, King William Street, E.C. ...	0	10	6
Hopkin, William King, 16, Cross Street, Hatton Garden, E.C.	1	1	0
Howard, George, Royal Hill, Greenwich ...	0	5	0
Howden, Robert, 78, Gracechurch Street, E.C. ...	1	1	0
Hugill, John, 147, Cannon Street, E.C. ...	1	1	0
Hunt, Charles, 29, Chapel Street, S.W. ...	0	10	6
Hunter, John, 45, Kensington High Street ...	0	5	0
Ive, William, 2, Stanhope Terrace, South Kensington	1	1	0
Jacks, Ebenezer, 161, Gower Street... ...	0	10	6
Johnson, Robert Dodds, 56, Camberwell New Road ...	0	10	6
Jones, William John, 3, Newland Terrace, Kensington ...	0	10	6
Jones, William, 8, Richmond Terrace, Shepherd's Bush ...	0	5	0
Jull, Thomas, ...	0	10	6
Kendall, Charles Fisher, 126, Clapham Road, S.W. ...	0	10	6
Kent, Thomas, 226, Blackfriars Road, S.E. ...	0	10	6
Kent, Thomas, Ramsey, 103, Westminster Bridge Road ...	0	10	6

	£	s.	d.
Knott, Samuel, 15, Norton Folgate, E.	0	5	0
Lawrence, Frederick, 383, Kentish Town Road, N.W.	0	10	6
Lescher, Joseph Sidney, 60, Bartholomew Close, E.C.	1	1	0
Lockyer, George, 208, High Street, Deptford	0	10	6
Long, Henry, 48, High Street, Notting Hill	1	1	0
Maitland, John, 10, Chester Place, Hyde Park, W.	1	1	0
Malden, William Walter, 195, Brompton Road, S.W.	1	1	0
Masson, George, 43, King William Street, E.C.	0	10	6
Maw, Charles, 11, Aldersgate Street, E.C.	1	1	0
Maw, Son, and Thompson, 11, Aldersgate Street, E.C.	2	2	0
May, John, Garden Wharf, Battersea, S.W.	0	10	6
Merrell, James, Camden Road Villas, Camden Town	1	1	0
Mould, Samuel, 21, Moorgate Street, E.C.	0	10	6
Nind, George, New Wandsworth	0	10	6
Northway, John, 27, Great Tower Street E.C.	1	1	0
Orpe, Thomas Mansell, 329, Old Kent Road, S.E.	0	10	6
Pidduck, John William, 11, Bridge Terrace, Harrow Road, W.	0	10	6
Pratt, Edmund, 8 Upper Berkeley Street West, W.	1	1	0
Preston and Sons, 88, Leadenhall Street, E.C.	2	2	0
Price, John Moore, 3, Loughborough Place, Brixton Road, S.W.	0	10	6
Richardson, George, 12, Norland Place, Notting Hill, W.	0	10	6
Ringrose, George, 123, St. George Street, E.	0	10	6
Rouse, Frederick Joseph, 114, High Street, Clapham, S.W.	0	10	6
Rowe, Robert, 40, Alfred Place West, South Kensington	0	10	6
Sadler, William, 15, Norton Folgate, E.	0	10	6
Schacht, William, 6, Finsbury Place South	0	10	6
Sellick, Edward, Apothecaries' Hall, E.C.	0	10	6
Sheppard, Alfred, 51, Hollywood Road, West Brompton, S.W.	0	10	6
Simpson, Henry, 5, Hanover Place, Regent's Park, N.W.	0	10	6
Smith, William, 2, Alfred Terrace, Broadway, South Hackney	0	10	6
Sparrow, William Cunningham Fairlie, 5, Pimlico Road, S.W.	1	1	0
Street, George, 265, Whitechapel Road, E.	0	10	6
Stickland, William H., 40, Alfred Place West, South Kensington	0	10	6
Taplin, William Gilbert, 75, Hampstead Road, N.W.	1	1	0
Thompson, Henry A., 22, Worship Street, E.C.	1	1	0
Thompson, Henry A., 11, Little Britain	0	10	6
Thompson, John, 11, Aldersgate Street, E.C.	1	1	0
Tibbs, Frederick, 81, Chalk Farm Road, N.W.	0	10	6
Tippett, Benjamin Matthew, 3, Sloane Street, S.W.	0	10	6
Trotman, Alfred Court, 16, Cambridge Street, Hyde Park	0	10	6
Tuck, William Henry, 630, Mile End Road, E.	0	10	6
Tugwell, William Henry, Lewisham Road, Greenwich	0	10	6
Umney, Charles, 40, Aldersgate Street, E.C.	0	10	6
Vizer, Edwin Bennett, 63, Lupus Street, S.W.	1	1	0
Warner and Co., Charterhouse Square	1	1	0
Wastie, Francis, 183, Lower Kennington Lane, S.E.	0	10	6
Watson, W., 7, Waterloo Place, Limehouse, E.	0	5	0
Webb, Edward Alfred, 60, Bartholomew Close, E.C.	1	1	0
Westrup, Joseph Boak, 76, Kennington Park Road, S.E.	0	10	6
Whittle, Elias C. C., Townshend Road, St. John's Wood, N.W.	0	5	0
Williams, John, 16, Cross Street, Hatton Garden, E.C.	1	1	0
Williams, Joseph John, 13, Desborough Place, Harrow Road, W.	0	10	6
Williams, William James, 137, Cannon Street, E.C.	0	10	6
Wood, Edward, 20, Sussex Terrace, Pimlico, S.W.	0	10	6
Woolldridge, John, 310, Euston Road, N.W.	0	10	6
Wootton, William, 33, Liverpool Road, N.	0	10	6
Young, George, 12, Ebenezer Terrace, Millwall, E.	0	5	0

Country.

	£	s.	d.
Abingdon, Ballard, Walter	0	5	0
,, Preston, Alfred Prince	0	10	6
,, Smith, William Finch	0	5	0
Accrington, Cooper, Mark	0	10	6
Addingham, Spencer, Thomas	0	2	6
Alford, Shaw, Charles J.	0	10	6
Arbroath, Burn, David H.	0	5	0
Ashford, Stedman, William	0	10	0
Baldock, Kirkman, Charles John	0	5	0
Balham, Smith, Percy J.	0	10	6
Barnstaple, Goss, Samuel	0	7	6
Barrow-in-Furness, Sansom, Edwin	0	5	0
Basingstoke, Meatyard and Sapp	1	1	0
,, Woodman, George	0	5	0
Bath, Capper, Edmund	0	5	0
Belper, Calvert, James	0	10	0
,, Burkinshaw, William Thomas	0	10	6
Binbrook, Maughan, Samuel	0	10	6
Bingley, Skirrow, William Edward	0	5	0
Birmingham, Perry, William Henry	0	5	0
Bodmin, Williams, Joel Drew	1	1	0
Bognor, Long, Alfred Thorby	0	10	6
Bournemouth, Duncan, Alexander	1	1	0
,, Mason, John	0	5	0
Bradford, Harrison and Parkinson	2	2	0
,, Hick, George	0	10	6
,, Hick, Joseph	0	10	6
,, Rogerson and Son	2	2	0
Brampton, Younger, Thomas	0	10	6
Bridgnorth, Steward, William	0	10	6
Brighton, Barton, Charles	0	10	6
,, Barton, Henry	0	10	6
Brighton, Brew, Thomas A.	0	10	6
,, Cornish, William	0	5	0
,, Glaisyer, Thomas	0	10	6
,, Gwatkin, James T.	0	10	6
,, Haffender, Thomas	0	10	6
,, Kemp, John	0	10	6
,, Long, Henry	0	10	6
Bristol, Berry, William	0	5	0
Broseley, Stevens, John	0	10	6
Brynmawr, Evans, Alfred E.	0	5	0
Buckingham, Sirett, George	0	10	6
,, Sirett, George B.	0	10	6
Caistor, Levick, George Alfred	0	3	0
Cambridge, Deck, Arthur	0	10	6
Carlisle, Parker, Edward	0	5	0
Cheltenham, Fletcher and Palmer	1	1	0
Chester-le-Street, Greenwell, Richard Henry	0	10	6
,, Longbotham, Joseph	0	5	0
Chichester, Long, William E.	0	10	6
,, Pratt, John	0	10	6
Chipping Ongar, Chapman, Richard James	0	10	6
Chulmleigh, Joint, Robert James	0	6	0
Colchester, Bates, Thomas William	0	5	0
,, Cole, Frederic Abraham	0	5	0
,, Manthorp, Samuel	0	5	0
,, Prosser, Evan Thomas	0	5	0
,, Shenstone, James Byron Burt	0	5	0
Coventry, Wyleys and Co.	1	1	0
Crewe, Bayley, William	0	10	0
Cullen, Seivwright, George	0	10	6
Danesmoor, Hole, Cornelius	0	10	0
Doncaster, Hough, William, sen.	0	10	6
Dorking, Clark, William Williams	0	10	0
Dover, Bottle, Alexander	1	1	0
,, Forster, Robert	0	10	6
,, Forster, Robert Henry	0	5	0
,, Hambrook, John Barber	0	5	0
Ealing, Hayles Brothers	1	1	0
,, Barry, Thomas Stephen	0	10	6
Eastbourne, Hall, Samuel	0	10	6
Eton, Bingham, William Hill	0	10	6
,, Lewis and Son	1	1	0
Falkirk, Murdoch, David	0	10	6
Folkestone, Cadman, Daniel Charles	0	10	6
,, Stainer, John	1	1	0
Gannie by Banff, Stephen, James	0	5	0
Gateshead, Elliott, Robert	0	10	6
,, Garbutt, Cornelius Durham	0	10	6
,, Dickenson, Joshua Steel	0	5	0
Glasgow, Pinkerton, John Stark	0	10	6
Gomersal, Parkin, William	0	2	6
Gosport, Hunter, John	0	5	0
,, French, Benjamin	0	10	6
Grantham, Hall, Thomas	0	10	6
,, Newcome, John	1	1	0
Gravesend, Dismorr, Henry	0	10	6
Grays, Soole, John Henry	0	10	6
Great Berkhampstead, Rippon, Richard Oliver	1	1	0
Hambleon, Gunn, John	0	2	6
Ham Street, Buss, Thomas Sargant	0	5	0
Harleston, Woods, Charles	0	5	0
Harrogate, Taylor, Joseph Harneis	0	10	6
Harwich, Bevan, Charles F.	0	10	6
Hedon, Soutter, J. S.	0	10	6
Hereford, Chave, William Francis	0	10	6
Heywood, Beckett, William	0	10	6
Hull, Allison, E. and H.	1	1	0
,, Anholm, A.	0	10	6
,, Balk, William	0	10	6
,, Bell, Charles B.	0	10	6
,, Briggs, G. J.	0	5	0
,, Desforges, J. H.	0	5	0
,, Dixon, Joseph	0	5	0
,, Dyson, George	0	5	0
,, Earle, Francis	1	1	0
,, Fisher, J. R.	0	5	0
,, Gibson, Charles P.	0	10	6
,, Grindall, William	0	5	0
,, Hall, H. R. F.	0	5	0
,, Hart, George W.	0	10	6
,, Kirton, J. B.	0	10	6
,, Milner, J. G.	0	5	0
,, Myers, George	0	10	6
,, Smith, A.	0	10	6
,, Shepherdson, Welburn	0	10	6
,, Stanning, William	0	5	0
Huddersfield, Higgins, Tom Sellers	0	10	6
Hyde, Brunt, Thomas H.	0	10	6
Ilkeston, Potts, Richard Smith	0	5	0
Kibworth, Potter, Fanny Elizabeth	0	5	0
Kidderminster, Bond, Charles	0	10	6
,, Steward, Josiah	0	10	6
,, Steward, Theophilus	0	10	6
King's Lynn, Atmore, George	0	5	0
,, Bailey, William	0	2	6
Leamington, Newby, Charles Adey	1	1	0
Leeds, Bilbrough, J. B.	0	10	6

	£	s.	d.
Leeds, Brooke, Thomas	0	10	6
,, Goodall, Backhouse and Co.	1	1	0
,, Harvey, Thomas	1	1	0
,, Hirst, J. A.	0	10	6
,, Jefferson, Peter	0	5	0
,, Reynolds, Freshfield	0	10	6
,, Reynolds, Richard	1	1	0
,, Sagar, Henry	0	5	0
,, Smeeton, William	0	10	6
,, Taylor and Fletcher	1	1	0
,, Yewdall, Edwin	0	10	6
Leith, Wilson, James	1	0	0
Lewisham, Clift and Crow	1	1	0
Lincoln, Clarke, Francis Jonathan	1	1	0
Liskeard, Eliott, Samuel	0	5	0
Llandilo, Hughes, Thomas	0	10	6
Llangollen, Jones, Humphrey	0	5	0
Louth, Simpson, Henry D.	0	10	6
Malvern, Metcalfe, Edmund Henry	0	10	6
Manchester, Benger, F. B.	0	5	0
,, Brown, William Scott	1	1	0
,, Casey, Edward	0	2	6
,, Carter, William	0	10	6
,, Maunder, Robert	0	10	6
,, Mitchell, John	0	10	6
,, Paine, Standen	0	5	0
,, Walsh, Edward	0	10	6
,, Whittaker, Ellis	0	10	6
,, Wilkinson, George	0	10	6
,, Wilkinson, William	1	1	0
,, Wright and Barnaby	1	1	0
Middlesborough, Smith, Christopher S.	0	5	0
Newcastle-under-Lyme, Cartwright, William	0	10	6
New Barnet, Young, Robert T.	0	10	6
Newcastle-on-Tyne, Mann, Robert	0	10	6
,, Potts, Thomas	0	10	6
,, Proctor, Barnard Simpson	1	1	0
Northampton, Barry, James	1	1	0
,, Mayger, William David	0	10	6
,, Merrick, Thomas J.	0	10	0
,, Shipman, Jno. Joshua	0	10	6
Norwood, Upper, Izod, James	1	1	0
Nottingham, Dennis, Jno. Lee	0	10	0
Oakham, Wellington, James Martin	0	10	6
Oldham, Bagshaw, William	0	10	6
,, Hargraves, Henry L.	0	10	6
,, Henthorn, Joshua	0	10	6
Oswestry, Vaughan, David	0	10	6
Oxford, Hitchcock and Sons	1	1	0
,, Houghton, T., and Son	0	10	6
,, Prior, George Thomas	0	10	6
Portsea, Spear, George	0	5	0
Preston, Houghton, William	0	10	6
Putney, Farmer, John	0	5	0
Ramsgate, Fisher, Charles, and Sons	2	2	0
Reading, Arrowsmith, George W. T.	0	5	0
,, Bradley, Charles	0	5	0
,, Hayward, William G.	0	5	0
,, Ridley, Charles H.	0	5	0
,, Timothy, Thomas Norris	0	5	0
Richmond (Surrey), Clarke, Thomas M.	0	10	6
,, ,, Hopwood and Sons	1	1	0
Rochdale, Jones, John	0	10	6
Runcorn, Whittaker, William	0	10	6
Ryde, Dixon, Henry	0	10	6
,, Gibbs, William	0	10	6
,, Pollard, Henry Hindes	0	10	6
,, Taylor, Richard	0	10	6
,, Wavell, John	0	10	6
St. Leonard's, Thomas, Horace	1	1	0
Salford, Manfield, J. W.	0	5	0
Salisbury, Atkins, Samuel R.	0	10	6
Selby, Burton, John	0	2	6
,, Colton, Thomas	0	2	6
,, Cutting, Thomas J.	0	2	6
,, Glew, William	0	2	6
Shildon, Veitch, T. D.	0	10	6
Shrewsbury, Blunt, Thomas, and Son	1	1	0
,, Cross, William Gowen	0	10	6
,, Cross, William Gowen, jun.	0	10	6
,, Edwards, William	0	10	6
,, Salter, Joseph B.	0	10	6
Sittingbourne, Gordelier, P. W. G.	1	1	0
Skelton, Taylor, Thomas, and Son	0	10	6
Southampton, Randall, William B.	1	1	0
Southsea, Cruse, Thomas H.	0	10	6
South Shields, Forrest, Robert	0	10	0
,, Mays, R. J. J.	0	10	6
,, Noble, John	0	5	0
,, Oates, Thomas	0	10	0
,, Riddle, Joseph	0	5	0
,, Tate, Christopher	0	2	6
,, Taylor, James	0	10	6
South Stockton, Knights, John Atmore	1	1	0
Stockton-on-Tees, Bainbridge, Robert R.	0	2	0
,, Brayshay, Thomas	0	10	6
,, ,, William Bolam	1	1	0
Stockton-on-Tees, Hodgson, Edward	0	10	6
Stourbridge, Bland, John Handel	0	10	6
,, Burgess, William	0	5	0
,, Clark, Thomas P.	0	5	0
,, Hughes, Samuel	0	10	6
,, Jones, Rowland Gill	0	5	0
,, Loverock, Henry	0	5	0
,, Morris, Alfred Phillip	0	10	6
,, Perks, Francis	0	10	6
,, Whitwell, George	0	5	0
Stratford, Holford, Thomas Constantine	0	10	6
Stretford, West, Thomas	0	5	0
Stroud, Coley, Samuel J.	0	10	6
Sunderland, Nicholson, John Joseph	0	10	6
,, Sharp, David Blakey	0	10	6
,, Walton, John	0	10	6
Sydenham, Holloway, Thomas Henry	0	10	6
,, Lang, William	1	1	0
Taunton, Evans, Joseph James	0	10	6
,, Fouracre, Robert	0	10	6
,, Gregory, George Henry	0	5	0
,, Hambly, Charles J.	0	10	6
,, Kirkpatrick, Samuel	0	5	0
,, Prince, Henry	0	10	6
,, Redman, Sidney	0	5	0
,, Woollatt, Richard	0	5	0
Teignmouth, Cocking, Frederick J.	0	5	0
Thornton-in-Craven, Wilson, Thomas	1	1	0
Thrapstone, Pars, Robert Corelli	0	5	0
Torquay, Cocks, John Walter	0	5	0
,, Guyer, James Brett	0	5	0
,, Riches, Thomas	0	5	0
,, Sloman, Richard	0	5	0
,, Smith, Edward	0	5	0
,, Yates, William Lee	0	5	0
Tottenham, Bently, William James	0	10	6
Tunbridge Wells, Cheverton, George	0	10	6
,, Gardener, Charles	0	10	6
,, Howard, Richard	0	10	6
Watford, Chater, Edward Mitchell	0	10	6
,, Chater, Jonathan	1	1	0
,, Oldfield, Henry	0	10	6
Welwyn, Lawrance, Edward	0	11	0
Wellington, Langford, John Brown	0	10	0
Weymouth, Groves, Thomas Bennett	0	10	6
Windsor, Boyce, John Pierce	0	10	6
,, Collins, Henry George	0	5	0
,, Crook, Edward	0	10	6
,, Griffiths, Alfred William	0	10	6
,, Grisbrook, Edward	0	5	0
,, Leigh, John	0	10	6
,, Russell, Charles James L.	0	10	6
,, Squire, James	0	5	0
,, Weller, George	0	10	6
Wolverhampton, Gow, Alexander	0	10	6
,, Perkins, John	0	10	6
,, Stanway, Edward Thomas	0	10	0
Woodbridge, Betts, John	1	1	0
Woolwich, Atkins, Francis Thomas	0	10	0
,, Parkes, John C.	0	10	6
,, Rastrick, John Alfred	0	10	6
Worcester, Whitfield, John Lockley	1	1	0
Yarm, Reed, George	0	10	6
Yarmouth, Great, Walpole, William	0	10	6

Legacy of the late George Waugh, £25 (supplemented by the executrix, Mrs. Waugh, £75) ... 100 0 0

NORTH BRITISH BRANCH, EDINBURGH.

The North British Branch held their fifth meeting of the present Session, in the Society's rooms, on Friday evening, 28th March, at half-past 8 o'clock; Mr. Baildon, President, in the chair. Mr. John Mackay, in presenting a copy of the Proceedings of the American Pharmaceutical Conference held in Ohio, and a copy of the recent publication of the United States' Pharmacopœia, both of which volumes had been sent to the Society here by their friends on the other side of the Atlantic, proceeded to make some remarks on the general scope of the latter. While the arrangement was in many respects similar to that carried out in the British Pharmacopœia, he remarked that the materia medica substances were classed in two divisions, primary and secondary. The preparations were all arranged in alphabetical order, but he thought the omission of the dose attached to each compound a mistake, as much benefit had resulted from the authorities who compiled our own work having distinctly added the dose to all the preparations. He also mentioned the fact, that the troy ounce had been adopted throughout the work, and that therefore all formulæ were entered by the ounce, the pound having been discarded; so that no mistake could be made by comfounding the avoirdupois ounce or pound with the one intended. This was almost a necessity, as the troy ounce represented 480 grains, while the avoirdupois contained only 437½ grains. The drachm and scruple had also been discarded and grains used instead. The liquid measure indicated throughout is the old wine gallon. This contains 8 pints, each measuring 16 fluid ounces; and in order to prevent confusion, the term gallon is never employed, but that of pint constantly used.

He then noticed the various additions which had been made to the new edition of the work, and referred to the appointment of the Committee to whom had been delegated the revision, compilation, and publication of the work, by the Convention which had met in the summer of 1870 at Washington. This Committee had full power, on till 1880, to publish a new edition of this national work if at any time it was thought necessary to do so.

After going over the various additions and removals of the different substances in this edition of the book, he referred to the new mustard paper resembling Rigollot's leaves, and especially to suppositories and to the fluid extracts. In speaking of the former, he stated that a preference was given to theobroma oil as the excipient, and that nine different kinds were ordered as against only four which were officinal in the B. P.

One, he observed, was made with aloes, which reminded him of a suppository ordered some time ago by the late Sir James Simpson, containing gamboge.

Mr. Mackay then noticed the twenty-two liquid extracts in the new work. He remarked particularly upon the novelty of the menstruum proposed, namely, in a mixture of glycerine and diluted alcohol. In every case percolation and evaporation were ordered in the preparation of these extracts. He gave the precise directions as printed, and submitted liquid ext. gentian and extract of ergot made exactly as recommended. The cost he had found to be about 3*d.* per ounce; but if made on the large scale, and some of the alcohol perhaps saved in the evaporation, the cost might be much lessened. Both preparations were clear and looked uncommonly well, and evidently were possessed of great strength. One house in London had already made some experiments with similar preparations, while specimens of a few were shown at the last meeting of the Society in London; so that he had no doubt whatever in believing that it would, ere long, be determined whether such concentrations, made as directed, were suited for use in medical practice, and if so, the compilers of the supplement already proposed to be added to the existing B. P. would have their attention directed to the new mode of preparation, and probably suggest additions to the list of pharmaceutical preparations.

The liquid extracts submitted gave much satisfaction, the ext. gentian especially appearing to be a very superior preparation.

Mr. Mackay further noticed, that while the new chemical nomenclature had not been introduced, there had been a slight modification, to the extent that salts of alkaline metals were now recognized as compounds, not of the oxides, but of the base itself,—as, for example, carbonate of baryta was now called carbonate of barium; carbonate of lime, carbonate of calcium; citrate of potass, citrate of potassium: and so on.

In concluding his remarks, Mr. Mackay referred to the excellent manner in which the work was printed and published. The price was moderate, and he thought the volume well worthy perusal. While the Convention had invested the Committee with full powers, there was a caution apparently exercised by them which gave a guarantee that nothing whatever would be inserted by them in any future edition of this national work without full verification and testing as to the preparation and adoption of new formulæ.

Mr. Baildon proposed a vote of thanks to Mr. Mackay for having brought before the Society, in the full and clear manner he had done, the various features and constitution of this new edition of the American Pharmacopœia. This was carried with acclamation; and Mr. Paton then read a Paper on "Perfumes Physiologically and Commercially Considered." (See p. 803.)

After remarks from various members present, a very cordial vote of thanks was proposed by the Chairman to Mr. Paton for his interesting paper. This was seconded by Mr. Young, and carried unanimously.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The eleventh general meeting of this Association was held at the Royal Institution, Thursday evening, March 27th. The President, E. Davies, Esq., F.C.S., in the chair. The minutes of the previous meeting were read and confirmed.

Mr. R. L. Wood was elected a member, and Mr. W. Croskell an associate; and several donations were announced.

Mr. Alfred H. Mason, F.C.S., then read a paper on "The Manufacture of Glycerine: its Properties, Various Applications, and Quality, as it exists in Commerce." The paper was experimentally illustrated, and specimens of products taken in the various stages of manufacture of pure glycerine, by different processes, were exhibited and explained; also specimens illustrating its application in pharmacy, and as a constituent in toilet requisites, etc.

The Manufacture of Glycerine: its Properties, Various Applications, and Quality, as it exists in Commerce.

BY A. H. MASON, F.C.S.

Glycerine ($C_3H_8O_3$) was discovered by Scheele in 1779, who obtained it in the preparation of lead plaister. He named it "Sweet principle of Oils," from its sweet taste. Subsequently its properties were more accurately studied by Chevreul, in his classical investigations on the chemical history of bodies of fatty origin, and by Pelouze.

Most of the fats and oils of the animal and vegetable kingdoms have a constitution analogous to that of the compound ethers,—acetic ether, for example. When acetic ether is treated with alkalies it assimilates the elements of water, forming an alkaline acetate and alcohol. Oils and fats in like manner undergo, by the same treatment, a similar change. They assimilate the elements of water, glycerine is set free, and a salt of the acid, previously in combination with glycerine, is formed.

Glycerine is present in combination with solid and fluid fatty acids, in the shape of glycerides, to an amount of eight to nine per cent., and may be separated by treatment with bases (potash, soda, lime, baryta, oxide of lead), or with acids (sulphuric acid), and certain chlorides (chloride of zinc), also by means of superheated steam, or very hot water without the formation of steam in closed vessels. Glycerine is also formed as a constant product by the alcoholic fermentation of dextrose, levulose, and lactose. According to Pasteur's researches, the quantity of glycerine thus formed amounts to about three per cent. of the weight of the sugar.

Glycerine may be manufactured—(1) By saponifying oils with oxide of lead; *sic*, five parts of finely triturated litharge are heated with nine parts of olive oil or any other glyceride, and a small quantity of water, the mixture being constantly stirred and the water renewed, until the oxide of lead is converted into a plaister (Emplastrum Plumbi, B. Ph.).

$$\underset{\text{Oxide of Lead.}}{3\,PbO} + \underset{\text{Water.}}{3\,H_2O} + \underset{\text{Oleate of Glyceryl (Olive Oil or Oleine).}}{2(C_3H_5, 3\,C_{18}H_{33}O_2)}$$

$$= \underset{\text{Oleate of Lead (Lead Plaister).}}{3(Pb, 2\,C_{18}H_{33}O_2)} + \underset{\text{Hydrate of Glyceryl (Glycerine).}}{2(C_3H_5, 3\,HO)}$$

Insoluble lead salts (in this case, the oleate and stearate of lead) are formed; warm water is then added, and the aqueous liquid decanted, filtered, and sulphuretted hydrogen passed through the filtrate, in order to precipitate a small quantity of plumbous oxide, which dissolves. The liquid is then digested with animal charcoal, and evaporated *in vacuo*, or over a water-bath, until of the required specific gravity.

(2) From the alkaline mother-liquor of the soap-works (from which the soap has been separated by means of common salt), by neutralizing with sulphuric acid, removing the excess of that acid by carbonate of barium, evaporating the filtrate to a syrup, digesting it for several days with alcohol, separating the alcoholic liquid from the sulphate of sodium, which crystallizes out, decolourizing with animal charcoal, again evaporating to a syrup, exhausting the residue with strong alcohol, and finally evaporating the filtered solution over the water-bath. This process is, however, too troublesome and expensive for use on the large scale; besides, it is found that, by adding great excess of alkali, the glycerine is taken up and the soap produced is found to absorb and hold a much larger percentage of water,—a desideratum to the manufacturer of cheap soaps.

(3) From the residue of the manufacture of stearic acid for candles, by lime saponification. When this process is used, the glycerine remains dissolved in the water after the separation of the insoluble lime-soap. The lime also dissolved having been eliminated by either sulphuric acid, or, preferably, oxalic acid, the evaporation of the liquid to the consistency of a syrup will yield a glycerine pure enough for many technical purposes. This method, when properly carried out, yields a very pure product, and is the one principally used by continental manufacturers, but it is somewhat complicated, and unless great attention is paid to every part of it, small quantities of lime are apt to remain in the glycerine, rendering it unfit for use in medicine and pharmacy.

(4) By decomposing or rather dissociating neutral fats by means of water, or of superheated steam. This is the best and only unobjectionable method of obtaining glycerine, and is the process brought to a successful issue by Mr. W. F. Wilson, F.R.S.* It consists in injecting superheated steam at a temperature of between 500° and 600° into heated fat. The fats assimilate the elements of water, and are decomposed into their constituents—the fatty acids (oleic, stearic, or palmitic, as the case may be),—and glycerine; both distil over and form in the recipient two layers of liquid, of which the lower is tolerably pure aqueous glycerine. Supposing palmatine to have been the material employed,

$$\underset{\text{Palmitine}}{C_3H_5,3C_{16}H_{31}O_2} + \underset{\text{Water}}{3H_2O} = \underset{\text{Glycerine}}{C_3H_5,3HO} + \underset{\text{Palmitic Acid}}{3HC_{16}H_{31}O''}$$

First, we get a weak solution of glycerine containing from twenty to thirty per cent.; then by concentration rough glycerine. Brown glycerine is the product of a first distillation—pale glycerine, white glycerine, produced by further distillation, show the successive stages of advance to pure glycerine.

Properties.—Pure glycerine is a colourless, viscous, neutral, inodorous liquid, with a sweet taste, from whence it derives its name—γλυκὺς, sweet. Concentrated as far as possible *in vacuo* over sulphuric acid, it has the sp. gr. 1·28 at 59° (15°C). The glycerine of the British Pharmacopœia has the sp. gr. 125, and contains five per cent. of water. Glycerine is difficultly volatile, and only begins to distil unchanged at 518° Fahr. in a current of superheated steam, or in a partial vacuum, but it cannot be distilled in the ordinary way without much decomposition, intensely irritating vapours of acrolein being evolved. The vapour of glycerine is inflammable. Glycerine is uncrystallizable; at 408 Fahr. it becomes gummy and almost solid. It is miscible with water and alcohol in all proportions, and is a powerful solvent. Glycerine* is insoluble in ether, chloroform, etc. It does not evaporate, but on the other hand is hygroscopic, attracting moisture from the atmosphere and becoming more limpid; like sugar, it possesses strong antiseptic powers.

By gradually adding glycerine to a mixture of sulphuric and fuming nitric acids, carefully cooled, glonoin $C_3H_5N_3O_9$ (nitro-glycerine) is prepared; on adding water to the solution nitro-glycerine is precipitated as a heavy yellowish oil, soluble in alcohol and ether. It is a very unstable compound, and explodes when struck violently; it is largely used for various purposes, the preparation of dualine, and dynamite, etc.

Glycerine treated with iodide of phosphorus, whereby iodide of allyl is formed on being dissolved in alcohol, and distilled with sulphocyanide of potassium, yields sulphocyan-allyl, or artificial oil of mustard.

$$C_3H_5I + KNCS = KI + \underset{\text{Mustard Oil.}}{(C_2H_5)N(CS)''}:$$

or if sulphide of potash is substituted, sulphide of allyl $(C_3H_5)_2S$, essential oil of garlic is yielded.

Various applications.—As may be imagined, glycerine being a production in which so many wonderful properties are combined, its applications and uses are now manifold, and it appears remarkable that whilst so many sources of impure glycerine have long been known to exist, hundreds of tons being thrown away annually, it is but of late years that it has been utilized, and now the demand for use in pharmacy, arts, etc., is with difficulty supplied.

In the beginning of 1844 Mr. Thomas De La Rue, being engaged in some experiments requiring the use of syrupy substances, procured from the Apothecaries' Hall, London, some glycerine, some of which he applied to a burn and an irritation of the skin. The experience thus obtained of its properties of soothing and keeping moist, led to its introduction into the Hospital for Skin Diseases, where it soon came into extensive use, and from this time it gained considerable favour with the medical profession, being even suggested as a substitute for cod liver oil, or at any rate a vehicle to render that medicine more palatable. But the question of purity arose, most of the samples at that time being found contaminated with lead, even in those samples which were sold as "pure and free from lead;" but since the introduction of Mr. Wilson's process these contaminations need not be, and are rarely met with, so that now glycerine daily becomes more and more made use of in pharmacy and in the surgery.

It must be borne in mind that in applying glycerine externally and internally it should be previously diluted. Glycerine has a strong affinity for moisture, it takes it from the skin and thus gives rise to a sense of burning. Dilution with water will mitigate this, and in most cases prevent it. In pharmaceutical preparations glycerine may be used as a preservative agent, and to economize the use of alcohol; its more important medicinal value is as a vehicle for the preparation of a great variety of remedies for both internal and external use. The therapeutic effects of some medicines are considerably modified by its use. Solutions in glycerine are practically found in the case of astringents to be much less active than solutions in water. Its usefulness as an application to the surface of the skin when dry and irritable, is testified by the fact that almost every pharmacist now-a-days has his speciality in the shape of glycerine lotion, glycerine cream, etc., and in the demand for the various manufactures of glycerine soaps. Mr. F. A. Sarg of Vienna claims to be the introducer of these things,† and he deserves praise for the perfection to which he has brought his glycerine toilet requisites; they really contain glycerine in very fair proportions.

* We believe the originator of this method was Mr. Tilghman, of the United States.—Ed. Pharm. Journ.

* An interesting table of the solubility of various salts in glycerine, by Klever, will be found in the first volume of the present series of the Pharmaceutical Journal.

† Die Urtheile der 'Allgemeinen Weiner medizinischen Zeitung' uber Glycerin. Jahrgange, 1869-70.

Glycerine is largely used for cosmetics and perfumery, for keeping clay moist for modelling purposes, for preventing mustard from drying up; it is also useful as a lubricating material for some kinds of machinery, more especially watch and chronometer works, because it is not altered by contact with air, does not become thick at a low temperature, and does not attack such metals as copper, brass, etc. It is used in making copying inks. It is an excellent solvent for many substances, including the tar-colours (aniline blue, cyanine, aniline violet) and alizarine. In order to render paper soft and pliable glycerine is added to the pulp; it enters largely into the manufacture of weavers' glue or dressing (which is composed of dextrine 5 parts, glycerine 12 parts, sulphate of alumina 1 part, and water 30 parts), by the use of this mixture the weaving of muslins need not be, as was formerly the case, carried on in damp darkened cellars, but may be performed in well-aired and well-lighted rooms. Santi uses glycerine for the compasses on board screw-steamers, in order to protect the inner compass box against the vibrations caused by the motion of the propeller. A mixture of finely powdered litharge and *anhydrous* glycerine, made into paste, forms a rapidly hardening cement, especially useful as a cover for the corks or bungs of vessels containing such fluids as benzol, essential oils, etc., the cement being impermeable to these liquids. Glycerine, on account of its strong antiseptic powers, has been used successfully as an agent for preserving animal and vegetable substances. For mounting botanical and zoological specimens, as a substitute for alcohol, glycerine has been found preferable, as not being liable to evaporation, not combustible, and preserving the natural colours of the preparations more perfectly. Glycerine is largely used in the process of calico-printing; it is also used under patent process in preparing paper for dry printing; when added to confectioners' wares, preserved fruits, and chocolates, it serves to preserve them from becoming dry—it serves a similar purpose in the manufacture of tobacco and snuff. The water in gas-meters is liable to freeze in winter, or to evaporate too rapidly in summer—the addition of glycerine prevents these evils. Dr. Pohl and Pasteur have made many experiments with glycerine to apply it for sweetening certain wines which had become sour; and it has been successfully established that glycerine gives the wine a certain mildness and reviving flavour, so that it may be of great service in time of a bad year's growth.

Quality, as it exists in commerce.—Many impurities are necessarily found in crude glycerine, according to the process of manufacture, or the quality of water used in manufacturing. For industrial purposes, these impurities are not objectionable or disadvantageous if only present in moderate proportions; for medicinal use of course it is absolutely necessary that pure glycerine should be used, and the glycerine purified by Wilson's process manufactured by Price's Patent Candle Company is undoubtedly superior to any other I have examined. The fact that continental manufacturers now offer medicinal glycerine *à la* Price, inodorous, etc., would tend to substantiate this statement; and it occurred to me that it might be interesting to know how these various manufactures compare with Price's,—hence the ultimate object of this paper.

I have selected nine samples to report upon, and these represent English and continental manufactures.

The various chemical reagents shown, with the results, in the tabular form below, have been applied in the usual way, standard solutions being added to the specimen of glycerine (the glycerine previously diluted with an equal bulk of water), excepting the argentic nitrate. One part of solution was added to four parts of undiluted glycerine, and the mixture allowed to stand twenty-four hours. The specific gravity was taken at 60° F. with Baumé's hydrometer; and several were taken by weight, and found to correspond. The odour is easily ascertained by rubbing a little on the back of the hand: the peculiar mousey smell with some samples is easily detected, and this becomes more intense by heating a little of the glycerine in a test-tube.

Glycerine mixed with an equal volume of rectified sulphuric acid, should not produce effervescence or colouration if sufficiently pure for medicinal use.

By adding absolute alcohol and concentrated sulphuric acid to glycerine, on heating a fruity smell is set free, more or less intense owing to the presence of butyric or formic acid; the peculiar pine-apple odour is very strong in some samples, showing the formation of butyric ether.

For detecting sugar and glucose in glycerine.—To five drops of the glycerine to be tested, add 100 to 120 drops of water, one drop of pure nitric acid, and three or four centigrammes of ammonium molybdate; boil the mixture, and in less than two minutes it will assume an intense bluish-green colour if any sugar or glucose is present.

Sample.	Specific Gravity. Hydrometer.	Colour.	Odour.	Odour when treated.	Sulphuric Acid.	Argentic Nitrate.	Ammonium Oxalate.	Potass. Ferrocyanid.	Ammon. Hydrosulph.	Barium Chloride.	Litmus.	For Butyric Acid.	For Sugar.
A	31 °B.	None.	None.	Very faint.	No change.	No change.	No change.	No change.	No change.	No change.	No change.	Slight smell.	None.
B	30° B.	None.	Do.	Slight mousey smell.	Slight discoloration.	Do.	Do.	Do.	Do.	Do.	Do.	Present.	Do
C	30° B.	Do.	Slight.	Do.	Do.	Slight tinge.	Slightly turbid.	Do.	Do.	Do.	Do.	Do.	Do.
D	30° B.	Do.	Do.	Do.	No change.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
E	31° B.	Do.	Very faint.	Do.	Slight tinge.	Faint opalescence.	No change.	Do.	Do.	Do.	Do.	Do.	Do.
F	29° B.	Do.	Fatty.	Do.	Do.	Slightly tinged.	Slightly turbid.	Do.	Do.	Do.	Do.	Do.	Do.
G	28° B.	Slightly tinged.	Do.	Disagreeable fatty.	Do.	More tinged.	Do.	Do.	Do.	Do.	Do.	Do.	Do.
H	28½° B.	None.	Mousey.	More mousey.	Discoloration.	No change.	No change.	Do.	Do.	Do.	Do.	Do.	Do.
I	28° B.	Brown.	Strong and fatty.	Strong and fatty, very offensive.	Intense discoloration and disagreeable odour.	Flocculent deposit.	Great deposit.	Do.	Discoloration and black deposit.	Deposit.	Red.	Plenty, and disagreeable fatty smell.	Do.

In the foregoing table, A represents Price's patent glycerine; B, C, D, E, F, were sold by continental manufacturers as double distilled white glycerine, *à la* Price, inodorous, guaranteed to stand the nitrate of silver test (sp. gr. 30° to 31° B); G and H as refined glycerine (28° B sp. gr.); and I a sample of concentrated *crude* glycerine from Hamburg, as exported for manufacturing purposes. A, B, and H have been exposed to strong sunlight in closed vessels for two days. A was unchanged, but B and H had the mousey odour developed very fully, but without discoloration.

It will be observed that there are *slight* impurities in

B, C, D, E, F, but I think none to prevent their being used in pharmacy and medicine when not intended for internal administration.

I consider that pure medicinal glycerine should not be affected by nitrate of silver, sulphuric acid, oxalate of ammonia, or exposure to sunlight, and should be perfectly free from smell after this treatment.

A long and interesting discussion followed. The President alluded to several experiments he had made to ascertain if glycerine and water would freeze, and thought it a singular fact that they would not, and hoped for some explanation of the phenomenon.

Dr. Cook, of Edinburgh, ably criticized the paper, alluding to a specimen of solid glycerine which Dr. Gladstone exhibited before the Chemical Society, which had come from Vienna, supposed to be frozen by excessive cold and the motion of the train. Dr. Cook thought the fruity smell produced by treating glycerine with absolute alcohol and rectified sulphuric acid was due to the presence of formic acid rather than butyric. The mousey smell from some samples he thought was due to acrolein.

Messrs. Armstrong, Tanner, Rigby, and Williams continued the discussion, after which Mr. Mason replied to the various questions which had been raised.

On the motion of the President, supported by Dr. Cook, an unanimous vote of thanks was accorded to Mr. Mason for his interesting communication, and the meeting terminated.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, 3rd April, 1873. Dr. Odling, F.R.S., etc., President, in the chair.

After the formal business of the Society was transacted, a paper on "A method of Determining with great exactness the Specific Gravity of Liquids," was read by the author, Dr. Sprengel. The instrument, consisting of a U-shaped glass tube, terminating in capillary tubes bent at right angles, is very delicate when proper precautions are taken. The second paper, entitled "Researches on the Action of the Copper-zinc Couple on Organic Bodies, No. II. on the Iodides of Methyl and Amyl," by J. H. Gladstone, F.R.S., and A. Tribe, is a continuation of the authors' researches on this subject, an account of which they communicated to the Society some short time ago. Dr. C. R. A. Wright then read a memoir "On Cymene from various Sources," in which he gives the results of his examination of cymene prepared from eight different sources, showing them to be identical. The last paper was by Dr. H. E. Armstrong, being No. XI. of "Communications from the Laboratory of the London Institution, Action of the Acid Chlorides on Nitrates and Nitrites, Part I. Acetic Chloride."

The meeting finally adjourned until Thursday, 17th April, when a lecture "On the Heat produced by Chemical Action," will be delivered by Dr. Debus, F.R.S.

PARIS SOCIÉTÉ DE PHARMACIE.

A meeting of this Society was held on Wednesday, March 5, under the presidency of M. Bussy. In the course of the preliminary business a letter was read asking the advice of the Society, under the following circumstances:—A pharmacien having died without leaving either widow or children, his brothers and sisters had provisionally carried on the business under the superintendence of a qualified pharmacien, assisted by a pupil approved by the medical jury of the department. This state of things had been denounced as illegal by another pharmacien, who had entered an action against the heirs, which being in the first instance decided in their favour, was now carried on appeal to the court at Caen. It was stated in the discussion which followed the reading of the letter that the custom in the Paris Circumscription was to allow to children, brothers, or sisters inheriting, the same delay as to a widow, putting them under the same obligations. This authorization was usually accorded by the Prefect of Police, on the advice of the School of Pharmacy.

M. Poggiale presented a note by M. Pollacci on the preparation of the hydrates of potash and soda by heating the nitrates of the alkalies with iron filings.

Commercial Propylamine.

M. Wurtz read the report of the commission appointed to investigate the subject of the propylamine of commerce. The report, pointed out that it was no part of their duty to answer the question as to what was the therapeutic value of propylamine, but that since that substance was prescribed by medical men the duty of pharmacists was to furnish it pure, and always identical in physical and chemical characters and medical properties.

Propalymine was stated to have been first discovered in 1850 by Wertheim, while treating narcotine with a caustic alkali, and to have been afterwards noticed by Winckler in ergotine and herring brine; by Wicke in the flowers of *Cratægus oxyacantha*; by Dessaignes in the *Chenopodium vulvaria*, in the blood of veal and in human urine. But in 1863, Wicke arrived at the conclusion that this ammonia compound, which he had also obtained from the flowers of the pear and mountain-ash, was trimethylamine. The method adopted by all these authors was to mix the substance from which it was wished to obtain the propylamine with potash or lime and submit the mixture to distillation. The gases disengaged (a mixture of ammonia, "propylamine," etc.) were collected in water acidulated with hydrochloric acid. The solution being evaporated, the residue was treated with absolute alcohol, which dissolved only the chloride of "propylamine;" this was afterwards decomposed by lime and the "propylamine" collected in water. The "propylamine" used by Dr. Dujardin-Beaumetz, and which has been obtained from herring brine, is a colourless liquid having an odour *sui generis* of herring brine and ammonia. But the reporters do not think this substance is really propylamine, and consider that nearly all the authors who have treated of this subject have mistaken an aqueous solution of trimethylamine for that substance.

The propylamine obtained by means of propylic alcohol by Sylva, in 1869, was a liquid having a strong ammoniacal odour, very alkaline, inflammable, colouring cupric solutions blue, precipitating alumina from its solutions and re-dissolving the precipitate, characters which belong also to its isomer isopropylamine, discovered by Gautier, which he obtained by means of isopropylcarbilamine:—

$$NC_4H_7 + 2H_2O = C_3H_9N + CH_2O_2.$$

But these three ammonias, although isomeric, differ from each other in their boiling points and the crystalline forms of their salts. Thus trimethylamine boils at between 4° and 5° C.; propylamine at from 49° to 50° C.; and isopropylamine at from 31° to 32° C. Winckler has established the identity of trimethylamine obtained from herring brine with that prepared synthetically, not only by direct comparison of the two bodies, but also by the characteristic reaction with iodide of methyl in the production of a crystalline magma of rectangular prisms of iodide of trimethylammonium.

The reporters consider that the commercial "propylamine" is but a complex product containing trimethylamine and ammonia in a greater or less degree of concentration; that medical men are using a substance of variable composition and consequently the results cannot always be the same. They therefore suggest that a uniform method of preparation should be adopted, such as to distil herring brine and collect the product in acidulated water, as before described; or that as it is trimethylamine which is contained in herring brine, it would be more simple to prepare that ammonia direct by means of methylic alcohol. The method proposed is to transform the methylic alcohol into iodide of methyl; to heat the ether so obtained under pressure with ammonia which would give crystals of iodide of tetramethylammonium, nearly insoluble in cold water. These crystals are then to be washed with distilled water to carry off any iodide of ammonia which may have formed, afterwards decomposed by lime, and the gas collected in water. The solution so obtained could be titrated in the same way as an ordinary ammoniacal solution, and therapeutics would have at its disposal a product of constant composition.

But the reporters consider it would be better to replace the alkaline solution, which from its disagreeable odour is repugnant to a patient, by the hydrochlorate of the base, which is nearly inodorous and has a saline taste, if it should prove that the effects of the salt are the same as those of the pure alkali. So far the experience of M. Beaumetz with this salt is satisfactory, and it is probable that such a substitution will be possible.

M. Petit said that he had examined various specimens of commercial "propylamine," containing from 2 to 52 centigrams of alkaloids or ammonia per cubic centimetre, and he had come to the conclusion that the greater part of them were much richer in ammonia than in propylamine, monoethylamine or diethylamine.

M. Lefort read a paper upon the preparation of pure protoiodide of mercury.

Sulphovinate of Soda.

M. Bussy said that he had recently had occasion to examine various specimens of sulphovinate of soda and that a certain proportion of them were mixtures in various proportions of sulphovinate of soda and bisulphate of soda. The presence of the latter salt, sometimes in large quantity, was not, in his opinion, the result of a fraud, but of a defect in its preparation, probably the prolonged action of a high temperature, especially in the presence of water.

M. Limousin remarked that the sulphovinate of soda is a very hygroscopic salt, and that when in order to drive off the humidity taken up from the air it is dried at a temperature exceeding 100° C. or 120° C., it is partially decomposed into bisulphate of soda and alcohol.

M. Jungfleisch said that in evaporating large quantities of sulphovinate of soda, water favoured the decomposition of the salt. The liquor became more acid as the temperature rose and the operation was prolonged. This decomposition could only be prevented by employing an excess of alcohol.

In the discussion which followed it was agreed that sulphovinate of soda is decomposed by simple prolonged contact with water, especially when heated. It then becomes acid and precipitable by chloride of barium. Such a decomposition is to be feared in lemonade or draughts prepared with it and kept for some time.

M. Boudet remarked that the danger would be the greater because sulphovinate of soda is usually prescribed in considerable doses.

The Society decided that these observations upon the ready decomposition of sulphovinate of soda during its preparation, or when kept in solution or in a humid state, merit the attention of pharmacists because of the danger that might result from the presence of bisulphate of soda both to the patient and the pharmacist.

Parliamentary and Law Proceedings.

Serious Charge against a Chemist.

At the Chester Assizes on Tuesday, April 1, Edwin Eastwood, described in the calendar as a druggist, of Dukinfield, was arraigned on the charge of administering to Ann Jones a certain noxious drug, with intent to procure a miscarriage. A bill charging the prisoner with wilful murder had been previously ignored by the grand jury. The nature of the evidence has already been described in this journal (pp. 338 and 355). The jury returned a verdict of "Guilty," and the judge, after commenting on the gravity of the offence, sentenced the prisoner to ten years' penal servitude.—*Stalybridge Reporter.*

Prosecutions of an Unqualified Practitioner.

At the Lanchester Petty Sessions on Thursday, March 27, Mr. Percival Hall, of Holmside, near Lanchester, was charged with wilfully and falsely using the name or title of surgeon, contrary to the provisions of the Medical Act. It was stated that the defendant had practised for many years, and the men of a neighbouring colliery paid 6*d.* a fortnight to him. His name was not on the Medical Register, but he had signed a certificate of death as a surgeon. Several technical objections were taken. The Bench considered the offence proved, and imposed a penalty of 5*s.* and costs.

On Thursday, April 3, a similar charge against the same defendant was heard at the Chester-le-Street Police Court. The Bench again decided against the defendant, and fined him 20*s.* and costs.—*Durham County Advertiser and Durham Chronicle.*

Reviews.

Half-yearly Abstract of the Medical Sciences; being a Digest of British and Continental Medicine, and of the Progress of Medicine and the Collateral Sciences. Edited by William Domett Stone, M.D., etc. Vol. LVI. London: Churchill, 1872.

Progress in legal or theological science is as slow as that of a glacier;—in medicine it is as rapid as the stream to which the glacier gives birth. To keep pace with it the student or the practitioner must either devote himself entirely to reading, or must rely on some such periodical abstract as Dr. Domett Stone endeavours to supply. If well done, a half-yearly summary of the progress of medical science would be invaluable; but, on the other hand, if imperfect, it is of rather less worth than a weekly periodical like the *British Medical Journal*, or the *Lancet.* Dr. Domett Stone's performance comes within neither of these extremes. It cannot honestly be called satisfactory; neither is it so perfunctory as to deserve absolute condemnation. It is a tolerable bit of compilation, corresponding to Homer's description of the drugs with which it so largely deals:—

Πολλὰ μὲν ἐσθλὰ μεμιγμένα, πολλὰ δὲ λυγρά.

Much of his volume is occupied with matters for which no competent medical man would thank the purveyor. There is a tone of mediocrity over a considerable part of the extracts, which implies little "progress" in the science which they are adduced to illustrate. Far too much space is devoted to native and colonial research; far too little to continental; while in the latter the French are laid under contribution nearly three times as often as the German *savants*—a ratio which, if science be held to guide the selection, should simply be reversed. Again, even in the English or colonial part of the volume, credit is given to the wrong person as the originator of this or that method or preparation or suggestion. For instance, in the mode of distinguishing creosote from carbolic acid the *Canada Medical Journal* is quoted as the first source of the innovation, whereas it was primarily suggested in our own columns. Moreover, the sins of omission are as flagrant as those of commission. The signal success of Leube in sustaining the nutrition of invalids by injections of minced pancreas *per anum*, when the ordinary channels of food-ingestion were closed, receives not a word of notice, although it has solved the *quæstio vexata* of forcible feeding in mania; while the occasional production of *erythema fugax* by the excessive use of hydrate of chloral receives ample illustration.

On the whole the volume before us cannot be recommended as a perfect mirror of the half-year's progress in medicine. It contains much that the general practitioner will find acceptable; but the competent physician or surgeon will glean but small sustenance from it. He may ask for bread only to be offered a STONE.

Obituary.

Notice has been received of the deaths of the following:—

On the 21st of March, 1873, Mr. Francis William Joy, Pharmaceutical Chemist, of Cardiff. Mr. Joy joined the Pharmaceutical Society in 1857, and during the greater part of the intervening time actively and efficiently served the Society as its Local Secretary. He died of bronchitis at the age of 42 years.

On the 21st of March, 1873, Mr. Josiah Steward, Pharmaceutical Chemist, of Trimpley, near Bewdley. Aged 69 years. Mr. Steward was a Member of the Pharmaceutical Society, having been one of its Founders.

On the 7th of December, Mr. Thomas Garnett, Chemist and Druggist, of Kendal. Aged 33 years.

On the 4th of April, 1873, Mr. William Maudsley, Chemist and Druggist, of 260, Tottenham Court Road. Aged 36 years.

Notes and Queries.

[334].—BLEACHING FERNS.—*Mr. George Delves* and *C. W.* wish to be informed of a good process for bleaching ferns and rendering them transparent.

DIARRHŒA AND CHOLERA MIXTURE.—"*A. B. C.*," asks for the formula prescribed by Sir John Fisher, late Chief Surgeon to the Metropolitan Police. The following is taken from a letter forwarded by that gentleman to the *Times*, of August 3, 1866:—

Aromatic Confection	6 drachm.
Tincture of Opium	1 "
Tincture of Catechu	2 oz.
Aromatic Spirit of Ammonia . . .	1 "
Chloric Ether	2 drachm.
Peppermint Water	13 oz.

Mix. Three tablespoonfuls to be taken every three or four hours until the diarrhœa ceases.

The following journals have been received:—The 'British Medical Journal,' April 5; the 'Medical Times and Gazette,' April 5; the 'Lancet,' April 5; the 'London Medical Record,' April 2; 'Medical Press and Circular,' April 4; 'Nature,' April 5; 'Chemical News,' April 5; 'Gardener's Chronicle,' April 5; the 'Grocer,' April 5; 'Journal of the Society of Arts,' April 5; 'Grocery News,' April 5; 'Produce Markets Review,' April 5; 'Scientific American,' April 5; 'Brewers' Guardian,' April 8; 'Journal de Pharmacie et de Chimie' for April; 'Moniteur Scientifique-Quesneville' for April; 'Practitioner' for April; 'Journal of Applied Science' for April; 'British Journal of Dental Science' for April; 'Educational Times' for April; Food, Water, and Air, for April.

Correspondence.

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

BENEVOLENT FUND.

Sir,—I cannot help expressing my surprise at the letter from Mr. Walter B. Clark, of Leicester, which appeared in your Journal last week; he thinks "the Benevolent Fund is *at last* exciting some attention."

I do not know what has so suddenly brought about this discovery, but it does seem strange that when we have elected annually two annuitants, until we have now thirteen such on the list, each receiving thirty pounds per annum, and when every deserving applicant has received relief, I say it does seem strange that the vitality of the Benevolent Fund should only now present itself to Mr. Clark. Happily other members of our Society held sounder views on the foundation of a charitable trust, and did not withhold their contributions lest men of the future only should benefit by them. But for this, and the proper investing of the unexpended subscriptions and donations at the end of each year, no unfortunate brother chemist or destitute widow would have had the assurance of a certain income to solace the remainder of his or her declining years; and what, perhaps, would be worse than that, even those who have been elected as annuitants might be suddenly bereft of their annuities if the Trustees of the Fund adopted Mr. Clark's view. It must surely be apparent that, when the money is capitalized, it is "at once devoted to charitable purposes." Where casual relief only is granted by an association, it may be justifiable to expend all the subscriptions received, but it is a well-known rule in societies granting pensions, to keep those pensions within the limit of the income arising from capital; and I trust that wholesome regulation will never be neglected by us.

When genuine cases are refused assistance (and Mr. Clark does not cite one such), it will be time to ask the Council to pursue a different policy; but when month after month grants are made, and in the common course of things demands on the Fund multiply, it seems to me that those who have the power to give are scarcely justified in withholding their assistance.

Few men in our ranks have possessed a more active spirit of benevolence than our late friend George Waugh; few men had better means of knowing how much was done, how much left undone by the Council in this matter; no man gave more liberally from first to last. Let his judgment as to the usefulness and proper appropriation, as well as his example in support of our Benevolent Fund, be a guide and example to us all!

Piccadilly, April 8th, 1873. GEORGE W. SANDFORD.

LEGALITY *v.* ILLEGALITY.—AN EXPLANATION.

Sir,—I am so inadequately and unfavourably reported in the two last Journal reports of the meetings of the Pharmaceutical Council, that in simple self-defence, as well as in the interest of the question I have had in hand, I must claim from you a little space that I may fairly state my position.

Without an intention to garble a report, the sins of omission may be so flagrant as to render it worthless, misleading, and mischievous. These remarks apply to the reports of the observations made in support of the amendments which I moved at the March and April meetings of the Council.

At the March meeting I read and commented upon the annotations of Mr. Flux on the draft of the proposed amended bye-laws, and I also referred to Mr. Flux's remarks made before the Parliamentary Committee. The annotations and remarks were in direct opposition to the views of the majority of the Council. The whole of this is withheld from the report.

At the last meeting of the Council I again moved an amendment, which I based upon Mr. Flux's opinion so deliberately given. I thought it was scarcely possible to withhold the publication of the amendment. I stated at the same time that I moved in this manner, because Mr. Flux's opinions, as cited by me at the previous meeting, were withheld in the report. This statement which justified me in again moving in opposition is also withheld.

No doubt all these omissions may be purely accidental. The consequences are, however, the same. I am misreported, and possibly to some degree damaged, and what is more important, the members fail to receive the fair and full report to which they are entitled.

Perhaps the imperfection of the reports arises from the system under which they are obtained. It would be well, therefore, to adopt some other plan better suited for the purpose, than to permit the evils of the present system to continue.

In December last, when Mr. Schacht proposed the amended regulations of the Board of Examiners, he first moved "that the question as to the Council possessing the legal powers to carry the proposed alterations into effect be referred to the Parliamentary Committee," and immediately afterwards, with needless precipitation, and without having solved the legal doubt, a majority of the Council voted their enactment.

In due time amended bye-laws are sought for to empower the Board of Examiners to carry out the amended regulations, and the proposed altered bye-laws are submitted to Mr. Flux, the Society's solicitor, for his approval.

To the following portion of the first draft of the amended bye-law, section 10, clause 16, Mr. Flux made the following marginal note:—

Part of Proposed Bye-law.	*Mr. Flux's Marginal Note.*
After the 31st day of December, 1876, no person shall be admitted to the Minor examination who has not been registered or employed as an apprentice or student at least three years previously.	This appears to us to vary from the intention that the examinations shall be freely open to all the world, and we recommend its erasure.

Mr. Flux also makes the following note to another proposed amendment of bye-law, what is equally applicable to section 10, clause 16. "The Statutes contemplate that each examination shall be complete in itself and open to all the world, but proper regulations may be made for the *conduct* of the examinations."

Before the *Parliamentary Committee* Mr. Flux also maintained with great force and clearness that the charter and statutes gave no power to exact a three years' interval between the Preliminary and Minor examinations. He averred that a reasonable time might be exacted—say a few days,—but he maintained that a period of three years was, in his opinion, unreasonable and illegal.

Having read and re-read the Acts and charter, with a view to discover the powers necessary to enforce the term and interval between the Preliminary and Minor examinations fixed by the amended bye-law as accepted by the Council, I was not unprepared to find that Mr. Flux, in his capacity of legal adviser to the Society, recommended its erasure, and that he so far independently justified the position of opposition I had taken up.

I was, however, filled with wondering amazement when I discovered at the last meeting of the Council that Mr. Flux had completely altered his views, because the words "apprentice or student" had been removed from the proposed bye-law. The words, about which there surely must hang a spell, still remain, although not precisely in the same position.

To facilitate a comparison of the proposed amended bye-law submitted to Mr. Flux, and which he pronounced to be illegal, and the amended bye-law he now pronounces to be in conformity to law, I place them side by side.

The Illegal Bye-law.	*The Legal Bye-law.*
After the 31st day of December, 1876, no person shall be admitted to the Minor examination who has not been registered or employed as an apprentice or student at least three years previously.	After the 31st day of December, 1876, no person shall be allowed to pass the Major or the Minor examinations, unless he shall satisfy the examiners that for three years he has been registered and employed as an apprentice or student, or has otherwise for three years been practically engaged in the translation and dispensing of prescriptions.

Perhaps my obtuseness and want of legal training incapacitate me from comprehending the subtle distinction which may exist between the two formulæ.

I can only congratulate myself under these circumstances, that I compound physic as a vocation, and not expound law.

The question of legality is a very grave one, and as I honestly believed that the Council was over-stepping its powers, I have done my best in an open manner to oppose the progress of the bye-law in its various stages.

If the Council be competent to stretch the law in one direction, why not in another?

The plea of advantage to the Society is urged on behalf of the illegal test. This is dangerous ground on which to move. Rather let fresh power be sought from Parliament if it can be shown that it is necessary and advisable to institute such a change.

I have tried in vain to procure, from all likely quarters, evidence that an appreciable number of persons pass the examinations who have not been previously subjected to a term of apprenticeship.

If proof of this kind had been adduced, there would have been a show of reason to justify a compulsory term if *legally obtained and exacted.* Not a tittle of evidence,—which evidence should have been the ground-work for the proposed alterations,—has been offered.

It is not yet too late to halt in the illegal course, and I trust that the members will, at the special general meeting, refuse to sanction the objectionable bye-law, which if passed, will remain a precedent of illegality.

205, *St. John's Road, E.C.,* Robert Hampson.
April 8th, 1873.

P.S.—I am reported—in the report of the April meeting of Council—to have proposed eighteen members for the Board of Examiners. This is a mistake, Mr. Schacht made this proposition.

[*⁎* We publish Mr. Hampson's letter *in extenso*, though it appears to contain matter which is not subject to reporting. In justice to ourselves we may add, that nothing was cut out or withheld from the draft of Mr. Hampson's speech handed to us by the reporter appointed to take down the Council proceedings, and likewise that Mr. Hampson had full opportunity to make any requisite correction in the proof-sheets.—Ed. Ph. Journ.]

Pharmacy in Ireland.

Sir,—A great amount of misunderstanding seems to exist in the minds of English chemists regarding the state of pharmacy in Ireland, especially with regard to the position occupied by chemists and druggists there.

The Irish chemists and druggists must not be confounded with those bearing the same name in England and Scotland. They are merely retailers of drugs, and have never been trained to dispense physicians' prescriptions. In fact, such a class may exist in England and Scotland in a few years, especially if the standard of pharmaceutical education be raised much higher. The Irish apothecaries are the Irish pharmacists proper, and in the larger towns, where they have given up the practice of medicine, and have devoted themselves to the retailing of drugs and the dispensing of prescriptions, pharmacy is in as flourishing a condition as it is either in England or Scotland. But the very fact of so many apothecaries having recognized that the practice of medicine and the practice of pharmacy ought to be vested in separate individuals, proves that a change in the existing state of things is required. Either the apothecaries must give up the medical part of their examination, or a new class must be instituted, having equal privileges with them in the practice of pharmacy.

At a meeting of the United Society of Chemists and Druggists of Ireland held recently, it was proposed that the Pharmaceutical Society be requested to extend their operations to Ireland. It would certainly be an advantage to have all the pharmacists of the United Kingdom subject to the same examinations; but it would be a great mistake to lower the examination—permitting pharmacists to commence business—to our Minor, where an examination equal to our Major might be easily enforced.

The draft bill drawn up by the Court of Apothecaries (a copy of which was printed in the first volume of the present series of the Pharmaceutical Journal, page 405) would meet all the requirements of the case. When this bill was formerly discussed in the pages of the Journal, the chemists and druggists (of Ireland) claimed a right to a modified examination, upon what grounds I cannot conceive. It would be a great misfortune to allow any class of men to become pharmacists who have never received the necessary training which would enable them to discharge such responsible duties, without their first giving ample proof of their abilities.

The apothecaries seem quite alive to the necessity for some change; and in place of crying out about vested interests, as they might have done, will evidently give their support to any good measure; but those who know the chemists and druggists of Ireland could never advocate their being admitted, as a body, to the privilege of dispensing.

The influence of the Pharmaceutical Society might be exerted in procuring a mutual recognition of examinations; our Major being held equal to the examination proposed in the draft bill for pharmacists commencing business, and our Minor equal to the proposed examination for assistants. The Modified examination we could scarcely expect to be recognized.

ALEX. ANDERSON.

277, *Oxford Street, W., March* 31*st*, 1873.

SUBJECTS FOR EXAMINATION.

Sir,—Among the many proposals regarding the examinations which have appeared in the Journal lately, there have been, as far as I have seen, none urging the advisability of including a knowledge of pharmaceutic jurisprudence in the list of subjects required for the Major or Minor. Nevertheless it is, in my humble opinion, a subject which yields in importance to scarcely any. And if the Council were to require a knowledge of the Arsenic Act, the Pharmacy Act, etc., we should not hear of so many unfortunate pharmacists being censured for contravening any of the legal enactments concerning the business as we do at present. A knowledge of medical jurisprudence is required from candidates for a medical degree, and if a knowledge of pharmaceutic jurisprudence were insisted on for the Major or Minor, it would, I think, do something towards raising the business towards that professional status which many seem to desire.

I hope that this may induce those who are more fully qualified to discuss this subject than I am, to enter the lists.

JURISPRUDENTIA.

Edinburgh, March 29*th*, 1873.

CHEAP DISPENSING.

Sir,—The subject of cheap dispensing has been the burthen of so many letters in the Journal, that its readers may be excused if they consider the subject rather threadbare. However, sometimes a specimen crops up, so glaringly inconsistent, that it seems best, when found, to make a note of it. The following prescription was handed me for dispensing, and two shillings charged as being a fair remuneration:—

℞ Acid. Nit. Mur. Dil. . . . . ʒij
Tinct. Scillæ . . . . ℥ss
Syrupi . . . . ℥j
Ext. Cinchon. Liq. Flavæ . . ʒiij
Aquæ ad . . . . ℥vj
℥ss ter in die ex aqua. M. ft. mist.

Judge of my surprise when the customer informed me that it had been made up for sixteenpence at a first-class establishment in a neighbouring fashionable resort, and that at Bristol tenpence was considered an honest price; while, to crown all, the medical man who wrote the prescription, gave advice and medicine for a shilling. Now, Sir, I have not the slightest reason for doubting the statement, but how is it done? I take it that the prime cost of ingredients and bottle, etc., would be hard upon fourteenpence (and say nothing about time), so that even at sixteenpence, with bottle brought, what a pitiful profit it would leave the man who has spent months in studying to qualify.

Of course, if legitimately dispensed, there could not be a profit either at tenpence or a shilling, and they cannot live upon the loss; so the only conclusion one can arrive at is that the ext. cinchon. liq. must be very much below the B. P. standard. Mr. Gerrard last week clearly showed how utterly dishonest such a system of dispensing is, and a glance at the figures representing his analysis of various samples of citrate of iron and quinine will perhaps reveal the real secret of cheap physic.

W. GEORGE BLADON.

Malvern Wells, April 1*st*, 1873.

METHYLATED SPIRIT AND THE ADULTERATION ACT.

Sir,—I have, like many others, been accustomed to keep two kinds of soap—liniment and spirit of camphor, made from methylated spirit—where a poor class of customers require such for *outward application*. Now, as one likes to know and do what is legal, can you inform me whether, under the new Adulterated Drug Act, such can be sold over the counter; and if so, will *one be compelled* to print *methylated* soap liniment and *methylated* spirit of camphor? Of course the pure I always use in prescriptions.

W. DALE.

Queen Street, Portsea, April 2*nd*, 1873.

PHARMACY IN QUEENSLAND.

Sir,—Will you kindly give insertion to this letter, as it may induce enterprising young men to go out to a colony that is fast rising in importance.

Several of our correspondents in Queensland have complained of the great want of Chemists' Assistants in that colony, and we know of one instance in which a good branch establishment had to be closed simply from the want of a competent assistant to carry it on.

We would beg to suggest this colony as an admirable field of labour for young men who have passed their examinations, and have not secured an engagement in this country.

BURGOYNE, BURBIDGES, AND CO.

16, *Coleman Street, London, E.C.,*
April 4*th*, 1873.

"*Lux.*"—You would probably obtain an explanation of the words in question at the office from whence the advertisement issued. Our correspondent writes that a dispensary appointment, for which it was specified that a legal qualification should be possessed by the candidates, was given to a person who had passed what is known as the "Assistants' Examination" of the Apothecaries' Company. Our correspondent further states that the fee for the above examination is two guineas, and he is of opinion, "seeing that a person passing so cheap and easy an examination can compete with those who go through the expensive ordeal of the Pharmaceutical Society and obtain one of the best paid situations that now offer," there exists a strong argument in favour of lowering the examination fees. As the law at present stands, no legal qualification at all is necessary for holding a dispensary appointment, such as that mentioned by our correspondent, any more than legal qualification is necessary for a dispensing chemist's assistant. This, no doubt, is a grave deficiency, but we are unable to perceive that it affords any argument in favour of lowering the examination fees of the Pharmaceutical Society.

W. A. C.—Several recipes for the removal of dandriff have appeared in the present series of the Journal. See Vol. I., p. 557; Vol. II., pp. 637, 878.

J. W.—The medal you refer to is a thing not at all countenanced by the Pharmaceutical Society, and we should expect those making use of the fact of possessing it would be classed among quacks and other exhibitors of spurious credentials.

W. K. H.—It is not necessary to rub the subnitrate down in a mortar before mixing it with any considerable bulk of an aqueous vehicle. The carbonate, on account of its somewhat granular condition, should first be triturated with a little of the vehicle.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. W. Brierly, Mr. Delves, Mr. Bennett, Mr. Clowes, Mr. Hanbury, Mr. Butler, X. Y. Z.

THE EMBRYO APPENDIX.

BY CHARLES SYMES, PH.D.

The report of the discussion under this head at the pharmaceutical meeting forms an interesting portion of this Journal for April 5th. Professor Redwood appears to adhere as tenaciously as Paul himself to the good old maxim, "Prove all things, hold fast that which is good;" and I quite agree with him that it is time tinct. aurantii recentis should be put on trial. It is of much older date than Mr. Martindale supposes. I have prepared it in quantities of two or three gallons at a time for a period of twelve years, and during the first half of that time made various experiments as to the best proportions of peel, spirit, and water calculated to produce a good tincture. For the last five or six years I have uniformly adhered to the formula given a few months since in this Journal with very satisfactory results, but using a tincture containing a larger proportion of spirit for preparing tinct. quinæ comp. Seeing it desirable, however, to have one uniform tincture for all purposes, I have recently prepared one gallon from the following formula:—

Thin fresh peel of Bitter Oranges . . .	5 oz.
Distilled Water	3 oz.
Rectified Spirit	17 oz.

Macerate the peel in the water with occasional agitation for forty-eight hours, then add the spirit, and continue the maceration and occasional agitation for a week. This makes an excellent tincture, and I suggest it as a suitable one for the Appendix. The *rationale* of the process is this: rectified spirit is the best solvent of the volatile oil, but it tends to harden the texture of the peel, and thus to seal up from its action that oil in the containing vesicles.

Water has just the opposite effect; it tends to soften and break up the organization of the peel, so that the previous maceration with it, and afterwards with the addition of the spirit, enables the operator to produce in nine days a tincture which could not be so well prepared with rectified spirit alone in a month.

I cannot imagine that any complication would arise from the introduction of a second tincture: that prepared from the fresh peel is not quite so dark as from the dry,—the chief difference is in point of flavour.

I have used it in dispensing for the above-mentioned period, and my experience has been that no one has complained of any difference as regards colour; but occasionally a customer has remarked that "a mixture possessed a much finer flavour of orange than when previously dispensed elsewhere." A simple explanation of the difference has always been satisfactory, has left the reputation of the previous dispenser unscathed, and has not diminished my own. Then comes the question of supply. Bitter Seville oranges are abundant in the markets from January till the end of April or beginning of May; and a chemist can very nearly estimate his consumption of the tincture during the season in which they cannot well be procured; he has only to act accordingly. Should his supply run short, I have no doubt but his wholesale friends would be glad to help him out of the difficulty.

Tincture of lemon peel is best prepared in the manner I have suggested to adopt for tincture of orange peel; but of course at the present time no material alteration in the B. P. existing formulæ can be made.

I think there would be an advantage in introducing into the proposed Appendix, a new syrup of lemons—"a syrup of lemon peel," made by adding 1 part tincture to 7 simple syrup—to correspond with the syrup of orange peel. Syrup of lemons is often prescribed as a flavouring agent in alkaline mixtures, where it is evidently not desired to exercise any neutralizing effect; the proposed syrup could be designated syr. cort. limonis; and if on the publication of a new edition of the Pharmacopœia it was found desirable to retain the acid syrup, it would be best prepared by adding 20 grains of citric acid to each fluid ounce of the above.

Extractum belladonnæ alcoholicum, prepared by treating the inspissated juice with alcohol, is a therapeutic agent by no means new, but one which should find its way into the Appendix. The only Pharmacopœia preparation (according to that authority), into which the present extract enters, is emplastrum belladonnæ, in the formula for which instructions are given for more or less imperfectly exhausting the extract with spirit.

If, however, we turn to unguentum belladonnæ we find the extract there in the proportion of 80 grains to one ounce of lard—"a most unnatural admixture," the instructions for preparing which should be—"rub with untiring perseverance, and do not scrutinize with microscopic eye when finished."

With *one fourth the quantity* of alcoholic extract we can prepare an ointment with which the B.P. preparation cannot compare either in elegance or efficiency.

The same remark applies to the preparation of pessaries, suppositories, and bougies of belladonna with cacao-butter or other fatty substances. The retention of the present extract would be convenient, perhaps, for dispensing in the form of pills, but for mixtures, the succus belladonnæ is well calculated to replace it.

A SOLUTION OF CHLORIDE OF IRON.

BY EDWARD BUTLER.

If a quantity of Liquor Ferri Alkalini, P.L. 1824, be kept until it has deposited a part of its iron as hydrated peroxide, this deposit, if filtered off, washed frequently, and added while moist to a weak solution of hydrochloric acid, about f℥i strong acid to f℥xv of water, and the solution filtered, presents the following peculiarities:—

It is a deep garnet red colour instead of yellow.

It has scarcely any taste, either acid or ferrous, but is very astringent.

This preparation seems to answer to the article mentioned by Mr. Squire, in his last edition of the Companion to the Pharmacopœia, as liq. ferri chloroxidi.

THE BOTANICAL ORIGIN AND COUNTRY OF MYRRH.*

BY D. HANBURY, F.R.S.

The remarks relative to myrrh in the 'Admiralty Manual of Scientific Inquiry, 1859 and 1871,'† having

* Reprinted from *Ocean Highways* for April, 1873, the loan of the woodcuts being kindly permitted.

† *Vide* PHARM. JOURN., I. (1860), 217; II. (1871), 205.

elicited no information, it may tend to stimulate those who are located in positions favourable for research if the state of our knowledge on the subject is briefly explained. The direction in which investigations should be made will thus become more apparent.

Myrrh is a gum-resin exuding from the stem of a small tree or shrub which is a native of the hot and dry countries around the southern extremity of the Red Sea. Though the substance itself has been known to mankind from the remotest period of history, and though it has been among the most precious articles of ancient commerce, the tree which affords it is almost—perhaps altogether—unknown to botanists. Whether the myrrh-tree belongs to a single species is doubtful; it is more probable that the drug is furnished by two or three distinct but allied species.

Let us now consider what has been ascertained on the subject. In 1820–26, the German traveller Ehrenberg visited the countries bordering the Red Sea, and among other places, Ghizan (Jhizan or Jezan), a town or village lying on the Arabian coast in latitude 16° 40′ N., opposite to the group of islands called the Farsan Archipelago,—that is to say, about 300 miles north of the straits of Bab-el-Mandeb

Balsamodendron Myrrha (after N. v. Esenbeck).

Here, and on the neighbouring mountains of Djara and Kara (which I do not find on any map I have been able to consult), he discovered myrrh-trees, forming, as he says, the underwood of a forest of *Acacia, Moringa,* and *Euphorbia.* From these myrrh-trees, he states, he picked some very fine myrrh. He also obtained herbarium specimens which the botanist Nees von Esenbeck described and figured under the name of *Balsamodendron Myrrha,*—thus, as it would seem, completely settling the question.

A few years ago Ehrenberg's herbarium was incorporated in the Royal Herbarium of Berlin, and these myrrh-tree specimens were re-examined by Dr. Otto Berg, with results which doubtless occasioned him some surprise. He found in fact, that Ehrenberg's Arabian myrrh-tree comprised two very distinct plants, namely, that figured by Von Esenbeck, and another to which was attached (*correctly,* let us hope) Ehrenberg's own tickets, stating that from it he had got myrrh. Berg gave the new myrrh-tree the name of *B. Ehrenbergianum.*

Whether myrrh is collected *from both* we do not know. Ehrenberg himself does not assert that the natives about Ghizan collect myrrh at all; and the myrrh of commerce is certainly not brought from that neighbourhood.

Whence, then, is myrrh brought? Vaughan, who was port-surgeon at Aden in 1852, says that a little is obtained on the south coast of Arabia, about 40 miles to the east of Aden. But this Arabian myrrh, of which I have seen samples, has not (although pure and clean) exactly the characters of true myrrh, and there is good reason to believe it the produce of another species than that affording the latter. However this may be, the Aden myrrh-tree is wholly unknown to botanists. Vaughan further pointed out that

B. Ehrenbergianum (after Berg).

myrrh, which is more commonly known at Aden by its Indian name of *Hera-bôl* than by its Arabic designation of *Mur,* is collected in great quantities by the Somali tribes occupying the country between Zeila and Cape Gardafui; and that it is also brought from Harar (otherwise called Hurrur or Adari), a commercial town of the interior, about 175 miles south-west of Zeila. Harar was visited in 1855 by Burton, who describes it as the "great half-way house" for the produce of Efát, Gurague, and the Galla countries. The drug arrives at the great fair of Berbera held in November, December, and January, and is bought up by the Banians of India for shipment to Aden and Bombay.

Cruttenden, who visited the Somali coast in 1843, and was afterwards assistant political agent at Aden, says myrrh is brought from the Wadi Nogál, a valley debouching into the Indian Ocean, south of Cape Gardafui, in about latitude 8° N., and from its bordering districts of Ogahden, Murreyhan, and Agahora. He says further that the mountains at the back of

Bender Mirayeh (a town about 20 miles south-west of Ras Filek, on the Somali coast) afford it, and that the drug is brought to Bender Mirayeh for sale.*

Whether it is *true myrrh* which is produced in these districts of the Somali country, or whether it is another kind of myrrh called by the Arabs *Bisa-ból*, and which is chiefly consumed in India and China, is an open question.

Again, it has been stated on very good authority, that myrrh is produced in the country lying between Tajúra and Shoa. Sir W. Cornwallis Harris, who was chief of a mission to the latter country in 1841, found the myrrh-tree between Waramilli and Nága Koomi, that is, about 200 miles from Tajúra, on the road to Ankober, the capital of Shoa. In an appendix to his narrative, he names as localities for the plant, the Adal desert, the jungle of the Háwash, and the borders of Efát.

It will thus be seen that four districts are asserted to produce myrrh, namely—1. the country about Ghizan, on the eastern shore of the Red Sea; 2. the southern Arabian coast eastward of Aden; 3. the Somali country south and west of Cape Gardafui; and 4. the region lying between Tajúra and Shoa, including Harar to the south-east.

Furthermore, there are certainly three varieties of myrrh which may well be derived from as many distinct species of myrrh-tree.

What are required for the botanical elucidation of the origin of myrrh are numerous, well-preserved, pressed and dried specimens of the tree, which ought to include, in addition to foliage, the flowers and fruits; specimens of the exudation of the tree should also be collected, in order that competent persons may pronounce whether it is true myrrh or not. Information as to the collection of the drug in any one of the localities named could not fail to be of interest.

The myrrh-trees appear to be of low stature and unattractive aspect, rigid, often spiny, with scanty foliage, minute flowers, and small, oval, dry berries.

* 'Journal of Royal Geographical Society,' xix. (1849), 65, 66.

GREEN IODIDE OF MERCURY.*

BY JULES LEFORT.

The green iodide of mercury, as hitherto prepared, is one of the most unsatisfactory mercurial salts in respect to stability. On this point the medical man and the pharmacist have long been in accord; for many therapeutists, M. Devergie† in particular, who have specially studied the action of this compound, consider it to be a medicament of doubtful value, and in any case to be very inferior to the red iodide. Indeed, it cannot well be otherwise, as it is known that the green iodide prepared by the direct action of iodine upon mercury, is always a mixture of the true mercurous iodide, a variable proportion of metallic mercury and sometimes of the red iodide, the colour varying from a dark green to a yellowish green, according to the care taken in its preparation.

Some chemists have been so convinced of the im-

* Paper read before the Paris Society of Pharmacy, March 5. 1873. From 'L'Union Pharmaceutique,' vol. xiv. p. 75.

† 'Bull. Thér. Méd. et Chirurg.,' Nov. 30, 1871.

perfection of the present mode of preparing this compound, that they have sought to obtain a better preparation by the double decomposition of a mercurous salt—such as the acetate or the nitrate—and an alkaline iodide, such as iodide of potassium. But, as is well known, these mercurous salts are not soluble in water except in presence of excess of acid; and if such solutions be treated with iodide of potassium, the free acid displacing a small quantity of iodine produces a mixture of red iodide of mercury and metallic mercury, which contaminates the precipitate. Of course the mercuric iodide is always easily separated from such a mixture; but such is not the case with respect to the metallic mercury which accompanies the green iodide through all the reactions to which it may be submitted.

In order to prepare the green iodide by double decomposition, the problem consists in finding a mercurous salt very soluble in water and neutral to test-paper. This I believe I have met with in the double pyrophosphate of soda and mercurous acetate, a salt which is included in the catalogue of double pyrophosphates which have been described by Persoz* and Pahl.† It is known, in fact, that the pyrophosphate of soda possesses the property of forming, with many salts and metallic oxides, definite compounds generally very soluble in water. Now I have found that with *chemically pure* pyrophosphate of soda mercurous acetate forms a compound which crystallizes in fine needles, changing after long exposure to air, but very soluble, without decomposition, in water. This salt, dissolved in a sufficient quantity of water, mixed with an equally dilute solution of iodide of potassium, yields a fine yellowish green precipitate, having exactly the composition HgI. As to the pyrophosphate of soda, it appears to take no part in the reaction unless it be to present the mercurous acetate to the iodide of potassium in a state of solution.

To prepare the pyrophosphate of soda and mercurous acetate, 60 grams of pure crystallized pyrophosphate of soda are dissolved in 300 grams of warm distilled water. After the solution becomes cool, 30 grams of mercurous acetate are added, and the mixture is left to react during several hours at ordinary temperature, assisted by occasional shakings. If the pyrophosphate of soda is chemically pure, the mercurous acetate is entirely dissolved, without the slightest decomposition; but such is not usually the case. During the action of the red heat upon the neutral phosphate of soda, to convert it into pyrophosphate, there appears to be a partial separation of the phosphoric acid from the soda, or a temperature too high and too long-continued eliminates a little phosphoric acid, so as to leave in the product of calcination a little free alkali. Practically, the pyrophosphate of soda usually reduces a small quantity of the mercurous acetate to a mercuric salt and metallic mercury. This fact has no other importance than slightly diminishing the yield of green iodide, and may be avoided in great part by care in choosing pyrophosphate of soda as pure as possible.

The solution of pyrophosphate of soda and mercurous acetate is filtered and added to another volume of distilled water. A solution of 30 grams of iodide of potassium in a litre of water is then poured in a little at a time, shaking after each addition. When the salts are perfectly pure, the precipitate produced is at first brownish green, then green, in which state it much resembles green oxide of chromium; but when it settles at the bottom of the vessel it has a yellowish green tint, which would lead to the presumption that it is a polychromatic salt. Neither in the first nor in the last phase of the precipitation is there any iodine or mercury set free, as is the case when mercurous nitrate and iodide of potassium is used. But should the solution of pyrophosphate of soda and mercurous acetate contain, as is usually the case, a little mercuric acetate, then towards the end of the operation a small quantity of red iodide is seen colouring the liquid a pale red; but it is easy to get rid of this by means of a slight excess of solution of iodide of potassium, which, thus diluted, does not decompose the green iodide of mercury. As a further precaution, the absence of mercuric iodide may be ensured by washing the precipitate with warm concentrated alcohol. The green iodide, washed sufficiently by decantation and afterwards collected upon a filter, should be dried at a moderate heat, and sheltered from the light.

The process described above is much more costly than that usually followed, but I consider the quality of the product obtained so superior as to remove any such objection.

* 'Journ. de Pharm. et de Chimie' [3], vol. xii. p. 218.
† 'Bull. Soc. Chim. de Paris,' 1873, vol. xix. p. 115.

THE MICROSCOPE IN PHARMACY.

BY HENRY POCKLINGTON.

(*Continued from p.* 762.)

Simarubæ Cortex.—Not in the B.P., but sufficiently generally used to be admitted here. General structure loose and spongy; medullary rays narrow and sinuous, or wider and straight; liber cells small, not numerous, and with thin walls; stellate cells numerous, large, porous, isolated, and aggregated in groups of three to six, sometimes more. Such is a brief general description of the structure of this bark, and with a few remarks on the more important points will suffice.

The first point that strikes one is the exceeding thinness of the walls of the whole of the cells excepting the stellates, and the thickness and solidity of the walls of the stellate cells. The whole structure, apart from these latter cells, is that of an endogenous water plant, so far as regards shape and delicacy of the cells. The liber cells themselves are almost wholly unthickened, and short tubular cells with relatively large central cavities. With these are associated almost perfectly globose, thin cells, containing prismatic, doubly refractive crystals, minute, and easily mistaken for small air-bubbles. Exceptionally long liber cells occasionally occur, and are apparently very minutely porous. The existence of pores can only be inferred from certain dispersive optical phenomena; they are entirely invisible under as high a power as can be used upon these tissues with success.

The stellate cells have generally very large central cavities, the smaller cells being nearly filled; they are very hard, minutely porous, and the successive depositions of sclerogen can only be seen with difficulty, in many instances, after the prolonged use of powerful reagents.

It is not an easy bark to examine, and cannot be properly examined when dried. An investigation of a fresh specimen would be interesting. A dried specimen affords a good subject wherewith to test the progress of a student. Magenta-stained sections are the most useful. Transverse sections unstained show but little. Radial sections are at once the most difficult to make and the most valuable. The absence of the bark from the Pharmacopœia, and the impossibility of studying it in dried specimens, are sufficient excuses for treating it with greater brevity than its interest structurally warrants.

The Cinchonas and a new candidate or two for pharmaceutical favour now only remain of the barks. Of the Cinchonas Mr. Howard has written so exhaustively that little remains to be said, save only from the microspectroscopic point of view. I shall therefore restrict myself to saying just enough to place before my readers the salient features of Cinchona structure, and to noting a few points of interest arising out of a spectroscopic examination of the colouring-matters of the bark, this latter serving as an introduction to the more serious microspectroscopic investigation of the coloriferous woods that will shortly engage our attention. Before touching the Cinchonas, however, I will say a little about the new candidate, and perhaps their some-day rival, *Eucalyptus globulus,* for very fine specimens of the bark and leaves of which plant I am indebted to the liberality of Messrs. Savory and Moore.

PERFUMES PHYSIOLOGICALLY AND COMMERCIALLY CONSIDERED.*

BY JAMES PATON.

Assistant Keeper, Museum of Science and Art, Edinburgh.

(*Concluded from p.* 805.)

Among animal perfumes, which are limited to three, musk deserves, from its importance, the first notice. Musk is secreted in a small follicle or pouch, termed in commerce a pod, which is found between the navel and the preputial orifice of the adult male alone of a small species of deer, *Moschus moschiferus.* The creature is nocturnal in its habits, exceedingly timid and fleet of foot, and therefore very difficult to stalk, if we may use such an expression. The animal is about the size of a greyhound, is hornless, and has two projecting canine tusk-like teeth developed in the upper jaw. The musk deer is very widely distributed in the mountainous regions of Central Asia, going northward from the slopes of the Himalayas, over the new kingdom of Kashgaria, and stretching even into Asiatic Russia, the length of Lake Baikal, and the course of the Yeniseisk. To the east it is found in the hilly regions of Assam and in the Chinese province of Sechuen, from which the finest qualities of musk are imported. Col. Markham, in his 'Journal of Sporting Adventure and Travels in Chinese Tartary and Thibet,' says:—"The musk, which is much better known than the deer itself, is only found in adult males; the females having none, neither has any portion of their bodies the slightest odour of musk. The dung of the males smells nearly as strong as musk; but, singularly enough, neither in the contents of the stomach nor bladder, nor in any other part of the body, is there any perceptible scent of musk. The pod which is placed near the navel, and between the flesh and skin, is composed of several layers of thin skin, in which the musk is confined, and has much the appearance of the craw or stomach of a partridge when full of food. There is an orifice outward through the skin, into which, by a slight pressure, the little finger will pass; but it has no connection whatever with the body. It is probable that musk is at times discharged through this orifice, as the pod is often found not half full, and sometimes even nearly void. The musk itself is in grains from the size of a small bullet to small shot. In autumn and winter the grains are firm, hard, and nearly dry; but in summer they become damp and soft. For two years after the birth of the animal the contents of the pod remain a soft milky substance, with a disagreeable smell. When it first becomes musk there is not much more than the eighth of an ounce. Though not so strong, the musk of young animals has a much pleasanter smell than that of old ones; but difference of food, climate, and situation, as far as my experience goes, does not at all affect the quality. . . . In many respects they are not unlike hares in their habits and economy. Each individual selects some particular spot for its favourite retreat, about which it remains still and at rest throughout the day, leaving it in the evening to search for food or to wander about, returning soon after daylight. They will occasionally rest for the day in any place where they may happen to be in the morning, but in general they return to near the same spot almost every day, making forms in different quarters of their retreat a little from each other, and visiting them in turn. . . . They seldom, if ever, lie in the sun, even in the coldest weather, and their forms are always made where there is something to shelter them from its rays. Towards evening they begin to move, and during the night they appear to wander about a good deal from top to bottom of the hill, or from one side to another. Their nocturnal rambles are apparently as much for recreation as in search of food, as they often visit regularly some steep ledge of rock or precipice, where there is little or no vegetation. The Puharries believe that they come to such places to play and dance with each other, and often set their snares along the edge of such a ledge or precipice in preference to the forest. In most of the hill states the musk deer is considered as royal property. In some the Rajahs keep men purposely to hunt it, and in Gurwhal a fine is imposed upon any Puharrie who is known to have sold a musk-pod to a stranger. In some districts they are hunted down with dogs, but snaring is by far the most common method practised for their capture; a few are occasionally shot by the village shikarries when in pursuit of other animals, but the match-lock is seldom taken out purposely to hunt musk deer, for a hill shikarrie does not carry the match lighted, and the deer being generally come upon face to face, almost every one would get away before he could strike a light and apply it to the match."

Three kinds of musk find their way into the English market, the first of which, Kabardeen, or Russian musk, comes to us from Siberia through Russia. It is of a very inferior quality, being poor in odour, and is said to be the produce of a different species from the Himalayan musk deer, called *Moschus Sibiricus.* The pods are large, and usually are to be depended on as to genuineness, which is much more than can be said for the pods we import in caddies from China. The Chinese musk generally is valued at from four to six times as much as the Russian, and in buying this very dear substance the purchaser would require to beware of bargaining for a pig in a poke. It is frequently adulterated with baked blood, dried liver, bark, pellets of lead, etc., to such an extent that only the smell of the orginal tenant remains in the pod. The perfumers further distinguish Assam musk from the Chinese or Tonquin musk, by its possession of a much more rank smell than that imported from China. Regarding the musk of the Western Himalayas, I find the following note in the catalogue of the Agra Exhibition of 1867:—"The Simla musk balls, which are presented as complimentary nazars by hill chiefs, are an inferior kind, and do not command anything like the price of the genuine Thibet balls. About 100 musk bags are imported from Changthan *viâ* Yarkand, of which about forty go to Yarkand; the rest

* Read at a meeting of the North British Branch of the Pharmaceutical Society, March 28, 1873.

go to Kashmir and Jammu, and are taken by Yarkand pilgrims to Mecca, for sale in India or other Asiatic countries. They are produced in the north-west of Rodokh and Nepal, and valued at Le (in Kashmir) from seven to fifteen rupees, at Yarkand from twenty-one to twenty-six rupees. In former times, musk bags of the Dasht-i-Khuttan, or great Tartar Desert, were in high repute, and fetched at the least forty-two rupees; but all supply from that quarter has long ceased."

Among animal perfumes musk not only stands pre-eminent, but in many respects it is the most wonderful material nature places at the disposal of the perfumer, and it has in all times been the most highly prized among the oriental peoples who possessed or could purchase it. According to the author and prophet of the Mussulman faith, the floor of the seventh heaven, or paradise of the faithful, is composed of pure wheaten flour mixed with musk and saffron, and the black-eyed houris who will welcome the immortal braves to these realms of odoriferous bliss are themselves fashioned out of pure musk. So enchanting to the senses of the followers of the prophet is the odour of musk, that it is said there exist two mosques in the mortar of which an enormous quantity of pure musk was mixed up; and such is the penetrating and enduring odour of this substance, that probably the perfume will continue powerful and persistent as long as the finger of time permits the walls to hold together.

Besides the *Moschus moschiferus*, which is practically the only source of musk in commerce, many other animals and even plants are possessed of a powerful musk odour. Among the creatures possessing the scent are the musk ox, *Ovibos moschatus*, of the northern regions; the musk rat of India, *Sorex myosurus;* the European musk rat, *Mygale moschata;* and of all other sources, the alligators and crocodiles of both hemispheres. This source of musk is well-known and utilized in India, as an extract from the catalogue of the Madras Exhibition of 1855, speaking of the alligator in Travancore, will show. "Musk," it says, "is taken from the glands of the jaw, which is very fine if well prepared, and separated from the flesh, otherwise it will give a very bad smell." Among the articles exhibited by Egypt in the Paris Exhibition of 1867, there occurred the musk of the crocodile as one of the ingredients in Egyptian perfumery. Many insects are also powerfully pervaded with an odour of musk. Among plants possessing the odour there may be named the seeds of *Abelmoschus moschata*, and the *Mimulus moschatus*, an American importation common in nearly all gardens, and which has taken so kindly to many of our water-courses that the whole reach of many of our streams is yellow with them in July. The most powerful odour of musk is, however, contained in the Sumbul or musk-root, *Hyalolena Siverzovii*, an umbelliferous root which comes to us from Afghanistan.

Civet must have been in the days of Shakespeare a very fashionable perfume, judging from the frequency of his allusions to that substance; and coming down even to the time of Cowper, we find the substance singled out for mention, though perhaps not what Exhibition juries term "honourable mention."

> "I cannot talk with civet in the room,
> A fine puss gentleman, that's all perfume."

It does not appear that the fine puss is here put in with any special purpose, but it occurs quite appropriately when we know that civet is yielded by several species of animals of the cat tribe, chiefly by *Viverra civetta*, or the civet, which occurs in the hottest regions of North Africa and Abyssinia, and *Viverra zibetha*, or the zibeth, a native of the Philippine Islands. Besides these animals there are various allied species of *Viverra* and *Viverrula*, which occur throughout India, all possessed of a civet pouch. The civet apparatus is present in both the male and female, and consists of two glands or sacs, placed in the neighbourhood of the genital organs, the inner surface of the sacs being pierced with a number of apertures communicating with the glandular follicles which secrete the material. Civets used to be kept in confinement in Dutch towns for the purpose of growing the scent; and at the present day the animal is reared in some parts of Africa in a semi-domesticated condition, and has its civet apparatus cleaned out with a long wooden spoon twice or thrice a week. Civet has in its natural condition anything but a pleasant odour, but in a highly dilute condition it combines most effectively with other odours and imparts to them both permanence and pleasing floral fragrance.

The source of ambergris was for a very long time a profound mystery, and the guesses hazarded about its origin were about as numerous as they were ridiculous. It was found sometimes floating on the surface of the open ocean, and most frequently cast up upon shores so far apart that it can scarcely be said ambergris belongs to one part of the sea more than another. From the coasts of Greenland, Iceland, both sides of America, the islands of the Indian seas, China and Japan, it has been brought. It was supposed at one time to be a balm which grew on sea cliffs just as fungi do on trees; then the dried saliva of whales, the excrement of birds, condensed froth of the sea, etc., etc. It is really formed, whether as a morbid secretion or not is not quite evident, in the alimentary canal of the sperm whale, from specimens of which it has frequently been extracted. Though it is usually obtained in pieces of from 2 oz. to 1 lb. it has been found in enormous masses. In 1691 a piece was found on the beach in county Sligo weighing 62 lbs. which sold in London for above £100. In 1695 the East India Company had a mass weighing 160 lbs. and it is said that pieces of as much even as 860 lbs. have been found, which is rather too much for the whale to contain, or for us to swallow comfortably. Ambergris has a mild sweet odour, not of much value by itself, but it mixes effectively with other perfumes, giving them ethereal odour and some amount of permanence. It is in great favour among oriental nations, where musk, ambergris, sandalwood and rose may be said to be the basis of the system of perfumery.

The time at our disposal will not permit of any extended notice of the most important series of perfumery materials, which are derived from the vegetable world, and to only one or two of the chief substances can any allusion be made. A very important series of substances which enter largely into the art of the perfumer, I have already had the pleasure of noticing in some detail in a paper on oriental spices formerly contributed to this society. Among vegetable sources of perfume the rose stands preeminent, as it has ever been the favourite flower in all regions of the globe, and as such sung by the poets. The first preparation of rose water is attributed to Avicenna in the tenth century, and there is an Indian story of a somewhat romantic air, which assigns to Noor Mahal, the wife of the famous Emperor Shah Jehan, the first discovery of the otto or Attar of roses. Doubtless otto of roses has for some centuries been prepared in India, and to the present day the finest and by far the most precious otto is prepared there. The otto, however, which supplies our markets comes from nearer home, a part of it being produced on the flower farms of Nice, on the Mediterranean coast of France; and the chief supply, not only of England but of all commerce being derived from the province of Adrianople in Turkey. The rose farms which thus supply the world with this prized odour, are chiefly situated on the southern slopes of the Balkan range, where the species cultivated are chiefly *Rosa damascena*, *R. sempervirens* and *R. mo chata;* this last, the musk rose, being that from which Indian otto is prepared. The roses, which are planted in rows, like vines in a vineyard, and are frequently interspersed with vine stocks, produce light red blossoms in the month of May, when the rose harvest takes place. The harvest is a somewhat precarious one, depending for its success on many influences of the atmosphere and weather, such as sudden frosts, the amount of heat, and moisture, etc., besides which the plants are subject to the attack of caterpillars. The entire flower is plucked and submitted to distillation, with its calyx attached. The distilling apparatus consists of a copper boiler tinned externally as well as internally, into which the roses are introduced with water, in the proportion of 50 measures of water to from 10 to 20 of roses. From the distilling apparatus a tube leads into a condensing vat of a primitive description, and the distillate is thence delivered into vasiform bottles of earthenware. It takes two hours boiling to complete the distillation of one charge, and the combined otto and water which come over, are separated by a long spoon funnel which has an aperture so small that it allows the water to escape, but retains the thicker otto. The best qualities of otto freeze at the lowest temperature, the freezing point ranging from 50 to 68° F. On an average 5000 lbs. of roses yield 1 lb. of otto. A substance of so much value of course presents too great temptation to adulteration to be resisted by the conscience of those who deal in it; and it is believed that adulteration is more the rule than the exception; purity in all cases being only a question of degree, and never becoming absolute. The adulterating medium is chiefly the varieties of oil yielded by the Andropogon grasses, and which go by the names of geranium, lemon grass, citronelle, verbena, etc. The oil is prepared for exportation by being put up in tinned copper flasks, which when filled are soldered up, or in gilt glass stoppered bottles, which generally contain inferior qualities. An average year's crop of Adrianople roses yields about 800,000 drams of otto, but for several years the produce, owing to unfortunate circumstances, has fallen off. The produce of 1871 amounted only to 540,000 drams, which was purchasable at 2*s.* 9*d.* per dram, f. o. b. at Gallipoli, equal to £10 10*s.* per lb. In 1867 the price f. o. b. at Gallipoli was 3*s.* 7½*d.* per dram, in 1868, 2*s.* 11*d.*, in 1869, 3*s.* 2*d.*, and in 1870, 2*s.* 11*d.*, and in each year the Turkish customs duties were being reduced 1 per cent., so that the duty, which amounted in 1867 to 5 per cent., was in 1870 only 2 per cent.

The lecturer subsequently noticed various other vegetable sources of perfumery, among which were sandalwood vanilla, the *Andropogon* grasses, Tonquin beans, and patchouli. Specimens of all these substances were exhibited to the meeting, besides stuffed specimens of various species of civets and the musk deer, and the substances which too frequently occupy the pod which should be filled with musk. The lecture concluded as follows—

In the department of the Alpes Maritimes, on the Mediterranean coast of France, flower farming is the staple occupation, and has attained an enormous expansion, and there the extraction of their odoriferous principles has become the leading manufacture. In the French reports on the Exhibition of 1867, it is stated that the trade in flowers and perfumery therefrom in the department amounted to 14,000,000 of francs, and that the yearly produce was 50,000 kilos. of essences, 450,000 kilos. of pomades or scented fats, 225,000 kilos. of perfumed oils, 3,000,000 kilos. of perfumed waters, and 35,000 kilos. of extracts. The flower trade has also become an important feature in the French Colony of Algeria, and some portions of Turkey are devoted to the cultivation of the rose, while in the East the rose, sandalwood, andropogons, patchouli, and the spices, are cultivated for our commerce. At Mitcham, near London, there exist considerable flower farms, chiefly for the cultivation of lavender and peppermint, the two substances, in which alone, as I have already mentioned, we excel. As far as can be made out from the Board of Trade returns, our perfumery trade in 1871 consisted of—Imports

Perfumery, 673,661 lbs., value . . .	£66,710
Essential or perfumed oils, 530,410 lbs., value	174,916
Perfumed spirits, including Eau de Cologne, 31,708 gals., value . . .	58,044
Giving a total value of . . .	£299,660

This of course represents only a small portion of an actual trade in perfumery and its materials which either escape classification, or are placed under other heads. In the same year we exported of perfumery of all sorts to the declared value of £135,444, besides of essential oils in which medicinal are confounded with the perfumes to the value of £226,389. These Board of Trade returns, however, can scarcely possess the value of a rough approximation to the extent of the perfumery trade, for besides the imperfect manner in which they are made up, the system of classification is so mysterious, and the heads under which the returns are made are so vague and general, that they possess only a significance of an uncomplimentary nature, and can lay claim to no higher utility than satisfying the not very exacting official conscience.

GENERATION OF SULPHURETTED HYDROGEN FOR LABORATORY OPERATIONS.*

BY W. SKEY.

In a paper read before the Wellington (New Zealand) Philosophical Society, the author stated that sulphuretted hydrogen was evolved from the surface of the sulphide, in the reaction of sulphides with zinc in acidified water, the zinc being oxidized and the sulphur of the sulphide hydrized. This reaction he now proposes to utilize in the generation of sulphuretted hydrogen for use in laboratory operations, by mixing well together equal proportions of fragments of galena and granulated zinc in a small apparatus of the kind generally in use for the preparation of this gas and adding dilute hydrochloric acid (1 to 20). Sulphuretted hydrogen is instantly given off, and its evolution proceeds energetically and regularly for a great length of time. A little hydrogen accompanies the sulphuretted hydrogen, which would not be objectionable in ordinary operations, together with traces of hydrochloric acid, which may be easily removed by passing it through a little carbonate of lime.

A better method is to use the zinc and the sulphide in mass, connecting them electrically by means of wires passing through the cork of the apparatus, which are only allowed contact with each other by means of proper connecting screws. The evolution of gas commences immediately upon making connection of the wires, and if care be taken to keep the zinc and sulphide from direct contact instantly ceases upon their disconnection. For this last method it is necessary to amalgamate the zinc.

THE TESTING OF FLOUR AND BREAD.†

BY J. ALFRED WANKLYN.

In the course of my work for the chemical section of a Manual, which Messrs. Smith and Elder are publishing, for the guidance of Medical Officers of Health and Public Analysts, I have had occasion to make some original observations on the subject of flour and bread, which appear to be called for at the present time. Notoriously, the detection of alum in bread is beset with difficulties, and is in a very unsatisfactory condition. This depends partly on the excessively small proportion of alum which is put into bread, and partly on the difficulty in dealing with alumina in presence of the ash of bread, which, as is well known, contains phosphoric acid, along with magnesia and lime, as well as silica. It has already been insisted upon by various authorities, that the testing for alum should not be on too small a scale: 100 grams of flour or 200 grams of bread appear to me to be proper quantities to operate upon; and I find that similar quantities have been recommended before. The novelties that I am introducing are, first, the acceleration of the incineration by the use of a jet of oxygen gas directed on the ignited mass. This is by no means unimportant, inasmuch as otherwise the task of incinerating 100 grams of flour might last for a few days. Secondly, instead of using nitric or hydrochloric acid for the attack of the ash, I use

* Abstracted from a paper in the *Chemical News*.
† From the *British Medical Journal*.

sulphuric acid; and, thirdly, I use weighed quantities of reagents, and as little as possible of them, and at the same time avoid all unnecessary dilution. Attention to these particulars renders the detection of alum in bread a certainty. I will give an outline of the process.

The ash from 100 grams of flour weighs 700 milligrams, and, in a case of aluminized flour, may contain some 30 milligrams of alumina in addition. I moisten this ash with a measured 0·5 cubic centimetre of oil of vitriol, then heat up until the oil of vitriol begins to volatilize, whereby the silica is rendered insoluble and the attack of the alumina in the ash is insured. Having done this, and allowed the ash to cool, I dilute with a little water and filter. The filtrate is then treated with 1½ gram of pure caustic potash, which renders it alkaline and redissolves the alumina. The solution is then filtered, and the filtrate treated with 1½ gram of chloride of ammonium, and boiled and allowed to stand, whereupon the alumina is precipitated as phosphate of alumina, which admits of being got on a filter, washed, ignited, and weighed.

The advantage gained in this instance by using weighed quantities of reagents, and by avoiding dilution, will commend itself to chemists, who will not fail to recognize that, though there be difficulty in insuring that an indefinite quantity of acid and alkali shall be quite free from alumina and silica, there is not much difficulty in getting 1 gram of sulphuric acid, 1½ gram of potash or soda, and 1½ gram of chloride of ammonium, so as collectively not to contain a couple of milligrams of alumina or of silica.

The testing whether flour be sound or not by the strength of the aqueous extract is not new, but has been developed and rendered easily practicable in the course of my experiments. The basis of the method is, that in sound flour there is very little sugar and dextrine, but that in unsound flour there is either much sugar and dextrine, or else that a short exposure to the action of water converts much of the starch of the flour into dextrine and sugar. In the space of an hour and a half, I can by a little management make a determination of the quantity of extractive given by a sample of flour. I take 100 grams of the flour, mix it well with some water, and then dilute the whole mass with water until it occupies exactly half a litre. I then pour it on a dry paper filter in a dry funnel, whereupon the liquid runs through tolerably rapidly at first; by and by, as is known, such a filter will become clogged up, but not until at least some 50 cubic centimetres of filtrate have run through. These may be measured and evaporated down to dryness in the water-bath, and the residue weighed. Ten times the residue yielded by the 50 cubic centimetres is equal to the amount of extractive yielded by 100 grams of the flour. The extractive furnished by 100 grams of sound flour is 4·69 grams. Of this, 0·44 gram is ash and 0·92 gram vegetable albumen, leaving 3·33 grams of dextrine, sugar, and gum. If sound flour be left for twenty hours in contact with cold water, and then the aqueous extract be taken, it will be found to be increased somewhat: I found it to be 6·01 grams. In unsound flour, Odling has found 12 and 18·2 grams of extractive per 100 grams of flour. I believe that Odling first proposed the determination of the amount of extractive yielded by flour to cold water as a test of the soundness of flour. I am inclined to the belief that this test may be made very practicable and valuable.

THE VAPOUR-DENSITY OF POTASSIUM.*

BY JAMES DEWAR AND WILLIAM DITTMAR.

Since the elaborate experiments of Deville and Troost on the vapour-densities of substances at high temperatures, little has been added to chemical science in this field of research. Doubtless this is in great part owing to the difficulty of any *one* student manipulating the complex apparatus necessary for the execution of the experiments. But the operations are greatly increased in difficulty when we select bodies that are readily inflammable in air and attack with facility glass and porcelain at the high temperatures to which they are exposed. This is the reason why the molecular weights of a most important class of elementary bodies, viz. the *alkali metals* (although these are volatile at moderate temperatures), have remained to the present time undetermined. It was with the view of adding something to our knowledge in this department, that we recently undertook some experiments with potassium, the results of which we now beg leave to lay before the Society. The special difficulties we had to overcome are involved in the endeavour to answer the following questions:—

1. Is it possible to convert potassium into a gas of one atmosphere's pressure at any of the *constant* temperatures we can at present command?

2. Is it possible to generate *pure* potassium-vapour and to keep it from getting oxidized?

3. Supposing a definite volume of such vapour to have been procured, how can its *weight* be ascertained?

After a succession of failures, which we shall not detail, we at last succeeded in devising a workable process, which may be briefly described as follows:—

A cylindrical iron bottle of at least 200 cub. centims. capacity, of a thickness in the body ensuring sufficient rigidity at even a bright red heat, and provided with a well-ground inbent neck, pierced with a canal of about 2 millims. in diameter, is employed as a generator and receptacle of the vapour.

A mass of about 20 kilogrs. of zinc contained in a plumbago crucible, which, being placed in a forge-fire, can be readily heated up to the boiling-point, serves as a bath.

The experiment begins by first deoxidizing the inside of the receptacle at a red heat by means of a current of dry hydrogen, which is continuously maintained until the bottle has cooled down below redness. At this stage about 200 grms. of pure mercury are introduced into the bottle, which is then inserted into the red-hot zinc, without, however, covering the upper extremity of the bottle. After ¾ of the mercury is distilled off (which is accomplished in a very short time), the neck is withdrawn, and while the mercury-vapours are still streaming out, an iron test-tube, previously prepared with great care and charged with 4–5 grms. of potassium, is dropped into the bottle, the neck reinserted, and after the *whole* of the bottle has been immersed into the zinc, the blast of the forge is forcibly increased so as, in the shortest possible time, to bring the zinc into the state of boiling, proper arrangements being made for keeping the neck of the bottle red-hot. The potassium in a short time begins to volatilize, issuing in jets into the air, and depositing caustic potash at the nozzle, which must be kept clear by means of an iron wire. As soon as the distillation of the potassium ceases, the nozzle is closed by means of a ground-in wire plug, at once immersed into a mass of mercury contained in a test-tube, and the bottle withdrawn to a proper support, on which it is allowed to cool.

After it has reached a manageable temperature, the bottle is inserted into a mass of recently boiled water, the wire plug withdrawn, and the hydrogen formed by the action of the water on the potassium pumped out, by means of a "Sprengel," into a eudiometer, to be measured.

In the experiments we have hitherto carried out, we have satisfied ourselves that the amount of mercury-vapour *not* swept out by the potassium is quite inappreciable; and as our object has been in the meantime to merely arrive at approximate results and to perfect our methods of manipulation, we have neglected the minute correction, which, on account of that small remnant of mercury, ought, strictly speaking, to have been applied to the volume of the vapour as calculated from the capacity of the bottle in the cold, the coefficient of expansion of iron, and the temperature (1040° Deville) at which the vapour was measured.

* Paper read before the Royal Society, March 6, 1873.

The results of our observations conclusively show that the density of potassium-vapour, as produced in the process described, cannot exceed 45 times that of hydrogen, and that therefore the molecule of potassium consists of *two atoms* (K_2).

We intend to prosecute our research in other directions, proposing to ascertain, if possible, the densities of the *iodides* of cæsium, rubidium, and potassium, these being, according to Bunsen's experiments, the most volatile of the haloids of the alkali metals.

PROFESSOR TYNDALL ON LIGHT.*

(*Continued from p.* 807.)

And now we have to push these considerations to a final illustration. Polarized light may be turned to account in various ways as an analyser of molecular condition. I hold in my hand a strip of glass six feet long, two inches wide, and a quarter of an inch thick. Holding it by the centre between my finger and thumb, I sweep over one of its halves a wet woollen rag; you hear an acute sound, due to the vibrations of the glass. What is the condition of that glass while the sound is heard? This: its two halves lengthen and shorten in quick succession. Its two ends, therefore, are in a state of quick vibration; but what is the condition of the centre? Here the pulses from the two ends alternately meet and retreat. Between their opposing actions the glass at the centre is kept motionless; but on the other hand it is here alternately strained and compressed. The state of the glass may be illustrated by spots of light, as the propagation of a sonorous pulse was illustrated in a former lecture. Here is a row of spots, which by a simple mechanical contrivance are made to vibrate to and fro. You notice the terminal dots have the largest amplitude of vibration, while those at the centre are alternately crowded together and drawn apart. The condition of this sounding strip of glass is here correctly represented.

Now, supposing we introduce the glass between the crossed Nicols, taking care to keep the strip oblique to the direction of vibration of the Nicols; and that we sweep our wet rubber over the glass, what will occur? At every moment of compression the light will flash through; at every moment of strain the light will flash through; and these states of strain and pressure will follow each other so rapidly that we may expect a permanent luminous impression upon the eye. By pure reasoning, therefore, we reach the conclusion that the light will be revived upon the screen whenever the glass is sounded. That it is so, experiment testifies: at every sweep of the rubber a fine luminous disk flashes out upon the screen. The experiment may be varied in this way: Placing in front of the polarizer a plate of ornamented glass, you have those beautiful coloured rings, intersected by a black cross; every sweep of the rubber not only abolishes the rings, but introduces complementary ones, the black cross being for the moment supplanted by a white one. This is Biot's experiment, though his apparatus confined the observation of it to a single person at a time. But we have to follow the ether still further. Suspended before you is a pendulum, which, when drawn aside and then liberated, oscillates to and fro. If, when the pendulum is passing the middle point of its excursion, I impart a shock to it tending to drive it at right angles to its present course, what occurs? The two impulses compound themselves to a vibration oblique in direction to the former one. But the pendulum, as you see oscillates, in a plane. But if the rectangular shock be imparted to the pendulum when it is at the limit of its swing, then the compounding of the two impulses causes the suspended ball to describe, not a straight line, but an ellipse; and if my shock be competent of itself to produce a vibration of the same amplitude as the first one, the ellipse becomes a circle. But why do I dwell upon these things? Simply to make known to you the exact resemblance of these gross mechanical vibrations to the vibrations of light. I hold in my hand a plate of quartz cut from the crystal perpendicular to its axis. This crystal thus cut, possesses the extraordinary power of twisting the plane of vibration or a polarized ray to an extent dependent on the thickness of the crystal. And the more refrangible the light, the greater is the amount of twisting, so that where white light is employed its constituent colours are thus drawn asunder. Placing the quartz between the polarizer and the analyser you see this splendid colour, and turning the analyser in front, from right to left, the other colours appear in succession. Specimens of quartz have been found which require the analyser to be turned from left to right, to obtain the same succession of colours. Crystals of the first class are therefore called right-handed, and of the second class, left-handed crystals.

With profound sagacity Fresnel, to whose genius we mainly owe the expansion and final triumph of the undulatory theory of light, reproduced mentally the mechanism of these crystals, and showed their action to be due to the circumstance, that in them the waves of ether so act upon each other as to produce the condition represented by our rotating pendulum. Instead of being plane polarized the light in rock crystal is circularly polarized. Two such rays transmitted along the axis of the crystal, and rotating in opposite directions, when brought to interference by the analyser, are demonstrably competent to produce the observed phenomena.

I now abandon the analyser and put in its place the piece of Iceland spar, with which we have already illustrated double refraction. The two images of the carbon points are now before you. Introducing a plate of quartz between the polarizer and the spar, the two images glow with complementary colours. Employing the image of an aperture instead of that of the carbon points, we have two complementary coloured circles. As the analyser is caused to rotate, the colours pass through various changes: but they are always complementary to each other. If the one be red, the other will be green; if the one be yellow, the other will be blue. And here we have it in our power to demonstrate a statement made in a former lecture, on the authority of Helmholtz, that, although the mixture of blue and yellow pigments produces green, the mixture of blue and yellow lights produces white. By enlarging our aperture, the two images produced by the spar are caused to approach each other, and finally to overlap. The one is now a vivid yellow, the other a vivid blue, and you notice that where the colours are superposed we have a pure white.

This brings us to a point of our inquiries which though not capable of brilliant illustration, is nevertheless, so likely to affect profoundly the future course of scientific thought that I am unwilling to pass it over without reference. I refer to the experiment which Faraday, its discoverer, called the magnetization of light. The arrangement for this celebrated experiment is now before you. We have put our electric lamp, then a Nicol's prism to polarize the beam emergent from the lamp; then an electro-magnet, then a second Nicol's prism, and finally our screen. At the present moment the prisms are crossed and the screen is dark. I place from pole to pole of the electro-magnet a cylinder of a peculiar kind of glass, first made by Faraday, and called Faraday's heavy glass. Through this glass the beam from the polarizer now passes, being intercepted by the Nicol's in front. I now excite the magnet, and instantly light appears upon the screen. On examination we find that by the action of the magnet upon the ether contained within the heavy glass the plane of vibration is caused to rotate, and thus get through the analyser.

I have already mentioned the two classes into which

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* Abstract of a series of lectures delivered in the Cooper Institute, New York, and reported in the *New York Tribune.*

quartz crystals are divided. In my hand I hold a plate, one-half of which consists of a right-handed and the other half of a left-handed crystal. Placing the plate in front of the polarizer, and turning one of the Nicols until the two halves of the plate show a common puce-colour, we have an exceedingly sensitive means of rendering the action of a magnet upon light visible. You observe that by turning either the polarizer or the analyser through the smallest angle, the uniformity of the colour disappears, and the two halves of the quartz show different colours. The magnet also produces this effect. The puce-coloured circle is now before you on the screen. Exciting the magnet, one-half of the image becomes suddenly red, the other half green. Interrupting the current, the two colours fade away and the primitive puce is restored. And now observe that the action depends upon the polarity of the magnet, or in other words, on the direction of the current which surrounds the magnet. Reversing the current the red and green reappear, but they have changed places. The red was formerly to the right and the green to the left; the green is now to the right and the red to the left. With the most exquisite ingenuity Faraday analysed all these actions and stated their laws. This experiment, however, long remained rather as a scientific curiosity than as a fruitful germ. That it would bear fruit of the highest importance, Faraday felt profoundly convinced, and recent researches are on the way to verify his conviction.

(*To be continued.*)

SECRETIONS IN PLANTS.

M. Van Tieghem has lately published a series of observations on the glands and reservoirs for secretions in plants, which it may be remembered were carefully studied, as far as circumstances would allow, two centuries ago, by our countryman, Nehemiah Grew. M. Van Tieghem shows that there are special cells set apart for the formation of special secretions. These cells may be isolated or aggregated. If on the surface or epidermis, they constitute the glandular hairs so common in plants; if in the interior of a plant they may —1, retain their original form; or, 2, they may be developed into branching tubes which are insinuated between the other cells, as in the branched laticiferous tubes of Euphorbias. If grouped they may form, 3, a special layer, as in Acorus; or, 4, they may be grouped into compact masses, as in the glands of the Orange and Myrtle; or, 5, they may be superposed in vertical ranks, may be simple or branched, and with or without obliteration of the party-walls or partitions, as in the true laticiferous vessels of Arads and Poppies; or, lastly, they may be arranged in a series of longitudinal threads ranged around an air canal or lacuna, the walls of which they line with a sort of epithelium of secreting cells.—*Gardeners' Chronicle.*

CHILBLAINS.

The *British Medical Journal* quotes a paragraph from the *Apotheker Zeitung* describing a solution of iodine and tannin, which F. Rhien has found to be a very efficient remedy for chilblains. About an ounce of tannin is dissolved in a pint of water, and 74 grains of iodine in $1\frac{3}{4}$ oz. of spirit of wine; the solutions are then mixed and enough water added to make the whole up to $2\frac{1}{2}$ pints. In applying it, which is best done at bed-time, the mixture is gently warmed over a slow fire, the affected part is dipped into it while still cold, and retained in it until the liquid on being stirred feels uncomfortably hot. The vessel is then withdrawn from the fire and the affected part dried over it. The vessel must be of earthenware or porcelain, and care must be taken not to use too much iodine, especially when abrasions are present.

THE JOHN CARGILL BROUGH FUND.

ADDITIONAL SUBSCRIPTION.

Watson, Cleave, and Co., Shanghai £5 0 0

A meeting of the General Committee, Mr. Daniel Hanbury, F.R.S., presiding, was held, by permission, at the London Institution on Tuesday, the 8th of April, when the Hon. Secretaries, Mr. Michael Carteighe, Mr. Alfred Marks, and Mr. W. Chandler Roberts, submitted their report and accounts, as also a scheme for administering the fund. In the report, it was stated that an appeal on behalf of the children had been made to the proprietors of the London Institution, the fellows of the Royal and Chemical Societies, and the members of the Royal Institution, and to others. The subscriptions received, including a grant from the Royal Bounty Fund of £150, in reply to a memorial drawn up by Mr. Roberts, and submitted by the Deputy-Master of the Mint, amount to about £1,500. In addition, subscriptions amounting to £200 are promised by the Savage Club, of which Mr. Brough was a member, and the sum of about £400 will be contributed by the Committee of Chemists and Druggists. After deducting expenses the net aggregate amount will be nearly £2,000.

A deed of trust of the usual kind was approved by the Committee, and the first trustees were appointed—Mr. Daniel Hanbury, F.R.S., Mr. Thomas Hyde Hills, and Mr. Michael Carteighe. It provides for the appointment of three trustees, in whose names investments in the ordinary trust securities are to be made. Power is given to the trustees to apply the interest, and such part of the capital as they may consider necessary, to the support, etc., of the children; the trust to terminate on the attainment of the age of twenty-one by the youngest child, when the unapplied portion of the fund to be paid to such one or more as the trustees may think proper. Vacancies in the number of trustees to be filled, if practicable, from members of the Committee, if not, from the subscribers.

The report further stated that two presentations to Christ's Hospital had been placed at the disposal of the family—one by a friend, the other by Mr. Alderman McArthur, M.P., the case having been investigated and recommended to him by Mr. Deputy Webster.

The Secretaries expressed their full confidence in the ability and judgment of Miss Brough, the aunt of the children, who has undertaken their guardianship, finding in her devotion the best reason for regarding with hopefulness the children's future. After a warm acknowledgement of the valuable assistance rendered by the members of the various committees, and especially by Mr. Thomas Piper, the Hon. Secretary of the London Institution, the report terminated as follows:—"The Honorary Secretaries feel that they would not be justified in concluding this report without assuring the General Committee that the generous sympathy and aid extended to the children have deeply touched the family, who regard the list of the several committees, comprising as it does so many honoured and distinguished names, as affording enduring testimony to the respect and affection in which Mr. Brough's memory is held."

The resolutions required to carry out the scheme having been passed unanimously, votes of thanks were accorded to the Treasurer of the Fund, Sir John Lubbock, Bart., M.P., F.R.S, Mr. Alderman McArthur, M.P., Mr. Deputy Webster, and the Chairman of the meeting.

Belladonna as an Antidote in Opium Poisoning.—In the Shanghai Hospital Reports for 1872 Dr. Johnston states that he has successfully employed atropia in cases of opium poisoning, a large number of which have come under his care. He has administered it hypodermically in quantities varying from one quarter to one-half a grain, repeating the injection if necessary after two hours. He did not find that injury resulted from the use of atropia in any of these cases.—*Medical Record.*

The Pharmaceutical Journal.

SATURDAY, APRIL 19, 1873.

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

THE BENEVOLENT FUND.

THE art of spending money satisfactorily is perhaps, all things considered, at least as difficult as that of getting it together; and it is therefore not surprising that the disbursements in connection with the Benevolent Fund should evoke criticism, or that such criticism should sometimes be unfavourable. In calling attention to the subject in these columns a fortnight since, it was with the hope that there would be a free expression of opinion on both sides of the question; and it is with satisfaction that our "Correspondence" columns have been opened to the discussion. Nothing but good can result from such an interchange of views; for while, on the one hand, the Council will doubtless be glad to adopt any wise suggestion made, or to carry out any clearly expressed wish of a majority of the subscribers, on the other it affords an opportunity of disabusing some minds of the idea that a varying body of gentlemen, selected for their fitness and placed in the best position for estimating this among other matters, should have persistently acted contrary to the true interests of the Fund.

So much depends upon the manner in which the relief is given that it will not be out of place to recall the fact that the Society has now engaged to pay the sum of thirty pounds yearly to each of thirteen persons as long as they live. It has also been decided to elect two more annuitants upon the same terms in October next. Now, considering there is little probability that the number of annuitants will ever be allowed to fall below that number, many subscribers will agree with Mr. SANDFORD, that the "well-known rule in societies in granting pensions, to keep those pensions within the limit of the income arising from capital," is a wholesome regulation which should not be neglected by the Pharmaceutical Society. Nevertheless, in the latest official statement respecting the Benevolent Fund it was shown that the interest on the £13,200 invested moneys was insufficient to pay the then existing annuities.

Another point worthy of observation is that this sum of money does not consist entirely of the accretion of surplus from ordinary subscriptions and donations. On four separate occasions the sum of £500 has been voted from the General Fund of the Society; about £2500 was the result of public dinners in 1848 and 1867; and another £500 came in the shape of a legacy. Many will remember the vigorous efforts that were made for the special purpose of raising the funded property to £10,000, at a time when it was necessary that applicants for relief from the fund should be connected with the Society; but since then, by the operation of the Pharmacy Act, its benefits have been thrown open to all persons on the register and their widows and children.

So much being said upon the past policy of the Council in reference to the permanent charges on the Benevolent Fund, a few words may be devoted to the question of temporary relief. The small amount of money so spent has been animadverted upon; though, notwithstanding the surprise of our correspondent, J. B. B., it is undoubtedly true that hitherto "no genuine case of necessity presented to the Council has been left unaided by temporary assistance." But he is right in supposing that there are more than thirteen needy druggists or druggists' widows; for last year special grants, amounting to £148, were made to various persons,—a fact of which he does not appear to be aware,—and doubtless there are many others who have not applied for assistance. This department of the Fund will, however, have to be considerably developed; of this there can be no question. With the immensely increased number of persons interested in the Fund, there will certainly be a corresponding increase in the number of applicants, and a large number will probably have to be relieved by special grants from the current subscriptions. Upon this point the numerous grants made at the last meeting of the Council, amounting to £110, are very significant, as is also the intimation that several cases stand over, pending inquiry.

The opportunities afforded for discussion at the annual meetings and in the Journal are such that there should be no excuse for the withdrawal of subscriptions. The subscribers can easily make their wishes known, and we are confident that the Council will be found not only willing but anxious to carry them out. But to imagine that relief can be administered satisfactorily by a series of local clubs is a great mistake, and we are glad that a correspondent has been able to show that the gentleman making the proposition has, like many good-natured people, proved to be worse in his bark than in his bite.

BARON LIEBIG.

SCIENCE, we fear, is about to lose one of her most distinguished votaries. Baron LIEBIG is so ill that his life is despaired of. For some years his health has been gradually declining; while the repeated fracture of a badly-set lower limb has precluded his taking that amount of walking exercise which the maintenance of bodily vigour demands. His physicians are in vigilant attendance on him, and we would fain indulge the hope that, septuagenarian as he is, his life may yet be spared to his country and to science.

APPOINTMENTS UNDER THE ADULTERATION ACT.

Mr. Francis Sutton, of Norwich, Pharmaceutical Chemist, and author of the well-known standard work on Volumetric Analysis, has been appointed analyst for the entire county of Norfolk. The fees to be paid by the public are to range from 2*s.* 6*d.* to 10*s.* 6*d.*; and these are to be supplemented so that in cases where 2*s.* 6*d.* is paid, the analyst will receive 10*s.*; 5*s.* will be increased to £1; and 10*s.* 6*d.* to £2. Mr. Sutton also holds the official appointments of Gas Examiner to the City of Norwich and Analyst to the Norfolk Chamber of Agriculture.

At Sheffield, the Town Council have elected Mr. Alfred H. Allen, F.C.S., as analyst for the borough, at a salary of £100 a year. Mr. Allen is Lecturer on Chemistry to the Sheffield School of Medicine and the Sheffield Pharmaceutical and Chemical Association, and is the author of several contributions on the methods of detecting adulterations.

We are glad to be able to record these two fresh appointments of analysts to discharge the duties required by the Adulteration of Food Act, 1872, since they show a disposition to construe the words in the Act relating to qualification in the sense for which we have contended.

CONVERSAZIONE AT ST. STEEVEN'S HOSPITAL, DUBLIN.

The healing art owes much to St. Steeven's Hospital, Dublin. The Medical Committee of the Institution entertained on Saturday, the 5th inst., a large number of its students and friends, who found much to interest them in the admirable assortment of chemical, botanical, and pharmaceutical preparations, as well as of surgical and philosophical instruments, exhibited on the occasion. The Lord Mayor at the close of the evening distributed the Cusack Prizes and Certificates to the successful competitors, and, addressing his audience, remarked on the satisfaction it must afford to every well-wisher of the Dublin school to find the St. Steeven's Hospital retaining and extending its attractions for the students of medicine, whether in its theoretical or practical departments. Centralization is unfavourable to science as well as to commercial or political life; and it is therefore with peculiar gratification that we see such provincial schools as that of Dublin keeping its ground against the powerful rivalry of the English and Scotch metropolitan seats of learning.

THE ANNUAL DINNER.

We understand that a large number of gentlemen have already authorized the placing of their names on the List of Stewards. But since the holidays have probably prevented many others from doing so, we are requested to say that the publication of the complete list is deferred until next week. Communications on the subject should be addressed to the Honorary Secretaries, Messrs. Richard Bremridge and Michael Carteighe, 17, Bloomsbury Square.

Provincial Transactions.

BRIGHTON ASSOCIATION OF PHARMACY.

THE EARLY CLOSING MOVEMENT.

A meeting in connection with the Brighton Association of Pharmacy was held at the Hanover Lecture Hall, North Road, Brighton, on Friday evening, April 11, to consider the question of early closing. Mr. Cornish, in the absence of Mr. Savage, the President of the Association, occupied the chair.

The Chairman announced that a paper would be read, supplied by one of their body, after the reading of which he hoped that some of the gentlemen present would give the meeting the benefit of their opinions, so that a general understanding to shorten the hours might take place.

Mr. Smith then read a paper written by Mr. Padwick, of Preston Street, the effect of which may be briefly given. Speaking of the cause of their present position, he thought they should not ignore the fact that they had worn and were still wearing chains of their own forging, and from which other business men have for some time past freed themselves; how galling they were none knew better than they who had to wear them. The principals were debarred from many home comforts and relaxations by continuous interruptions, the majority of which were needless, and assistants were compelled to be in attendance, thus preventing attention to the studies now so necessary to their obtaining the necessary qualifications in pharmacy. He alluded to many poisoning cases caused by inadvertence, some of which occurred when (the more active duties of the day being done) business discipline was in a degree relaxed, and hence the blunder, and he concluded his arguments in favour of early closing by suggesting that a committee be formed to carry out the matter; that circulars be sent to each of the principals, proposing eight o'clock as the time for shutters to be put up, and the doors to be finally closed at nine o'clock—the requirements of visitors during the four summer months to be met by the extension of the time by half-an-hour—and requesting each gentleman's aid and co-operation, and asking him, if the hour named be not considered practical in his case, to state the time at which he would be prepared to close his establishment.

The Chairman remarked that the peculiarity of their calling was that it was different from any other tradesman's business. But it should be understood that if they did shorten the hours of business, in all cases of emergency the public would be able to get all necessary things. It was for the meeting to consider whether they should act upon Mr. Padwick's suggestion.

Mr. Smith said that druggists work their minds and bodies as hard as those in other trades and professions, and therefore need the same amount of leisure; but in addition to ordinary work, the young men have to study for their examinations, while the older members of the profession are continually refreshing their memories, and adding to their stock of knowledge in order to keep up with the pharmacy of the day.

Mr. Armitage argued against the early closing movement on principle. He had closed his shops in Trafalgar Street early, and had experienced a loss in consequence. He thought the druggists should be able to close earlier, but how was it to be done? In his neighbourhood he did the most trade from a quarter past eight to ten o'clock. He, therefore, could not view the movement with much favour in his neighbourhood. Referring to the assistants, he remarked that where the shop closed late, they had the opportunity of going out in the daytime, and he did not think that if the shop closed earlier that they would use the time for educational purposes.

Mr. Smith: They must study at some time, or they will not pass their examinations.

Mr. Haffenden argued that so long as the shop was open, people would come in. His practice was to close on the Sunday, and he found he did not lose any of the real trade. In cases of emergency, people came to the side door. Acting upon Mr. Padwick's suggestion, he moved that a committee be appointed for the purpose of eliciting the views of the chemists, of whom it was said there were sixty-five in the town.

Mr. Cox, jun., in seconding the resolution, said that certain neighbourhoods must have certain times for closing.

Mr. Barton supported the resolution, remarking that they ought to have sufficient *esprit de corps* to arrange among themselves a more reasonable time for closing. Fourteen and fifteen hours a day was too long a time to be engaged in active business.

Mr. Glaisyer, of North Street, remarked that at his establishment the shutters were put up at 8 P.M., and the shop was entirely closed at 9.30 P.M., but probably that course could not be made a rule for every establishment. With regard to the arguments which had been advanced that assistants wanted time to study for their examinations, the principals expected that they had already passed, and that they came to work, not to study. It was arranged that they had time for recreation, and not to have any particular time set apart for study as if they were apprentices.

Mr. Colby, jun., did not advocate early closing, observing that assistants had recreation in the day time.

The resolution was then carried unanimously, and the following were elected as the committee to carry it out:—Mr. Savage, Mr. Cornish, Mr. Barton, and Mr. Haffenden, and the officers of the Association.

A vote of thanks having been accorded to Mr. Padwick for his paper,

The Chairman, replying to Mr. Glaisyer, said his remarks were strictly right in principle, but they had to keep themselves up to the mark, as new discoveries in chemical science were being constantly made. If they could shorten the hours it would confer a benefit upon the principals and their assistants, whose interests it was right they should have at heart.

A vote of thanks was then accorded to the Chairman, and the meeting separated.

CARLISLE CHEMISTS' ASSOCIATION.

On Wednesday evening, April 2nd, the Carlisle Chemists' Association held their monthly meeting, when a very pleasant, interesting, and amusing evening was spent. Mr. J. D. Walker, chemist, kindly exhibited an excellent microscope, and a collection of mounted objects, many of them being of pharmaceutical interest. He also explained the various parts of the microscope and their uses. A present of "Indian barks and their alkaloids" from Messrs. Howards and Sons was placed upon the table and much admired. The thanks of the Association were given to Messrs. Howards and Sons for their interesting donation, as also a vote of thanks to Mr. Walker for his instructive and interesting exhibition.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL ASSOCIATION.

A monthly meeting of this Association was held on April 9th, Mr. W. Ward, F.C.S., President, in the chair, on which occasion a lecture was delivered by E. Birks, Esq., Lecturer on Botany to the Sheffield School of Medicine, on "The Microscope, and how to use it." The lecturer commenced with a description of the various parts of the microscope, and explained how each was used in the investigation of any subject to which the instrument is applicable.

He then proceeded to illustrate the way in which the microscope should be worked in the study of vegetable histology, or the investigation of the elementary structure of plants and plant life; a full description being given of the vegetable cell and its contents, also of the manner in which cells are propagated and increased. The lecturer took occasion to state the views of those authors who maintain the hypothesis of the physical basis of life, as opposed to those who consider that life or vitality is essentially different from any known physical force, concluding a very able lecture by giving some practical hints as to the manner of working with and manipulating the microscope.

On the motion of Mr. Maleham, seconded by Mr. Ellinor, a vote of thanks was unanimously tendered to Mr. Birks for his interesting and instructive lecture. Some general announcements concluded the business of the meeting.

ASSOCIATION OF CHEMISTS AND DRUGGISTS OF IRELAND.

The usual monthly meeting of the above Society was held on Monday evening, at 12, Grafton Street. There was a very large attendance. W. Wells, Esq., was elected chairman.

The principal business was to discuss a bill promoted by the Apothecaries' Company for forming a Pharmaceutical Society in Ireland. The bill was generally approved by the meeting, and with a few amendments, will be submitted to the Apothecaries' Hall for approval.

It is expected that a bill will be introduced as soon as possible, as there is a perfect understanding between the Hall and the trade.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

At the meeting of the Society of Arts on the 26th March, Mr. P. L. Simmonds read a paper on the Starches of Commerce. The chair was taken by Mr. Thomas Greenish, F.C.S., F.R.M.S. The following is a full abstract of the paper:—

The Edible Starches of Commerce, their Production and Consumption.

BY P. L. SIMMONDS.

The production and consumption of edible starches have now attained very large proportions. Unlike the French, who have two words which they apply, with different meanings—fecula and amidon, or starch,—we are, in a great degree, limited to one, all being essentially starches in commerce, even with the minor classifications of arrowroots, sagos, tapiocas, corn-flours, etc.

The French confine the term fecula to the starch obtained from roots, such as manioc; of stems, as the sago; and fruits or seeds, as of the horse-chestnut, acorns, etc.; while the amylaceous product obtained from the cereals, which crystallizes, on drying, into needle-like forms, they define as amidon, or starch.

Very little has been published on this extensive and important branch of commerce,—at least in a collected form, for occasional papers have appeared, from time to time, in various scientific journals. Perhaps, however, the best and most carefully conducted investigation into all the tropical starch-producing plants, their characteristics, and properties, was that carried out, about a quarter of a century ago, by Dr. Shiers, in British Guiana, and published locally in a pamphlet.

It is not my intention to trouble you with scientific and chemical descriptions of the special characters of the starches from various plants, or to treat upon the mooted question of how far they furnish nutritive food,—subjects which fall more properly within the scope of Societies like the Microscopical, the Chemical, the Pharmaceutical, the Medical, etc. I shall restrict myself to the commercial aspect of the question. I may, however, state that I have placed on the table a very large and varied collection of edible starches, which have all been carefully identified and referred to their proper sources, by my friend in the chair, for in commercial circles there is too much confusion on this point. A few figures will serve to prove that the commerce in these articles is of considerable aggregate importance.

In 1850 we imported about one million pounds of arrowroot; in 1860 these imports had increased to more than 2,383,000 lbs. In 1860 the value of the edible starches, etc., imported was £206,438. In 1870 it had increased to £366,550.

In 1871, the last year for which we have the complete official detailed returns of imports, the aggregate value of the farinaceous substances and manufactures therefrom imported is stated at £274,281; sago and sago flour, £197,381; total, £471,662. But as the article "maizena" is thrown in with Indian-corn meal, and much maize, rice, and even potatoes are converted into edible starches here, I may as well add the figures given for Indian-corn meal (£13,944) to the above, which would bring up the total to £485,706 for the year.

Our imports of arrowroot from the West Indies, in the last ten years, have fluctuated between 12,000 cwts. and 22,000 cwts. a year; from South Africa we now get from 3,000 to 4,000 cwts. annually.

Having thus given you an outline of the extent of our imports, I proceed to treat of the production and consumption in the several localities, preferring to arrange the information under these divisions, as more generally recognizable and more easily followed.

European Starches.

But few plants are utilized for edible starches in Europe. We are mainly dependant for our supplies of these on tropical and sub-tropical countries. Occasionally small quantities of Portland arrowroot have been made from *Arum maculatum.* In Italy the fecula of *Arum italicum* and of *Pancratium maritimum* is manufactured to some extent, and sold at 3½d. per lb. About two tons are made annually by one maker at Cava.

Starch is manufactured in the south of France and the neighbourhood of Paris from the horse-chestnut. It yields about 16 or 17 per cent. of starch. If it is to be used as food, it must be treated with water containing carbonate of soda, to remove all bitterness, and then washed repeatedly with pure water. Only small quantities of it have been imported into this country, more for curiosity than for commercial purposes.

Rice starch has, within the last few years, been prepared as a beautiful food product, under the name of corn-flour, by an eminent firm, and the care with which it is manufactured, and its nutritive qualities, have commanded for it a large sale. As much as 80 or 90 per cent. of starch has been obtained from some kinds of dry rice, but the average may be taken at 73. Imported maize or Indian-corn is also converted in this country into a starchy food product, sold as corn-flour.

Under the name of farina, without the prefix of "potato," a large quantity of potato starch is imported and sold here. The process by which potato starch is now so largely made on the Continent by improved machinery is very perfect. Its hygroscopic properties are however great; even when sold in the shops in the form of dry powder, as a substitute for arrowroot, it contains 18 per cent. of water, and if placed in a damp atmosphere, it will rapidly absorb double that amount of water. The percentage of starch in the potato ranges from 9 to 26 per cent. Sago, vermicelli, and various other food products are made on the Continent with potato starch. The famed gravies, sauces, and soups of France are largely indebted for their excellence to the so-called farina from potatoes.

As Professor Owen observed as far back as 1856, in his official report on the alimentary substances shown at the Paris Exhibition of 1855—"The French at present appear to excel in the art of preparing and modifying the starch principle of the potato, so as to simulate the product of the *Maranta arundinacea,* called under one form arrowroot, and under another, or granular form, 'tapioca;' as also to simulate the starch principle of the *Cycas circinalis,* called 'sago,' and that of certain Asiatic species of *Orchis,* called 'salep.' It must be added that the conscientious fabricators of these imitations vend them as 'French, or indigenous arrowroots, sagos,' etc., and at a lower price than that for which the genuine exotic article can be obtained. I am afraid that there is little conscientious principle manifested among vendors here, for European arrowroots and sagos sell as readily and promiscuously as Indian and American."

West Indian Arrowroot.

Maranta arundinacea furnishes most of the genuine West Indian Arrowroot, although other species, such as *M. nobilis, M. Allouya, M. ramosissima,* are also cultivated for a similar starch from their tubers, and several species of *Canna* are utilised for the starch in their tubers.

The Bermuda arrowroot was long considered the purest quality made, its superiority either arising from the nature of the water or soil, or from greater care in the manufacture, but the production has been declining, and has now given way to other more profitable crops. The general export from the colony was, in 1870, 45,675 lbs.; in 1871, 30,276 lbs.; and in 1872, 26,710 lbs.; valued at £1,323.

When made by the labourers in the West Indies on a small scale, arrowroot is prepared much in the same manner as potato starch in this country for domestic use; the only implements required are a grater and wooden troughs and trays; when made on a larger scale, as on the estates of the proprietors, the crushing of the root and the reducing it to a pulp are effected by simple and cheap machinery (a wheel and rollers) worked by water. The arrowroot is dried under sheds. Little or no use is at present made of the pulp after the extraction of the starch by lixiviation, but probably a serviceable paper might be made of it at a trifling cost.

In 1869 there were 65½ acres under culture in Jamaica, and in 1870, but 49¼ acres. The exports have declined year by year from 70,204 lb. to 6,343 lbs. In the Island of St. Kitts, arrowroot and *tous les mois* (from Canna) are produced to some extent.

The amount of arrowroot exported from St. Vincent is now about two millions of pounds; in 1847, the quantity shipped was only 297,587 lbs.; and in 1851, 490,837 lbs. Many circumstances have promoted this increased culture. When it began the price of the article was high, and the grower obtained a largely remunerative profit; its culture was not laborious; it was subject to few risks; it did not for its success require rich land or much manure; there was a constant and increasing demand for it; and in consequence of the abundance of pure water, great facilities were afforded for the manufacture, and that by a process so simple, easy, and cheap, as to require little skill in conducting it, and scarcely any capital. St. Vincent is the only arrowroot-producing colony that has kept steadily progressive.

I have not any recent statistics of the production of arrowroot in Barbados, but I believe little is made or shipped from the island now.

In Antigua there has been considerable decline in the production. From 1850 to 1854 the exports were from 300 to 500 boxes and barrels, and from Montserrat, in some years, 250 barrels. In 1870 our imports of arrowroot from Antigua had dwindled to 30 cwt., value £28.

Tortola used to export arrowroot and *tous les mois* of the value of £500 to £1,500 a-year, but has dropped out of the production.

North American Starches.

The enormous production of Indian corn in the United States, and the fact of its containing a less proportion of gluten than wheat, have led to its extensive utilization for starch manufacture, and also as a food product, under the names of maizena and corn flour. As an alimentary product this starch is gradually working its way in Europe, and has been rewarded with silver medals at several of the Industrial Exhibitions. Maize contains about 75 per cent. of starch. A considerable quantity of Maranta starch is produced on the coasts of Georgia and Florida. The yield of roots of all sizes is from 100 to 150 bushels per acre. From a bushel of roots weighing 43 lbs., about $5\frac{3}{4}$ lbs. of clear, dry fecula is obtained.

South American Starches.

In British Guiana a good deal of edible starch is made from the various tropical roots, but the starchy products do not form an article of export from the colony now, the arrowroots, cassavas, etc., being locally used. Palatable starch can be obtained from the root of the *Alstrœmeria pallida*, Graham, and the starch from the various Chilian *Alstrœmerias* was suggested to be sought for and shown at the Exhibition of 1851. The tubers of many of these could doubtless be utilised in a similar manner. In Brazil considerable attention is given to the production and manufacture of edible starches. A most interesting and varied collection of these was shown at the Paris Exhibition in 1867; it comprised among others the following products, many of which I have not been able to identify, in the absence of either scientific name or other clue to the plants:—

Yellow pumpkin starch.
Pine starch, and pine farina.
Fecula of Itua.
Maizena—Indian corn fecula.
Meal and tapioca of seeds of gergelim (*Sesame*).
Fecula and tapioca di forno.
Jacatupé starch.
Mango starch.
Potato starch.
Bread fruit starch.
Carnauba starch from the trunk of *Copernicia cernifera.*
Shushu or xuxu starch (from a bulb).
Fecula of bananas.
Meal of yam (*Dioscorea sp.*).
Arrowroot fecula (*Maranta*).
Starch of bitter potato.
Starch of Brazil potato.
Meal of Demerara potato.
Fecula of Maira potato.
Water farina of manioc.
Dry farina of manioc.
Beiju of manioc (dried slices).
Flour of manioc gratings.
Puba manioc.
Dry meal of white manioc.
Dry meal of yellow manioc.
Dry meal of white manioc, sold at three milreis the alquiere.
Coarse manioc meal.
Starch of manioc.
Tapioca of manioc.
Carima of manioc in small balls.
Dried meal of Macacheira or Aipim (*Manihot Aipi*), sells at two and a-half milreis the alquiere.
Carima of macacheira in small balls.

Feculas from other roots and bulbs than the manioc are rarely manufactured. The *Maranta arundinacea* is grown in Para; there are two varieties, one with a large long root, which produces the most fecula, the other, named "ounce's paw," from the resemblance it bears to the forefoot of that animal.

The arrowroot, after being subjected to the action of running water, is sometimes buried in the mud until it ferments and becomes a plastic mass, to which they give the name *puba*, as they do in like manner to the manioc, when it undergoes a similar process.

Jacatupé starch is extracted from the bulbous root of a climber whose leaf is poisonous. The starch is used in soups, puddings, gruels, and other food preparations, and is said to possess important medicinal qualities, in dysentery, nephritic and other diseases.

The manioc or cassava is, however, the plant chiefly cultivated for food purposes in Brazil. No species of plants have been more changed in scientific nomenclature by botanists than these, for they have been classed as *Jatrophas*, *Janiphas*, *Manihots*, *Curcas*, etc. I will adopt the names given by Pohl to the two principal species (most of the others seem to be but mere varieties) the bitter or poisonous species, *Manihot utilissima*, and the sweet species, *M. Aipi.*

The manioc would seem to be a native of Brazil; it has been introduced into India, and is grown about Calcutta, Madras, the Straits Settlements, and other quarters. It flourishes better on the borders of the sea and on islands than in the interior of the continent. On the coast of Coromandel the roots are more fibrous, and therefore inferior to those raised in Malabar. It is extensively grown in Guiana, the West Indies, and various parts of Africa.

The tubers of the bitter cassava attain a length of three feet. They can be converted into bread or cakes. The volatile poison of the milky sap is destroyed by pressing the grated root in the first instance, the remaining acridity being expelled by the heating process. The starch, heated while in a moist state, furnishes the tapioca of commerce. Cassava is abundantly cultivated in Brazil and Venezuela —especially at Caraccas, where the singularly uniform temperature throughout the year is only 60 deg. to 70 deg. Fah. It is a very exhausting crop, and stands in need of rich soil and manuring. The propagation is effected by cuttings from the ligneous part of the stem.

The soil destined for manioc must not be wet. In warm countries the tubers are available in about eight months, though they continue to grow afterwards. The growth of the plant upwards is checked by breaking off the buds. The bitter is the more productive of the two species. The yellowish tubers attain sometimes a weight of 30 lbs. They do not become soft by boiling, like the Aipi or sweet manioc.

The sweet species, though a native of tropical South America, extends as far south as the Parana river. The root is reddish and harmless, and can be used, unlike the bitter species, without any further preparation than boiling as a culinary esculent, irrespective of its starch being also available for tapioca.

From the roots of the two species many food products are obtained, among others, coarse cakes made by rasping and pressing the root, which are cooked on a hot plate. The fecula, heated on hot iron plates, becomes partially cooked, and agglomerated in small, hard, irregular lumps, and in this form is known as tapioca. This substance, partially soluble in water, forms a nourishing food, much appreciated in Europe.

Farina of manioc in its crude form is often seen at Brazilian tables, but is more frequently mixed with water and baked in thin cakes, in this state forming the bread of the poorer classes. It thus forms a nourishing and cheap food; and it is to be regretted that in Europe the vendors should palm off potato-starch and other similar substances for the more delicate and agreeable cassava and tapioca.

Manioc meal is produced on an extensive scale in the province of Santa Catharina, where they employ improved machines for preparing it, especially in the settlements. These producers supply the markets of the capital and of the other provinces. The foreign export of manioc meal in 1845 was 145,722 alquieres. Manioc is the staple article of food for the whole population. There are more than 14,000 manufactories, and the total production is calculated at upwards of 500,000 alquieres. In abundant years the meal and fecula fall as low as 1 or 2 milreis the alquiere, but in years of scarcity often rise to above 8 milreis. The foreign export was for some time checked by a tax of 2 milreis imposed on each sack exported, but this tax was abolished in 1865.

There are two modes of preparing the root—the wet and the dry process. In the first, the grated root is put into water for four or six days, and afterwards kneaded with water, and pressed to extract the juice. The fecula which remains is sifted and baked in earth ovens, some fresh manioc paste, which has fermented, being always added. There are no less than fourteen varieties of the manioc distinguished in the province of Amazonas, some of which mature in six and others in twelve months.

The dry process is carried on as follows:—The manioc is rasped by hand, water added within, and then put to be pressed; afterwards dried, sifted, and subsequently baked. In making the starch, the deposit in the water is left for some time to allow the starch to settle down; it is washed three times, dried in the sun, and is then fit for sale.

The carima, or fine, creamy starch, is prepared by softening the puba manioc in water, after which it is strained and pressed in a sieve, and made into little balls, in which shape it comes to market, although sometimes reduced to farina. It is used in gruels and other food preparations, according to the custom of each locality.

The exports of tapioca from Brazil were 200,725 bushels in 1868, and as high as 332,823 bushels in 1866. In 1871 the exports were about seven million litres, valued at £26,050. The value of the imports of farinaceous substances from Brazil (nearly all tapioca) have been as follows in the last nine years:—

1863	£4,193
1864	5,413
1865	6,404
1866	8,024
1867	13,812
1868	15,188
1869	8,974
1870	12,960
1871	14,092

Twenty years since about 11,000 cwt. of tapioca used to be imported annually from Brazil, now we only receive about half that quantity.

At Santiago, one of the Cape Verdes, the crude farina of manioc costs about 1*s.* 6*d.* the decalitre, and when prepared fetches as much as 10*d.* the pound. One estate, the Praia Rei, on the island of St. Thomas, West Coast of Africa, produces about 150,000 litres of farine of manioc. In Angola, 150,000 lbs. are manufactured annually. At Mozambique, the Portuguese also prepare a good deal, which is sold for export at 2½ to 3½ francs the decalitre (17½ pints); dried slices of the root are sold in great quantity in the markets at 5*d.* to 5½*d.* the decalitre.

The common mess of the Balonda Africans is porridge made of the manioc. The meal is stirred into boiling water; as much as can be moistened is put in, one man holding the vessel, and the other stirring the porridge with all his might. It is very unsavoury, and no matter how much one may eat, two hours after he is as hungry as ever. When made thin it is like starch made from diseased potatoes.

Eastern Starches.

The water lilies are much used by the Chinese for food. The seeds of *Netumbium speciosum* provide an excellent meal, used like gruel, and the sliced roots furnish a species of arrowroot. The root of *Nymphœa alba*, in Sweden, and of *Nymphœa lotus*, *edulis* and *rubra*, are used for food in Egypt and the East. The starch from the roots of *Sagitaria sagitifolia* is employed by the Chinese, and from the *Alisma Plantago* by the Kalmucks.

At the Paris Exhibition, in 1867, arrowroots were shown in the Indian department from Sarun, from Palhully, from Dacca, from Dehra Doon, North Malabar, Penang, and Singapore. Although not so stated, I presume most of these would be from *Maranta* and some few from *Curcuma* and the Palms.

The *Maranta arundinacea*, a native of America, was introduced into India about 1840, by Mr. Elphinstone, and is now cultivated in several of the provinces, especially in the Presidency of Madras. It takes twelve or fifteen months to attain its full development. About a year, with good irrigation, brings the plant to maturity in the East, and the roots then contain the maximum of fecula. Thus after twelve months' culture they will afford 16 per cent. and subsequent yields were found on careful investigation by a good botanist (M. Lepine, of Pondicherry) to be—

Months.	Per Cent.
14	15
15	14
16	12
17	11
19	10

The fecula is obtained from the underground shoots, which are white, fleshy, about nine inches long by one and a half to two inches in diameter. They contain about twenty per cent. of fecula, but by the rude processes of rasping and washing not more than twelve per cent. on the average is obtained. Arrowroot is in extensive use in India, and some is also shipped to Europe.

The root of *Curcuma rubescens* yields a starch like arrowroot. In Travancore it forms a large part of the diet of the inhabitants, but has never been tried much in Bengal.

C. angustifolia yields an arrowroot in Tikor, Benares, and Madras; and *C. leucorrhiza* in Berar. Specimens of these may be seen in the India Museum.

The wild ginger plant, which furnishes starch, grows everywhere in the district of Chittagong; it is very difficult to eradicate from land, as the smallest root, or piece of a root, that has an eye, will spring up again. The plant dies off in December. A rough experiment was made with this root by the Civil Assistant-Surgeon of Chittagong, Dr. W. B. Beatson, and the yield was estimated at an ounce of starch from one pound of the root. The experiment, however, was not precise enough to be satisfactory, and he was inclined to think that the yield would be much larger, for the microscope shows the root to be loaded with starch granules. The supply of the root being inexhaustible, any quantity of starch might be extracted from it yearly and become a valuable article of commerce.

There would be no expense for cultivation, and, allowing for the cost of digging the root, and manufacturing the starch, by bruising and macerating the root in water, and drying the deposit, the product would be cheaper than Arracan rice, which is largely exported to Europe to be used, not as food, but in starch manufacture for laundry purposes, stiffening fabrics, etc.

It is not easy to decide whether the wild arrowroot plant found in Cuttack is identical with the cultivated arrowroot. A cup of arrowroot made of the one is not distinguishable from one made of the other—except, perhaps, by a slightly earthy taste observable in the wild arrowroot, which is easily accounted for by its imperfect preparation. The cultivation and more perfect manufacture of the garden arrowroot have been comparatively recently introduced into the province, so that it is neither generally grown nor its produce used by the natives. It is made from plants of his own growing by a native Christian of Khundittur, who sells his produce among the European residents of Cuttuck, his price being a little under 6d. per lb. This arrowroot is of excellent quality, and the process of manufacture is as simple as can be. The tubers are taken up in the cold season, washed, put into a large wooden mortar, and mashed. The mash is then taken out and well washed in cold water, the water drained off, and set to stand in flat vessels, in which it deposits a large proportion of the starch, which is re-washed in cold water and set to dry in the sun. The wild arrowroot, know in the bazaars as "Palooa," grows abundantly in the jungles of the district. It is collected in the cold season by the Sahars, the tubers pounded and washed, and the sediment dried in the sun. By these people it is eaten and sold for the manufacture of what is called "Abheer" in the Jumbulpore, and, to a less degree, also in the Cuttuck district; the wild arrowroot is made into cakes, or boiled with milk, and thus used as an article of food.

(*To be continued.*)

Parliamentary and Law Proceedings.

Alleged Adulteration of Pea Meal.

An action has recently been brought in the Birmingham County Court to recover damages alleged to have been sustained by the death of fifteen pigs, caused by eating adulterated meal supplied by the defendant. Evidence was given that the stomachs of the dead pigs presented symptoms of irritant poisoning. Dr. Hill, the borough analyst, said that he had analysed a portion of the meal, and had been unable to detect any trace of poison; but that there was some sand present, to which, perhaps, the inflammation was due. For the defence chemical evidence was given by experts that the meal contained no poison. The judge decided in favour of the defendant, expressing an opinion that the deaths resulted from the improper manner in which the food was given.—*Birmingham Gazette.*

Misuse of a Liniment.

At an inquest held at Preston on Tuesday, April 1, the inquiry related principally to the nature of the instructions sent out with a liniment. According to the evidence of the wife, deceased had been to Dr. Lonie on a Friday for treatment for rheumatism. The doctor gave him some medicine and a liniment, which lasted him till the following Monday. Dr. Lonie again saw him on that day and said that he had a "pleurisy stitch;" that he was not to have any more medicine of the kind he had been having, but fresh medicine with a sleeping-draught for the night. Deceased's son was sent for the medicine, to whom it was given by an assistant without verbal instructions, and deceased took what he thought was the mixture first and the draught afterwards. He immediately commenced to vomit, and medical assistance was called in. He died a fortnight afterwards. It would appear that the assistant, in the absence of instructions, supplied the messenger with some medicine and a lotion as before. The bottle containing the liniment was produced; it was labelled "poison," in rather small type, with instructions that its contents should be applied outwardly. The wife could not, and deceased did not, read the instructions. According to the evidence of the medical man who conducted the *post mortem* examination, there was extensive disease of the heart, but no evidence of poison. Some discussion followed as to the propriety of the assistant giving the medicine without communicating with Dr. Lonie, and the jury returned a verdict of "Death from natural causes."
—*From the Preston Herald.*

Reviews.

The Forms of Water in Clouds and Rivers, Ice and Glaciers. By John Tyndall, LL.D., F.R.S. London: H. S. King and Co.

This little book forms the first volume of 'The International Scientific Series;' a series intended to include a number of inexpensive treatises by distinguished men in England, America, Germany, and France on the results of modern scientific research. A glance down the list of authors is sufficient to satisfy one of the scientific value of these works: Huxley, Carpenter, Lubbock, Tyndall, Balfour Stewart, Lockyer, Wurtz, Odling, Berthelot, are men so eminent, each in his own branch, that the mere statement of their names guarantees at once the character of this new series. To those who have read Tyndall's former writings, it is unnecessary to say much about the style of the little volume he has just given to the public. But for the information of some who are as yet unacquainted with Tyndall as an author, we may state that they will find him throughout writing with a freshness, forcibleness, and perspicuity, that enable even the unscientific reader to grasp his meaning with ease, and make him to wonder at finding a subject of much difficulty at once interesting and intelligible. As might have been anticipated, the greater part of the book is devoted to glaciers. Tyndall's name is now so firmly associated with his Alpine investigations that we should naturally expect to hear something new on this subject, when he writes on 'Forms of Water.' There appears, however, to be little that could be called new by a well-informed man; old facts are well connected and seasoned occasionally with new. The reader is invited to be an imaginary companion to the author in his Alpine tours and work on the glaciers. After giving a little preparatory information necessary to enable him to understand what he will see on his tour, he is led at once to the Mer de Glace, with him to make careful measurements of the rate at which the "frozen rivers" are irresistibly but quietly winding down from lofty peaks to the valleys below. The remarkable resemblance to the motion of a river is established in a most satisfactory manner; not only does the ice-stream, retarded by friction on its bed, move more slowly in its lower than in its upper parts, but retarded by the rubbing of the rocky sides, the lateral portions are outstripped by the central, or to use terms commonly applied to a flowing river, the current is strongest in the centre. And further, where the bed of the glacier curves, it has been established by numerous measurements that the part of quickest motion lies nearer the *convex* side of the curve, the resemblance here to the movement of a running stream being most remarkable.

The production of "crevasses," "moraines," and the many other remarkable appearances on the glacier are explained in a most lucid manner, and throughout the interesting and vivid descriptions of scenery are scattered little morsels of science, put in so simple and pleasing a form that the most ordinary reader would scarcely be tempted to "skip them to go on with the story."

As an example of one of these little passages, perhaps rather a choice one, we may mention the explanation of how icicles are formed. At first sight, the formation might appear readily explicable and the matter too trivial to deserve any profound meditation, but the true explanation is founded on facts not so universally known and the true philosopher does not consider any natural phenomenon unworthy of his consideration. It is found that the sun's heat-rays may pass through air of icy coldness unabsorbed, and yet falling on snow cause it to melt: the mountaineer finds himself scorched by a burning sun and yet treading on thawing snow, and if temporarily sheltered from the sun's direct radiation, he finds himself in air of numbing chilliness. Imagine, then, the sun shining on a sheet of snow upon a roof, the snow is melted whilst the frosty air around may be many degrees below the freezing point, the water trickles from the melting snow and hangs in drops from the eaves beneath, here sheltered from the sun's radiation it is exposed to the chilling effect of the cold air and is rapidly refrozen; the next drop trickles down over this solid drop and attaches itself below, adding to the length of the ice pendant, drop after drop causing its further growth in length and thickness until the mature icicle is produced.

Having mastered the appearances and facts from a visit to the glacier, we are then informed briefly how the remarkable semblance in the movement of solid ice to that of liquid water has been accounted for. Ice is brittle, a sudden blow or strain will break it like glass, how then can a long column of ice move down rugged slopes, now narrowing as it is embraced by the walls of a chasm, now spreading and filling the interval between its wider banks, or as the author well figures it, at one time resembling "a plate of ice laid flat," at another, "a plate fixed on edge," and invariably throughout its downward course adapting itself most wonderfully to the irregularities of the surface over which it passes. Passing over explanations, only mentioned to be refuted, we find a satisfactory clue to the true one in the fact that ice is melted not only by heat, but also by pressure, and regealed when the pressure is removed. By powerful pressure in suitable moulds ice can be made to take any form we please; it is plain then that the lower parts of the glacier partially melted by the pressure of the upper portions assume temporarily a plastic condition, and hence their remarkable power of conforming to the unevenness of the rocks below.

Such is a brief and somewhat imperfect outline of the interesting little volume,—a few preliminary paragraphs leading to the subject of glaciers, a very real, though imaginary visit to these vast "ice-streams," during which the author explains in a simple manner what is known, chiefly what he himself has discovered by careful experiment and observation, about these interesting though long-neglected natural phenomena; and then a reference in conclusion to the evidences of former wide-spread "glacial action" visible in many parts of the United Kingdom.

This little book is well calculated to remove much of the deplorable ignorance of natural phenomena and their laws shown by the otherwise well-educated of the present day, as it cannot fail to be intelligible and interesting to any thoughtful reader, and will serve as a model of the way in which we should search into the processes in constant operation around us and unravel their laws. May many more such "Romances of Fact" be written to counteract the evil influence of the too numerous "Romances of fiction."

Grundlagen der Pharmaceutischen Waarenkunde einleitung in das Studium der Pharmacognosie. Von Dr. F. A. Flückiger. pp. v.; 133, and 104 illustrations. Berlin: J. Springer.

This book does infinite credit alike to the pharmaceutical profession of North Germany, to the public, and to its author—to the two former because it implies a state of technical education, and a recognition of the necessity of it, to which we in England are strangers. By this book pharmacy is reckoned a learned profession, requiring long and patient training. The pharmacist is a man of science, fully conversant with not only the names and medicinal properties of his drugs, and with their more salient chemical properties, as all English pharmacists are supposed to be, but also with the minute structure of such as are derived from the vegetable kingdom, and, further, with the life history, morphology, and physiology of the plants from which they are derived. With such a man of high culture imaged in his mind, Professor Flückiger has written a book worthy of his own high reputation, and quite unlike any English book. By diligent compilation from the works of English botanists and pharmacists, and the various papers from all sources published in this Journal, it would be possible perhaps to make something like it. But such a book would lack the unity of plan which characterizes Professor Flückiger's, and above all would not be, as our author's book is, an A B C guide to the pharmacological workshop. The professor insists upon the pharmacist possessing as intimate a knowledge of his drugs as the physician and surgeon must know of their medicinal properties, and of the anatomy and physiology of man and other animals. He would have him know, in fact, all that the advanced vegetable anatomist and physiologist knows, and more. It is evident that a book thus written is likely to be a very different thing from a book written for a more or less decided "cram," such as most English textbooks are. It is, in fact, simply an introduction—a guide book—to downright hard work in one small department of the vast field of pharmacology, and is very largely an elementary treatise on vegetable anatomy and physiology, having as its object to lead the student to the investigation of the natural chemistry by which pharmaceutical substances are elaborated. In giving this to the pharmaceutical student, our author has placed within the reach of an ordinary botanist a novel and most valuable work; in truth, saving a few pages, the book is a botanical treatise, combining the better qualities of the larger works of Schleiden, Mohl, and our own Henfrey. For the earlier portion the botanist will be all the better, although it must be confessed that these portions are the least complete and valuable. The bibliography, to mention one point only, is extremely deficient. English works—with two exceptions, those of Pereira and Royle and Headland—are not alluded to, and Mr. John E. Howard's magnificent 'Quinology' is wholly ignored, whilst continental names of lesser note are included.

The author's strong point evidently is vegetable structure, and he works at this as few but Germans do, with an infinite amount of painstaking, and avails himself of all the aid that chemistry will afford. The illustrations are about the most valuable portion of the book to the ordinary reader, who, for example, merely wishes to learn something about the structure of medicinal roots, woods, and barks. They are singularly well chosen and admirably drawn. The drawings illustrating the author's descriptions of various modifications of cell structure are cases in point. Take for instance the scalariform vessels of *Rhizoma Filicis*; no essential portion of the structure is omitted, nor on the other hand is the drawing encumbered by exceptional details. The markings of the vessels, with all their regular irregularity, so to speak, are shown to the life. The boldly diagrammatic figures in the following page of the "*Porencanalen*" and "*Steinzellen*" (felicitous expression this) of China bark are the best we have seen of such structures, whilst the drawings on page 38 of similar stone cells (stellate cells of Hassal) seen by polarized light are simply exquisite; but we differ from the author in advising the use of balsam instead of glycerine, as used by himself.

Roots, tubercules, stalks, wood bark, fruits, seeds, leaves, and flowers, are all described at greater length than we can possibly follow here, and each section is copiously illustrated whenever such illustration is necessary, and always from official plants. Take, for instance, the portion relating to the latex vessels (our author includes some doubtfully latex vessels in his term milchsäfte); we have first a drawing of the semi-vessel, semi-cell of Jalapa, then of the fig, and three different figures of the milk system of dandelion root, these latter showing the varied character of the vessels, and to some extent also their development. But the best figures in the book, and this is not easy to say in the face of the admirable figures of stomates and seeds of certain umbellifers immediately preceding them, are those of stems and roots distributed very freely between pages 55 and 88. The first on which we light is that of cascarilla bark, where the characteristic stone cells are very accurately drawn, and the binary cell contents carefully distinguished.

Other illustrations, however, surpass this. To take the best in the book, there are *Aconitum napellus*, transverse and vertical, *Actæa spicata*, with the various structures carefully shown, but in the case of aconite imperfectly described, sections of cinchonæ, sassafras, etc., and above all, an unequalled section of *Lignum quassiæ*. The one distinguishing feature of these illustrations is their general fidelity to nature. There is no attempt made to show every detail, clearly impossible of performance, but every effort is made to produce a drawing that shall show the general appearance of the structure. We submitted them to a tolerably severe test. Turning the book upside down, we tried how many of the drawings we could name, and were surprised to find that where a name could be ventured upon, the object being not always sufficiently well studied by us, the right name was hit upon. There are a few exceptions to the general excellence of the illustrations, however,—notably in the case of starches. In one case, calabar bean, the drawing is execrable in execution and hardly faithful to fact. The next drawing (103) errs the other way; it is too artistic, but is otherwise very good, and would probably give a novice a better idea of the appearance of starch by polarized light than any other drawing with which we are acquainted.

The author's remarks on certain cell-products, as raphides, starch, inulin, fats, and the perplexing protein compounds are interesting, and so far as we can see quite to date, albeit some portion may be open to discussion. This, however, cannot be done here.

Taking the book as a whole, there can be but one verdict, that it is incomparably superior to anything we have in England, and that the pharmaceutical student who wishes to begin at the foundation, and make it safe, in raising the superstructure of his business education, would find it worth while to learn German, in order to read it. There is one point more in which the book differs from our usual textbooks,—one which will commend it to the attention of every histologist, whether his work lie chiefly in the animal or vegetable kingdom,—and that is the admirable list of reagents, and running commentary thereon, with which the author concludes his book. Many of them are old friends, some two or three are new to us, one at least is novel of application—namely, cupric tartrate, which Ritthausen proposes as a test for albumen in living cells. Of those that are new to us it is not fair to speak by way of criticism, nor fair to the author to extract his novelties and lessen the interest of his book to any great extent. We recommend them one and all to the careful study of the experimental botanist and histologist.

Obituary.

JOHN GARLE, F.S.A.

"On the 7th instant, at his residence, Chiselhurst, John Garle, Esq., in his 59th year." Such is the pith of a paragraph which, under the formality characteristic of the first column of the *Times*, presented a special interest to many of its readers who are connected with the Pharmaceutical Society. Mr. Garle joined the Society at its formation, his name occurring in the first list of members, published in 1841. Since that time he has laboured lovingly and faithfully in its interest, serving the Society as a member of the examining board from the time of the institution of that body down to the present year. It is no exaggeration to say that his kindly disposition and amiable qualities greatly endeared him to his friends and colleagues, by whom his loss will be most seriously felt.

Notice has also been received of the death of the following:—

On the 25th February, 1873, Mr. Thomas Hall, Pharmaceutical Chemist, Newcastle-on-Tyne. Mr. Hall had been a member of the Pharmaceutical Society since 1853.

On the 19th March, 1873, Mr. William Fingland, Chemist and Druggist, of Thornhill, Dumfriesshire.

On the 7th April, 1873, Mr. John Hopwood, Chemist and Druggist, of Burnley.

Notes and Queries.

[335.]—BLACKFRIARS OINTMENT.—Will any correspondent favour me with a formula for "Blackfriars Ointment?"—E. JONES.

[336.]—COUGH PILLS.—*C. P.* wishes for the formula for "Sir Astley Cooper's Cough Pills."

Correspondence.

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

THE BENEVOLENT FUND.

Sir,—Mr. Clark is, no doubt, prepared to answer a question or reply to comments upon his letter, which is in reality a bill of indictment against the present and past administration of our Benevolent Fund. I would therefore ask him how he reconciles the declaration of his "having long since resolved to withhold his mite, etc.," with the fact of his name appearing to an annual subscription of 5*s.* in the Calendars 1871 and 1872? Without some explanation this appears to be a chronometric error, and if so, it is a bad beginning from a correspondent claiming to put others right.

The Pharmaceutical Society is arraigned as "deaf to the voices around, and hoarding up money." If by this is meant that the Pharmaceutical Council is deaf to those in need, the accusation strikes at the root of benevolence; and is so grave that, in the interests of true charity, Mr. Clark ought to merge from a mere assertion and proceed to proof forthwith. If he be able to produce such proof he will earn the thanks of contributors and recipients; whilst should he fail, justice to the Fund would demand of him a withdrawal as public as the calumny would be flagrant.

It may be that his judgment on pharmacists of the present day would prove as little warranted as that he pronounces against those of former days. Few will deny he pays a sorry compliment to the founders and early supporters of the Fund. Their aim was to provide for a less fortunate brother a haven in which he could rest after an unprosperous though hard-fought career. Their scheme was to invest £10,000, and to grant annuities—thus secured—as interest upon capital. It is now written of them, "They doubted the generosity of the men of to-day."

Many of them are gone from us, but our annuitants live and *will ever live*, the embodiment of their wise, their generous sympathy, reverencing their memories when this sneer is forgotten, or let us hope, repented of. Against the present efforts of the Council to grant annuities and temporary aid from the Benevolent Fund, a counter-proposition is set up by Mr. Clark, and here it is,—"The members in each town should unite their subscriptions, taken away from the Benevolent Fund, to relieve the destitute of their own neighbourhood."

It is only fair to the proposer of this scheme that we should test the working of it touching his own City of Leicester, thus:—Amount of Benevolent Fund subscribed in Leicester as stated in 'Calendar,' 1872, £1 11*s.*; 1873, £1 16*s.* 6*d.* The amount of subscriptions thus taken from the Benevolent Fund and available for the relief of the destitute in Leicester would amount to £3 7*s.* 6*d.* for twenty-four months. Calculating the exact form or amount of relief this sum would provide by the most sagacious management, it cannot bear comparison with the fact that the Benevolent Fund, under the old and abused system, has provided for the widow of a chemist whose application came from Leicester, through the Society's local secretary, Mr. Cooper, and was recommended by another Leicester chemist, an annuity of £30 since 1865—amounting at the present time to upwards of £220.

Those who advocate breaking up the integrity of our Fund and substituting for it a federalizing relief system, must furnish more convincing statistics. And let me add, before the Pharmaceutical Council is adjudged unworthy to represent, or incompetent to interpret, the sentiments of their fellow-subscribers, it must—and more especially the Benevolent Fund Committee must—be put upon its trial. Fortunately the Fund possesses in the person of our Secretary, an officer whose warm interest and indefatigable energy on behalf of our less fortunate brethren no one can gainsay. I have understood he has ready, and would gladly produce, full particulars of every case that has been presented to him, together with the decision of the Council thereon. This material, and the opportunity of reviewing the proceedings of Council at the annual election of annuitants have always been available, and it would, many will conceive, have been fairer to have first tested the value of criticisms at such a meeting, before attacking a benevolent fund which is virtually the property of the needy and the last remnant of their hope. Mr. Clark has elected to bring his charge for discussion and proof in the columns of our Journal. He *may* convince us that a donor to our Benevolent Fund does, by the fact of his election as a member of the Council, lose one of his senses, becoming deaf to the voices around; but at present I believe that the Council will meet him in his capacity of accuser without fear and without reproach.

A SUBSCRIBER TO THE FUND.

Sir,—I was delighted to learn from such good authority as Mr. Sandford, in your last number of the Journal, that every deserving applicant to the Benevolent Fund has received relief.

Is it possible that in the whole country there are only thirteen needy druggists or druggists' widows at the present time who are willing to accept £30 per annum? Then, Drugs for ever! and, Hurrah for the pestle and mortar! Or, on the other hand, is the sum to be received so small that it is not worth having?

The annual subscriptions to the Benevolent Fund appear to be—

London members more than . .	£400
Country members (about) . . .	500
Then, interest on £13,000 . . .	400
	£1300

Why not distribute this sum annually? Why, with an income of £1300, is only £400 spent? Mr. Sandford instances the late Mr. Waugh's approval of the conduct of the Council in this matter. But that which was only proper caution some years since is scarcely applicable at the present time. There is not much danger of the subscriptions decreasing, and I have omitted the donations altogether.

At any rate, sir, pray leave it to the discretion of subscribers, whether their money should be funded or spent at once. Let the Council act boldly in this matter, and leave the result to the Giver of increase.

J. B. B.

PHARMACY IN IRELAND.

Sir,—I cannot allow Mr. Anderson's letter to pass unnoticed, as in many points he is far from correct. In the commencement of his letter he says, "A great amount of misunderstanding exists in the minds of the English chemists regarding the state of pharmacy in Ireland, especially with regard to the position of the chemists and druggists there." I shall be glad to learn what is the misunderstanding regarding the state of pharmacy, and what "especially as regards the position of the chemists and druggists there." If he alludes to their social position being lower than that of their English brethren, he makes a great mistake, as it is equal to theirs, if not higher. Again he says, "the Irish chemists must not be confounded with those bearing the same name in England;" by this we must infer that they are not so competent. Here, again, Mr. Anderson is at fault. The Irish chemists, as a body, are *fully* as competent as their English brethren. He goes on to say, "The pharmacists proper are those who have given up the practice of medicine and devoted themselves to retailing of drugs and dispensing of prescriptions." If such is the case, St. Patrick must have banished them with the snakes, as there are none to be found now.

I do not agree with Mr. Anderson about the examinations. Men who have been in business for years would scarcely be inclined to read up for so difficult an examination as the Major examination of the Pharmaceutical Society.

If, at the passing of the Pharmacy Act, the Modified examination was considered qualification enough for membership of the Pharmaceutical Society and the dispensing of prescriptions in England, why should not the same rule apply here?

The Society of Chemists and Druggists, at their last meeting, approved in the main of the draft Bill proposed by the Apothecaries' Hall. I was one of the deputation which waited on the Apothecaries' Company, and we arrived at a perfect understanding about the examinations. The deputation submitted that having been five years in business and served a proper apprenticeship, should be considered qualification enough without *any* examination. The Governor and Court did not agree with this, and, as near as I can remember, the Governor (Dr. Collins) said the examination they would propose for chemists in business would be almost nominal; that so far as the gentlemen constituting the deputation, as well as numbers more in the trade were concerned, they would have no hesitation in dispensing with examinations; but the public must be protected, and he knew that there were those in business to whom it would not be safe to entrust the dispensing of prescriptions, and he suggested an examination similar to the Modified of the Pharmaceutical Society.

The apothecaries are certainly alive to the necessity for some change; the chemists have not neglected pointing it out to them, and if the Pharmaceutical Society endorses Mr. Anderson's opinions, we must go in for "Home Rule" in matters pharmaceutical; and though our Society is young it is *strong*, and in this matter the members will certainly pull together.

J. T. HOLMES.

30, *Upper Baggot Street, Dublin,*
April 14th, 1873.

EXAMINED AND UNEXAMINED ASSISTANTS.

Sir,—Allow me, through the medium of your columns, to draw attention to what I think an apparent slip in the Pharmacy Act, viz. the non-prohibition of branch businesses of registered chemists and druggists being conducted by unqualified men. A registered druggist, as I understand the Act, is quite at liberty to open as many shops as he pleases, and, so long as his own name is exhibited, he may conduct them by his senior apprentices, or it may be by non-examined assistants, paying a personal visit perhaps once or twice a week, or even less frequently. Some may say that such is quite legitimate, and argue thus:—The responsibility rests with the owner, and therefore he is as much justified in employing an unexamined assistant in his branch shop as in his principal; but I would meet this with a decided negative, holding, as I do, that it is quite as important that such a business should be conducted on the principles of qualification as that of a registered chemist (deceased) whose executors are held liable for the conducting of such business on these principles, if they choose to carry it on. Again, on the other hand, it may be argued that there is no temptation to follow such a course as stated; in reply to which I have just to say that very little proves a temptation to the meagrely-remunerated druggist. Were such an apparent small slip filled up, I am satisfied it would go far to increase further the safety of the public, and at the same time render greater justice to those young men who have thrown themselves into the field at an early hour fully equipped for their calling.

Edinburgh, April, 1873. FAIR PLAY.

W. G. is requested to communicate full particulars respecting the name and address of the person referred to, accompanied by his own name and address, in confidence, to the Registrar, 17, Bloomsbury Square.

W. Macnaught.—The Paris 'Codex' is published by Messrs. Baillière of the Rue Hautefeuille, Paris, but it could be obtained through Messrs. Williams and Norgate, Dulau, Trübner, or any respectable foreign bookseller.

"*Veterinary.*"—Blaine's 'Veterinary Art.'

X. Y. Z.—Much would depend upon the circumstances of the case. Consult a respectable solicitor.

H. W. (Belfast) and "*Cerasum.*"—We believe Messrs. Southall, Son, and Dymond, of Birmingham, are prepared to supply the article in question.

"*Cicuta.*"—(1.) The Adulteration Act was printed in the PHARMACEUTICAL JOURNAL for Sept. 28, 1872, p. 252. (2.) We cannot undertake to say what the decision of a magistrate upon the point would be.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Betts, Mr. J. Waugh, Mr. Bradford, Mr. Gerrard, Mr. Jones, Mr. Fairlie, Mr. Houghton, Mr. Macnaught, Messrs. Tyrer and Co., Mr. Symons, A. G. P., H. B., "Cicuta," "An Assistant."

SUGGESTED ADDITIONS TO THE PHARMACOPŒIA APPENDIX.

BY A. W. GERRARD,

Pharmacist, Guy's Hospital.

The following preparations are suggested as possessing sufficient merit to entitle them to a place in the proposed Appendix to the British Pharmacopœia. All of them have been prescribed for some time past by the physicians and surgeons of Guy's Hospital, and some of them by those of St. Bartholomew's Hospital, and they have been found to be highly useful and efficacious remedies.

GLYCERINE OF BELLADONNA.

Take of—

Extract of Belladonna ...	1 ounce.
Glycerine	1 fluid ounce.

Mix the glycerine gradually with the extract in a Wedgwood mortar.

This is a very useful preparation, and one which I believe would soon become a favourite with the medical profession.

SOLUTIONS FOR HYPODERMIC INJECTION OF ATROPINE, MORPHIA, AND QUININE.

For some time past different prescribers have been using solutions of these alkaloids for hypodermic injections of different strengths, and prepared by different methods. Being organic products, the solutions are liable to undergo change, developing a confervoid growth, the prevention of which is an object yet to be attained, and for which a series of experiments on the solubility and keeping properties of the various salts of the above, both organic and inorganic, are required.

My experience with the acetate of morphia has been that the stronger the solution is made the better it keeps. Some samples of the salt I have found would not entirely dissolve. This, I believe, was due to unconverted morphia, a defect of manufacture, which I have remedied by the careful addition of acetic acid until dissolved, and afterwards of a small quantity of dilute solution of ammonia until slight turbidity was produced, and then filtering. This ensures a neutral preparation. The following formula is a good one:—

Take of—

Acetate of Morphia	1 drachm.
Warm distilled Water	6 drachms.

Dissolve and filter.

LIQUID EXTRACT OF SENEGA.

To be made after the usual method for liquid extracts, namely, by maceration and percolation.

This class of preparations is now regarded with much favour, and I believe the future of English pharmacy is destined to witness a large increase in the number. I consider the above one of the best and most elegant; it has a pleasant, peach-like odour, and the characteristic sweetish bitter taste in a high degree.

OPIUM SUPPOSITORIES.

The only suppository in the Pharmacopœia containing opium is the compound suppository of lead, which contains acetate of lead as well as opium. I think it is desirable to add one containing opium simply, as it is frequently prescribed; and for this purpose I would advise the extract to be used, as being less irritating, more quickly absorbed, and forming a suppository of more uniform strength than the powder.

RESIN OF COPAIBA.

In a recent number of the *Lancet*, Dr. Wilks speaks highly of this substance as a remedial agent, and remarks that he should like to see it have a place in the Pharmacopœia, as it is at present found in but few chemists' shops.

NOTES ON INDIAN SIMARUBEÆ.

BY ALFRED W. BENNETT, M.A., B.SC., F.L.S.,

Lecturer on Botany, St. Thomas's Hospital.

(*Continued from p.* 802.)

There is a good review of the order by Planchon in Hooker's 'London Journal of Botany,' 2nd series, vol. v. The Indian species may be thus classified:—

Tribe I.—SIMARUBEÆ.

Ovary deeply divided.

1. AILANTHUS, *Desf.*

Lofty trees with alternate, unequally pinnate leaves. Flowers small, polygamous, bracteolate, in terminal or axillary panicles. Calyx 5-cleft; lobes equal, imbricate. Petals 5, valvate. Disc 10-lobed. Stamens 10 (in the hermaphrodite flowers 2–3); filaments short or elongated, not scaly. Ovary 2–5-partite; styles connate; ovules solitary in each cell, semi-anatropous. Fruit samaroid; samaræ 1–5, with very large membranous wing, 1-seeded. Seed pendulous, sparsely albuminous.

The genus is confined to Tropical Asia and Australia; and includes 4 species.

1. *A. glandulosa*, Desf. Act. Ac. Par. 1736, p. 263, t. 8; DC. Prodr. i. 89. A lofty tree with very large unequally pinnate leaves, frequently exceeding a foot in length; the leaflets very numerous, shortly stalked, pubescent or subglabrous, very coarsely toothed at the base. Flowers small in much branched panicles. Stamens with elongated exserted filiform filaments, several times longer than the anthers. Fruit of about three membranous linear-oblong samaræ, about 15 lines long by 4 lines broad. Seed near the centre of the samara, about 2 lines by 1 line.

A native of China, generally distributed over Northern India, but probably introduced. Apparently destitute of useful properties either in the wood or bark, but frequently planted in India for the sake of its magnificent foliage, which is also the ordinary food of one of the Chinese silkworms, *Bombyx Cynthia.*

2. *A. excelsa*, Roxb. Cor. i. t. 23; Fl. Ind. ii. 450; DC. Prodr. i. 89; W. & A. Prodr. 150; Wight, Illust. i. t. 67. A tree 60 to 80 feet high, with unequally pinnate leaves, a foot or more in length, the leaflets very numerous, on long stalks, very coarsely dentate, very unequal at the base, and, as well as the petioles, glandular hairy. Flowers larger than in *A. glandulosa*, on longish pedicels, in large, lax, often very much branched panicles. Petals ovate-lanceolate, commonly reflexed. Stamens with very short filaments, about half the length of the anthers. Samaræ larger than in *A. glandulosa*, 2 inches by ½ inch, strongly

veined, blunt or pointed at both ends, copper-red, always much twisted at the base.

Indigenous in South India; extensively planted in North Western India, as far north as Sahamupoor. A variety, *A. imberbiflora* is found in Queensland. The aromatic bark is used by the natives in dyspepsia. Dr. Wight mentions that in the Circars the bark is regarded as a powerful febrifuge, and as a tonic in cases of debility. The wood is soft, white, light, and not durable, but is used for catamarans, and made into sword-handles and sheaths for spears in Western India; the pith is large, and not much used. The roots throw up abundant suckers, and the tree has therefore been employed in the plantations made to clothe barren stony hills near Nice.

3. *A. malabarica*, DC. Prodr. ii. 89; Wight, Ic. t. 1604; W. and A. Prodr. 150; Thwaites, Ceyl. Pl. 69; Rheede, Mal. vi. t. 15. A lofty tree with very large leaves; the leaflets very distant, on long stalks, the two sides of the midrib very unequal, nearly or quite entire, the margin often thickened and wavy, nearly glabrous, much lighter beneath. The flowers as in *A. excelsa*, but rather larger. Stamens with very slender exserted filaments many times as long as anthers. Samaræ large, broadly linear, 2½ inches long by ¾ inch wide, rounded at both ends, reddish, not twisted.

Malabar; Travancore; Ceylon; also in Cochin China. The bark has a pleasant and slightly bitter taste, and is given in cases of dyspepsia, and is also considered a valuable tonic and febrifuge. It yields a fragrant resin known as "Muttee-pal" which may become valuable as an article of trade. Reduced to powder, mixed with milk, and strained, this resin is given in small doses in dysentery, and also in bronchitis, and is reputed to be an excellent remedy, chiefly owing to its balsamic properties. The fruit, triturated with mango, and mixed with rice, is reckoned useful in cases of ophthalmia. Wight states that the bark is rough and very thick, and studded with bright garnet-looking grains, apparently of a resinous nature, which do not dissolve in either alcohol or water. Mr. Broughton, the Government Quinologist, reported upon this resin as follows:— "The resin, as commonly met with, is dark brown or grey in colour, is plastic, opaque, and has an agreeable smell. It contains much impurity. The pure resin is very soft, having the consistence of thick treacle; and this is doubtless the reason why it is always mixed with fragments of wood and earth, which make it more easy to handle. The sample which I examined contained but 77 per cent. of resin, the remainder being adulterations. Alcohol readily dissolves the resin, and, on evaporation, leaves it as a very viscous, transparent, light brown semi-liquid, which does not solidify by many days' exposure to a steam heat; when burnt, it gives out a fragrance, and hence it is sometimes used for incense. The perfume is, however, inferior to that produced by many other resins employed in the concoction of the incense employed in Christian and heathen worship. The peculiar consistency of the resin would enable it to be used as a substitute for Venice turpentine for many purposes, though its price (6 rupees for 25 lb. in the crude state) forbids an extensive employment."

2. Samadera, *Gært.*

Larger or smaller trees, with glabrous habit and simple leaves. Flowers hermaphrodite, in very long-stalked axillary or terminal umbels. Calyx small, 3–5 cleft, imbricate. Petals 3–5, much larger than the calyx, coriaceous, imbricate.* Disc large, conical. Stamens 8–10, included in the corolla, with a small scale at the base. Ovary of 4–5 distinct carpels, free; styles free at the base, more or less united above; stigmas acute; ovules solitary, pendulous. Fruit of 1–5 large, dry, compressed 1-seeded drupes, with a narrow wing on one side.

This genus includes only three species, two of them natives of the Indian Peninsula, Malacca, and Ceylon, the third of the island of Madagascar.

1. *S. indica*, Gært. Frut. ii. t. 156; Wight. Ill. t. 68; W. and A. Prodr. 151; Hook. Ic. Plant. t. 7; Planch. in Hook. Jl. Bot. v. 562; Thwaites, Ceyl. Pl. 70.—*Niota pentapetala*, Poir. Encycl. iv. 490, DC. Prodr. i. 592; *N. tetrapetala*, Wall. (not of Lam. DC.); *N. Lamarckiana*, Blume; *Vittmania elliptica*, Vahl. symb. iii. t. 62. A small tree, 30–35 feet, with stout branches. Leaves fleshy, 8 inches long by 3 inches broad, or larger, elliptic-lanceolate, blunt, with short thick petioles. Flowers yellowish-white, numerous, in dense umbels, on short pedicels surmounting a very long peduncle, equalling the leaves in length. Calyx small, thick, ciliated, persistent in fruit. Petals narrowly oblong, often apiculate. Stamens double the number of the petals; filaments very long, with a scale at the base. Ovary usually of four distinct carpels. Fruit large, 1½ inch by 1 inch, oval, coriaceous, quite glabrous, smooth or slightly reticulated.

Western Peninsula and Ceylon. Colonel Drury, in his 'Useful Plants of India,' says that this tree grows abundantly in Travancore and Cochin, and is propagated easily from seeds. The bark, known as "Niepa" bark, has febrifugal properties, and is used by the natives for this purpose. An oil is extracted from the kernels of the fruit, which is extensively used in rheumatism on the western coast, and is procurable in the bazaars. In erysipelas the bruised leaves are applied externally. The seeds are strung together, and tied round children's necks as a preventive of asthma and affections of the chest. The following directions for the use of the bark, known as "kharinghota," are given in the *Technologist*:— "*Decoction as a febrifuge.* Take six ounces of rasped wood, three pints of water, boil over a slow fire until reduced to one pint, and strain. *Dose.* Two ounces to be taken three times a day. It may be given in all stages of fever. When taken during a febrile paroxysm, it should be given in three-ounce doses. It abates the severity of the symptoms, shortens the paroxysm, and hastens the cure. Sometimes nausea and vomiting occur after taking the dose. This will rather favour the recovery of the patient than otherwise. In such cases the dose should be lessened to one ounce, and repeated at greater intervals, or it may be given during the paroxysm only. In recent cases the fever is generally speedily subdued by the decoction. An infusion of the wood may at all times be used as a general tonic, and it is a perfect substitute for the infusion of quassia in the following form:— Take two drachms of the rasped wood, one pint of boiling water; infuse for two hours in a covered vessel, and strain. *Dose.* One ounce as a bitter tonic to improve the appetite and invigorate the system. It is of a light lemon colour, and a good vehicle for the administration of iron, iodide of potassium, etc."

* Erroneously described as valvate in Bentham and Hooker's 'Genera Plantarum.'

The wood is light, but durable, and is used for shoes and other articles. It takes a good polish.

2. *S. lucida*, Wall.; Plant. As. Rar. ii. t. 168; Planch. in Hook. Jl. Bot. v. 562. Very closely allied to *S. indica*, and perhaps only a variety. Leaves a lighter green, sometimes larger, and with longer petioles. Umbels almost sessile, or with the common peduncle much shorter than the leaves. Fruit smaller than in *S. indica*, pear-shaped, dark brown, glabrous, beautifully reticulated, with a very narrow wing.

Eastern Peninsula and Andaman Islands. Nothing is known about its properties; it has probably been confounded with the former.

(*To be continued.*)

SULPHOVINIC ACID AND THE SULPHOVINATES.*

BY M. BERTHELOT.

I. *Reaction of Sulphuric Acid upon Alcohol.*

The reaction of sulphuric acid upon alcohol gives rise to very varying products, according to the temperature at which it occurs.

(1.) If the two bodies, previously cooled, be gradually mixed, avoiding any rise of temperature, and keeping the whole at about 0°C., no reaction is at first produced; but under the influence of a prolonged contact, a peculiar sulphovinic acid is gradually formed, the salts of which differ from those of the ordinary acid, into which they are transformed under the influence of boiling. This acid, first noticed by Svanberg, and met with since by Gerhardt and myself, has been recently contested by Erlenmeyer, but, I think, wrongly. That author, not having operated with sufficient precautions, obtained, in fact, the ordinary acid in two different ways, so that he compared the salts of one and the same body. The existence of these special sulphovinates, which are more unstable than the ordinary sulphovinates, may be one of the causes of the spontaneous alteration in the commercial salts. I shall, therefore, point out further on how their production they may be avoided.

(2.) Mixture of concentrated acid and absolute alcohol, in equivalent proportions, without special precautions, gives rise to great disengagement of heat and the production of ordinary sulphovinic acid. The quantity of this acid immediately formed varies according to the mode of mixture; that is to say, according to the degree of local heat and the relative proportions in contact, and whether the acid or the alcohol is poured into the other.

For example, upon mixing without precaution one part by weight of concentrated acid with five parts of alcohol, I have found that at the end of one hour 10 per cent. of the acid was changed into sulphovinic acid, and at the end of twenty-four hours, 26 per cent. On the contrary, upon mixing carefully one part by weight of concentrated acid and two parts of alcohol, scarcely any was etherified at the end of one hour, and a very small percentage in twenty-four hours, although the excess of acid compared with the preceding experiment might be expected to favour the combination. Be that as it may with these preliminary phenomena, under the influence of time the combination proceeds to a fixed limit, which it does not appear to pass. Thus, at the ordinary temperature, concentrated acid and absolute alcohol yield for 100 parts of sulphuric acid the following proportions of sulphovinic acid:—

At the end of 40 hours	56·0
„ „ 90 „	59·0
„ „ 147 days	58·8

The reaction is greatly accelerated by a suitable heat. In fact, if the temperature of such a mixture be kept at 100° C., 56 per cent. of sulphovinic acid may be obtained in four hours. It is necessary, however, to avoid the prolonged use of such a temperature, since, at the end of ten hours, there would remain but about 42 per cent. This retrograde action is due to a slow formation of ordinary ether, produced at the expense of the sulphovinic acid, and which tends to regenerate the sulphuric acid.

(3.) The production of ordinary ether becomes very plentiful if the temperature be raised to about 145° C.; at about 160° or 170° C., in consequence of a more complex reaction, even ethylene is formed. Although within these limits of temperature sulphovinic acid always exists in the mixture, in consequence of certain equilibriums between that acid, ether, ethylene, free sulphuric acid, alcohol, and water, it is advisable carefully to avoid such complications in the preparation of sulphovinic acid.

It is therefore necessary to raise the temperature, to about 100° C., and maintain it for a short time, in order to provoke the formation of sulphovinic acid under its most stable form; but the temperature should not be raised too high, nor should the mixture be kept too long at 100° C.

II. *Reaction of Water upon Sulphovinic Acid and its Salts.*

The influence of water upon the production of sulphovinic acid and its salts is illustrated by the fact that when equivalents of strong sulphuric acid and alcohol are mixed together, the production of the acid does not pass a certain limit, 59 per cent. This limit is due, as in the formation of other compound ethers, to the presence of water, a necessary product of etherification. In an inverse sense water will decompose pure sulphovinic acid, and the decomposition will stop precisely at the same limit as the reciprocal combination. Between these four bodies, alcohol, sulphuric acid, sulphovinic acid and water, there is thus produced a certain equilibrium precisely as in the formation of other compound ethers.

But the limit is not always exactly the same for the same equivalent relations, probably because the bibasic organic acids, which might be compared to the sulphuric acid,—such as oxalic, succinic and tartaric acids,—form at the same time two compounds, a neutral ether and an acid ether, a fact which I have verified. Consequently, in these cases, the acid standard is diminished 66 per cent. of its original value when equivalent quantities are used. Whereas I have ascertained that concentrated sulphuric acid only forms one compound with alcohol, an ethereal acid, to the exclusion of neutral sulphuric ether, which is not produced under these conditions; also that the standard of the acid is only lowered 29·5 per cent.

But if the limit be not the same, the general phenomena remain alike. Between the four bodies, acid, alcohol, acid ether, and water, there is produced

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* Abstract from a letter to M. Bussy, President of the Paris Society of Pharmacy (Journ. de Pharm. et de Chimie [4], vol. xvii. p. 257).

a certain equilibrium. The proportions of this equilibrium do not appear to be affected by temperature, at least if it be not such as to produce new compounds, as ordinary ether or olefiant gas. In fact, the limit of the reaction (with equivalent quantities) in the cold, after some weeks, being 59 per cent. of sulphovinic acid, I have found 56 per cent. after a few hours. Although the absolute sameness of these limits has not been established, because of the slow formation of ordinary ether, yet the analogy of the ethers formed by organic acids and the preceding figures tend to show their identity.

The limit of equilibrium,—that is to say, the proportion of sulphovinic acid,—is also modified by the relative proportions of the four bodies. Water, in particular, after a time decomposes sulphovinic acid. Consequently the presence of an excess of water at starting lowers the limit of etherification; it also retards the combination. This is shown by the following figures:—

Nature of Mixture.	Per cent. of Sulphuric Acid etherified after a contact of 40 hours.	90 hours.	20 days.	147 days.
$SO_4H + C_4H_6O_2 + \frac{1}{3}HO$*	56·0	57·4	59·0	58·8
$SO_4H + C_4H_6O_2 + 1\frac{1}{3}HO$	13·2	21·2	41·2	54·8

Alcohol containing 25 per cent. of water yielded, at the end of a month, only 8 per cent. of sulphovinic acid, showing that the presence of water is an obstacle to the combination of the sulphuric acid with the alcohol.

On the other hand, if water be added to sulphovinic acid, or to a sulphovinate, there is decomposition and reproduction of alcohol and acid, slowly in the cold, rapidly at 100°C.,—in all cases inevitable, —until the equilibrium is established between the opposing actions. These are the principal facts in the preparation and preservation of the sulphovinates.

Finally, it may be remarked that sulphovinates are more slowly decomposed in solution than sulphovinic acid. It is in consequence of this slowness that solutions of sulphovinates can be evaporated to crystallization without being spoiled. But the salt should not be kept too long in a state of solution.

The decomposition of sulphovinates in solution presents a peculiar feature which is worth pointing out, namely, that when once commenced it is gradually accelerated. The resulting sulphuric acid takes up an equivalent portion of the base and sets free an equivalent portion of sulphovinic acid, and this latter is much more rapidly decomposed by water than the neutral sulphovinates. In the evaporation, the alcohol being given off, each equivalent of sulphovinic acid releases two equivalents of free sulphuric acid; two equivalents of sulphovinic acid quickly result from the reaction of this sulphuric acid upon the dissolved sulphovinate, and they in their turn are changed by the action of water into four equivalents of free sulphuric acid: the reaction once commenced being thus accelerated in geometrical progression.

These phenomena occur as well during evaporation by heat as a simple keeping of a solution; more slowly, indeed, in the latter case, but always certain. Hence the utility of maintaining solutions of sulphovinates either in a neutral state or slightly alkaline during evaporation or preservation; this may be done by adding to the solution a little neutral carbonate or bicarbonate, which will remain in the mother-liquors after crystallization. The presence of the alkaline salt retards the decomposition, without, however, preventing it altogether.

* Concentrated acid is here taken, which usually contains one-third or more of water.

I do not know whether the neutral sulphovinate, once isolated in a crystalline state, can be preserved. At ordinary temperatures, if the crystals were anhydrous, free from water of crystallization, perhaps it might be. But hitherto this result has not been attained. All the known sulphovinates contain water of crystallization; and I have found that they all undergo change after a longer or shorter time, sometimes after even years.

The alteration always progresses in the same manner; some of the crystals commence to effloresce; they become acid, and the whole mass then quickly undergoes decomposition. The mechanism of this alteration appears to result from the chemical action of water; it is due to a commencement of separation, however slight it may be, of the water of crystallization from the salt which is eliminated by efflorescence. While the crystals preserve their chemical nature and solid state intact they are stable; but the least trace of water of crystallization separated by efflorescence attacks the neighbouring crystals; after a certain time it there sets sulphuric acid free and leads to the cycle of successive decompositions described in connection with solutions. I do not think this fatal cycle can be avoided completely; but it can evidently be retarded by only preserving crystals which are well freed from the mother-liquors, and keeping them in a place having an invariable temperature.

NEW SOURCES OF ETHYL- AND METHYL-ANILINE.

BY JOHN SPILLER, F.C.S.*

In the process of manufacturing the Hofmann violet by the action of ethylic or methylic iodide upon rosaniline or one of its salts, there is always produced a considerable quantity of a dark-coloured resinous or pitch-like substance, which has received the name of "Hofmann gum." This by-product varies in amount and consistence according to the shade of violet simultaneously produced, being much more abundant when the iodide is employed in large proportion for the purpose of obtaining the bluer shades. It has hitherto received no technical application, but accumulates as a waste-refuse in the Aniline Dye-Works where Dr. A. W. Hofmann's process is used.

Whether obtained by the ethylic or methylic reaction, the properties of this body may be briefly summarized as follows:—It is easily fusible in boiling water, and very nearly of the same gravity, for it sinks or swims with the slightest current, being itself all but insoluble in that liquid. In dilute acids (sulphuric and hydrochloric) it is freely soluble, giving dark-brown liquids, from which the gum may be again thrown down unchanged by neutralizing with alkali. Alcohol and benzol dissolve it freely, especially when heated to nearly the boiling temperature; and glacial acetic acid likewise holds it in solution, being precipitated, however, on dilution with water.

During the past year a great number of experiments have been made upon various descriptions of Hofmann gum, varying in their origin and quality according to the amount and nature of the iodide concerned in their production. The results naturally divide themselves into two series, according as they happen to be ethyl or methyl derivatives, but there appears to be a perfect parallel between the two cases; and as much interest attaches just now to the economical production of methyl-aniline, the

* From the Proceedings of the Royal Society.

work has rather extended in the direction of the *methyl* gums.

Without further preface, I may state that the object of this note is to announce the fact that these gums furnish a large quantity of methyl-aniline by destructive distillation. After the Hofmann gum has been kept fused for some time to drive off nearly the whole of the enclosed water, it is charged into an iron still, either with or without the addition of roughly powdered charcoal, and then submitted to a greater heat over a coke fire.* An oily body of nauseous odour soon commences to come over, and the distillation may be safely carried on until the product amounts to half the weight of the gum originally employed. Small quantities of water and ammonia commonly appear, together with a little permanent gas; but practically the oil and residual pitch may be said to be the sole resultants of the operation. This oily body is methyl-aniline, and when purified by rectification in glass retorts becomes nearly colourless, boiling at 200° C., and rising only a few degrees above that point towards the end of the distillation. Not only does it possess the peculiar odour so characteristic of methyl-aniline, but the oil has the required boiling-point as stated above, and the remarkable property of forming permanently liquid compounds (not crystallizable) with any of the ordinary acids. When acted upon with arsenic acid, at or near the boiling-point of the mixture, it furnishes a violet of somewhat red shade, which may be employed as a dye; and the oil gives colours of various tints when treated with other oxidizing agents, according to the usual reactions of methyl-aniline. The red-violet from the arsenical melt may, after purification, be converted into the bluer shades by the Hofmann process, when a new generation of gum is again observed.

The specific gravity of the methyl-aniline oil has varied a little in different operations, but keeps within the ranges of 0·95 and 0·97. It is probable that this trifling variation may be ascribed to admixtures of dimethyl-aniline, due in part to the introduction of higher methylated products into the crude gum employed in these experiments.

By operating in a similar manner upon the *ethyl* gums the corresponding ethyl-aniline has been obtained, the boiling-point of which was higher and not so definite (205°-210° C.) as in the case of the oil already described.

By way of conclusion, and as giving further proof towards establishing the identity of the new oils with ethyl- and methyl-aniline respectively, it may be stated that they fail to give Girard's blue when heated with rosolic acid or rosaniline, but take the peculiar course of changing slightly towards violet, and then suddenly becoming decolourized,—reactions almost without parallel in the history of the tinctorial aniline derivatives.

PROFESSOR TYNDALL ON LIGHT.†

(*Continued from p.* 830.)

The question which we have now to answer experimentally is this: Is the eye as an organ of vision commensurate with the entire range of solar radiation? Is it capable of receiving visual impressions from all the rays emitted by the sun? The answer to this question we find to be "No." On both sides of the spectrum there is a copious outflow of rays which are incompetent to excite vision. Beyond the violet end of the spectrum this vast efflux of rays, entirely useless as regards our present powers of vision, is so copious and varied as to be able to form an invisible spectrum five or six times as long as the visible one. If the theory of evolution be true, then there are in store for man visual inspections far grander than he has yet experienced. These eyes of the future should find beyond the violet the actinic rays which produce chemical effects, rays which produce the decomposition of carbonic acid in plants, and which have so great a power in all the processes of vegetable and animal life.

These ultra-violet rays or waves, though incompetent to stir the optic nerve to vision, are able to agitate the molecules of certain substances so as to shake them asunder and produce chemical decomposition. All photography is founded upon such chemical actions; but there are special substances on which these ultra-violet rays exert a special power. They darken the white salts of silver; and, by permitting a spectrum to fall on paper properly saturated with a solution of such salts, the chemical action reveals the existence and the extent of the ultra-violet spectrum. One of the earliest, if not the very earliest attempts of this character was made by the celebrated Thomas Young, who photographed in this way the rings of Newton; thus proving that these invisible rays obeyed the principle of interference exactly like the visible ones.

As a general rule, bodies either allow the passage of light or they generate it. To use technical terms, they transmit the light or they absorb it, reducing it to darkness. This absorption, however, is not annihilation of the light; it is, in fact, a conversion of it into heat. But there is a third case in which the light is neither absorbed nor reduced to darkness, but transformed into light of another kind. Now, Professor Stokes, who has long occupied the chair of Newton in the University of Cambridge, and who is one of those original workers, who, though not widely known beyond scientific circles, really constitute the core of science, has demonstrated this change of one kind of light into another, and has pushed his experiments so far as to render the invisible rays visible. A piece of paper moistened with sulphate of quinine, when introduced into the portion of the spectrum beyond the violet, renders the non-luminous rays which lie there luminous. By the use of violet glass in cutting off the great mass of the luminous rays, we obtain a light rich in these invisible rays, and this light may be thrown upon the screen and the presence of such rays demonstrated by the paper covered with sulphate of quinine.

[A sheet of paper, moistened with sulphate of quinine, was introduced into the spectrum beyond the violet. Immediately a bluish tint appeared where previously none had been. The light from the electric lamp was then suffered to pass through a sheet of violet-coloured glass, and the experiment was repeated with the spectrum thus obtained. By the use of another sheet of paper a beautiful green hue was produced. A sheet of paper properly prepared, on which a rose with leaves appeared in outline, was placed in this light, and immediately the rose assumed a delicate blue tint, while the leaves showed an exquisite emerald green.]

These effects are due to the quality possessed by the sulphate of quinine and by other bodies, of changing the rapid vibrations of the rays beyond the violet into slower vibrations, and thus rendering the non-luminous rays luminous, and also changing one kind of light into another. Fluorescence is the name given to these effects. The human eye is a beautiful instance of this fluorescence, as Dr. Bence Jones has shown; and there is, no doubt, some substance in the crystalline lens analogous to the sulphate of quinine in its action.

The next question before us is, is radiation capable of diffusing heat? The same apparatus with which the diffusion of light has been shown will also serve to show the diffusion of radiant heat. I first cause an image of the carbon points to fall on the screen. By drawing out the lens the image contracts, but its intensity increases. If now I place some paper in the focus of the image formed the paper will smoke.

* A mixture of pulverized iron borings, kaolin, and syrupy silicate of soda forms an excellent lute for fixing on the head of the still, as it withstands a high temperature without softening.

† Abstract of a series of lectures delivered in the Cooper Institute, New York, and reported in the *New York Tribune*.

I will now cause the rays to converge to a focus, by the aid of a concave mirror. The mirror, silvered in front, is placed in this tin camera behind the electric lamp. A cone of rays, reflected, passes through the aperture in front, closed by a window of rock salt, and forms a focus outside the camera.

If I place paper in the focus formed by this mirror it will ignite. Zinc placed in it will not only fuse but also burn and vaporize. Magnesium will do the same.

Even such refractory metals as copper and silver will be fused on being brought within the focus. The same effects may be produced by the concentration of purely radiant heat. For this purpose convex lenses are employed to convey the purely radiant heat proceeding from the carbon points. Even a lens of so cold a substance as ice may be employed for this purpose. I have here a lens of ice brought to such a shape by being rubbed in a mould. At the focus to which the rays are brought by means of this lens, paper may be ignited and metals fused, and gun-cotton may be exploded.

This mode of concentrating the rays of heat—namely, by lenses—is the same as that first employed by the celebrated Academy of Florence. But the employment of a lens of ice is something remarkable. It was performed by Scoresby in the Arctic regions with solar light. It has, however, never before been performed with artificial light. The lens may be cold, as the ice is, and yet transmit sufficient heat to ignite various substances. This looks odd, but it is easy of explanation when we reflect that it is only those rays that are absorbed that produce the impression of heat. I shall now endeavour to ignite a diamond by the heat radiated from the carbon points. This experiment is a difficult one, and requires great caution. The diamond, as you see, is suspended in a jar. The jar is filled, by displacement, with oxygen; and the diamond is then brought within the focus of the light from the mirror.

Looking at these effects, the question naturally arises, What constituent of the radiation produces them? I introduce a cell of alum in front of the aperture of the camera, causing it to interfere with the light passing from the mirror to the focus. As you observe, the light remains as it was, but upon placing, as I now do, some gun-cotton in the focus, it shines brightly, but does not explode. As soon, however, as the alum cell is removed, the gun-cotton explodes.

This experiment shows us that there must be some constituent of the beam of light which, being transmitted, produces the calorific effect. What is this constituent? If we bring the light to a focus by means of the mirror within the camera, and then cut off all light, certain effects will follow which will give us a clue. Chemical combination exerts an enormous influence on the luminiferous ether. Every person in this brilliant audience is radiant with these rays, and the reason why we cannot see them is that the vibrations are too slow to awaken sensation in the retina. The atmosphere, which is a mechanical mixture of nitrogen and oxygen, is a practical vacuum to the passage of heat rays. When the atmosphere is dry there is an enormous reduction of temperature because of the amount of heat radiated by the earth into space. The elementary bodies, such as oxygen, hydrogen, chlorine, bromine, etc., are remarkably transparent to the rays of heat. Let us see what will result from using with our apparatus iodine dissolved in bisulphide of carbon.

By means of the iodine solution employed in this manner, we may intercept all the luminous rays of the spectrum and then examine the calorific rays alone. I now place a piece of paper where the focus of light was, and, as you observe, it instantly ignites.

I will now employ a sheet of platinum, coated with platinum black, instead of the paper used in the first experiment. Platinum, with its surface thus prepared, acts in regard to the invisible heat rays just as the sulphide of quinine paper did to the invisible light rays. A visible image of the carbon points appears on the surface of the platinum. The temperature of the air surrounding the glowing platinum has nothing to do with this circumstance of heating. The air at the focus may be of a frosty temperature, since no heat is communicated to it from the mirror. The heat raises the platinum to a white heat while not affecting the air. This, of course, is owing to the fact that while the air cannot absorb the heat rays, the platinum can and does. Still keeping the solution of iodine in bisulphide of carbon in front of the camera, and thus cutting off all the luminous rays, I will now proceed to burn at the perfectly dark focus paper and several of the metals.

What agent produces these effects? Let us heat a platinum wire by means of the voltaic current. The wire soon reddens, and finally glows with a white heat. Dr. Draper, to whom I am glad to pay a tribute of respect, has shown by prismatic analysis of the light emitted by the glowing wire that the light at first is a pure red. As the glow augments the red becomes more brilliant, but at the same time orange rays are added to the emission. Augmenting the temperature still further, yellow rays appear beside the orange, after the yellow green rays are emitted, and after the green come in succession blue, indigo, and violet rays. To display all these colours at the same time the platinum wire must be white-hot: the impression being in fact produced by the simultaneous action of all these colours on the optic nerve.

Let us reason backward from this experiment of Dr. Draper. At the beginning, and even before the electric current had acted at all upon the wire, it emitted invisible rays. The vibrations or waves causing these were too long and too slow to excite vision. What becomes of these waves? They are not destroyed, but their intensities are augmented as the shorter are introduced. It is the wave amplitude and not the wave length which determines the intensity of heat as well as of light and also of sound. The rule is that the square of the maximum velocity of the wave determines its intensity. All these waves existed simultaneously. Without such a provision there could be no sun. There cannot be light rays without dark rays also being found. This, Herschel's great discovery has shown. How shall we discover these dark rays? The human eye is delicate as regards the visual rays. But when we come to other rays, not capable of exciting visual impressions, the eye will not suffice, and we must employ an instrument of greater nicety.

I notice in the poetry of Emerson many allusions and expressions which find their application. For instance, he speaks at one place of the discontent felt by the human mind for what we may call the statical condition. Like an organic growth is the growth of science. Something seems an end, but when that end is reached the process does not stop, the bud expands and opens and fruit is born; and so in science, an investigation of a certain subject discovers facts which in the investigator's own and others' hands ripen into yet greater discoveries. In 1821 Seebeck of Berlin discovered that heat applied at the junction of two metals of unequal heat-conducting power soldered together at one end, the other extremities of the bars being connected with a galvanometer, would give rise to electric currents. Oersted, Nobili, and others caught at the idea and turned it to account in constructing a thermometer on this principle, by means of which most delicate changes of temperature may be determined. I place the instrument here and cast an image of the galvanometer dial on the screen. On approaching it with the hand the heat of the latter incites a current which deflects the needle and its image on the screen.

With this instrument we may discover the seat and intensity of the invisible rays of heat in the spectrum. This is done by carrying the thermo-electric pile through the spectrum many successive times, and recording its indications. The chart above the screen represents the range of the heat rays.

By this and other modes of experiment it has been shown that the heat radiated from the non-luminous portion is seven or eight times as great as from the luminous or visible.

The effects of the invisible rays in nature may now be instanced. The action of the sun on the tropical ocean results in warming the waters and vaporizing a portion for the production of rain and snow. It is the dark rays which accomplish these results. The light rays go deeper down. The non-luminous rays go but a short distance below the surface. Rivers are liberated by these same invisible rays. To enable you to see more clearly that it is the dark and not the light rays which produce these effects, I reflect the beam from the electric lamp by a mirror, and mark by a stick the place of the luminous focus. Now, placing the thermo-electric pile in this focus, you see the image of the needle deflected on the screen. Let us now cut off the light. Placing the pile where the focus of light was, the needle is still deflected though no light is at the focus.

By means of the Nicol's prisms we may polarize heat as well as light. They are introduced, and, when rotated to the proper angle with each other, polarization occurs. This polarized heat may be transferred to the thermo-electric pile, and its existence and amount shown by the deflection of the galvanometer needle.

The same effects may be produced with radiant heat as with light. Radiant heat is like light, capable of reflection, refraction, polarization both plain and circular, and double refraction. I will now cut off the light, and when I introduce a sheet of mica, the needle which previously was at zero will be deflected 90°.

(*To be continued.*)

RECENT PROGRESS IN WEATHER KNOWLEDGE.*

BY ROBERT H. SCOTT, F.R.S.,

Director of the Meteorological Office.

The prediction of the seasons, for any considerable period in advance, is of course a problem whose solution must affect the most important social interests, inasmuch as all the operations of agriculture are necessarily dependent on the varying character of the weather. Recently, in order to afford some practical information as to the effect of the weather on growing crops, an agitation has been set on foot for the organization of a system of telegraphic agricultural weather reports, in order, by a knowledge of the prospects of the harvest, to be able to regulate the price of grain. The late Commander Maury took an active part in this movement, and the question was mooted at the International Statistical Congress at St. Petersburg last summer.

Meanwhile, in the course of last summer, a commencement was made in England of giving intelligence as to the probable growth of crops, by adding six inland stations to the list of those which furnish information for the daily weather report.

Our recent experience of the rainfall of 1872, which was almost unprecedented and certainly unexpected, both as to its amount and continuance, is a fair illustration of the very moderate pretensions which even the most practised meteorologists can make to a knowledge of the probable character of the weather for even two months in advance. Abundant notes are now being received as to the concomitant phenomena of unusual drought during parts of last year in other regions of the earth, and as to the abnormal relations of barometrical pressure over north-east Europe on the one hand and Iceland on the other; but none of these facts throw any light, hitherto discoverable, on the causes of our exceptional weather.

Numerous instances might be cited of the failure of prophecies of weather based on the popularly-received signs, such as the shining of the sun on Candlemas Day, evidencing that the principles on which such prophecies depend are not mathematically correct. It is, nevertheless, undeniable that the movements of birds of passage are apparently directed by a prescience of the coming character of the weather; generally, their arrival may be attributed to the fact that they herald the approach of conditions of weather which have already set in in their home. Changes of weather ought to bear mathematical treatment as well as any other statistical facts, and consequently attempts have been made to apply mathematical reasoning to experience of the seasons, in order to test whether these popular ideas have or have not, any real basis of truth.

The most recent contribution to knowledge in this direction is a paper by Wladimir Köppen in the Russian Repertorium für Meteorologie, vol. ii., "On the Sequence of the Non-periodic Variations of Weather, investigated according to the Laws of Probability." The discussion is prefaced by the remark that while weather study has made great progress owing to the development of telegraphy, its results are mainly of utility to the seaman, but remain comparatively valueless for the farmer, while the advantage to be derived from a foreknowledge of the weather is as great in the one case as in the other.

Köppen has examined into the chance of a change of weather at any time, and he finds that *the weather has a decided tendency to preserve its character.* Thus, at Brussels, if it has rained for nine or ten days successively, the *next* day will be wet also in four cases out of five; and the chance of a change decreases with the length of time for which the weather *from* which the change is to take place has lasted.

In the case of temperature for five-day periods the same principle is found to be true; for if a cold five-day period sets in after warm weather, the probabilities are two to one that the next such period will be cold too; but if the cold has lasted for two months, they are nearly eight to one that the first five days of the next month will be cold too. The chance of change is, however, greater for the five-day periods than for single days. Similar results follow for the months, but here, again, the chance of change shows an increase.

In the instance we first cited, that of rain, the result is *not* that if it once begins to rain the chances are in favour of its never ceasing; all that is implied is, that the chances are against its ceasing on a definite day, and that they increase with the length of time the rain has lasted. The problem is similar to that of human life: the chance of a baby one year old living another year is less than that of a man of thirty.

The practical conclusion from all this is, that although it is known that a compensating anomaly for all extraordinary weather exists somewhere on the earth's surface,—*e. g.* the very common case of intense cold in America while in this country we have a mild winter, which was most strikingly true last January,—there is no reason, as yet ascertained, to anticipate that this compensation will occur at any given place in the course of a year. In other words, when definite conditions of weather have thoroughly established themselves, it is only with great difficulty that the courses of the atmospheric currents are changed.

Attempts have not unfrequently been made to predict the seasons for a long period in advance, but without much success hitherto. One great cause for failure is, that accurate meteorological records do not extend beyond the beginning of the century at more than a few stations, and for these the local influences cannot be altogether eliminated. Thus, it is hardly possible to say what has been the approximate temperature of these islands for more than twenty years,—a period far too short for the definite recognition of a cycle. The shortest of these cosmical cycles which has been determined is the sunspot period of $11\frac{1}{9}$ years according to Wolf, and there are indications of far longer periods, such as 33 years or even $69\frac{1}{3}$ years, according to Hornstein.

* Abstract of a Lecture delivered at the Royal Institution of Great Britain, Friday, February 14th, 1873.

At the last meeting of the British Association at Brighton, a paper by Mr. Meldrum, of the Mauritius, was read, in which he showed that the cyclones for which that district of the Indian Ocean enjoys an unenviable notoriety have been more frequent in some years than in others, and that these years of maximum frequency occurred at intervals of about 11 years, coinciding with those of maximum sunspot frequency. This agreement is most important, and it has been abundantly corroborated by an examination of the rainfall at such stations in the southern hemisphere as are available. This has been carried out by Mr. Lockyer, in 'Nature,' as well as by Mr. Meldrum. The results, for the comparatively short period to which they refer, are most striking, as they are sufficient to show that a periodicity is traceable in the weather of the Indian Ocean which is eminently suggestive of a close relationship between the changes which take place in the sun's surface, and the phenomena of our own atmosphere.

But, why has not this periodicity, if it exists, been detected long ago by an examination of European records, which are far more complete than any existing for the Indian Ocean? The answer to this is twofold: in the first place, we are preeminently in the district of the variable winds, and our storms are not nearly so regular in their character as those of the Mauritius, where almost the sole type of storm is the true tropical cyclone, with its concomitant rainfall. It is next to impossible in this country to keep an accurate record of all the several storms which pass over us. The existence of conjugate storms is not unfrequent; two and even three systems of disturbance being traceable at the same time within the area of the United Kingdom. Are these one single storm or several? and how should they be counted in a catalogue? Rain also cannot be taken as a sign of the frequency of storms in a year; for although we know that warm winters are invariably wet and stormy, it cannot be asserted that the all but constant rainfall of the early part of last year was in any way related to storms.

There is, however, in the second place, a far deeper reason for the non-discovery of these cycles in any chance series of rainfall records. The sun passes through phases of greater and less activity, and the terrestrial phenomena corresponding to the epochs of the former character are excessive evaporation in some parts of the globe, and consequent excessive precipitation in others. It must therefore be ascertained in what districts we are to look for the one and for the other of these phenomena respectively. The fact of the mutual compensation of anomalies will show that it is not imposssble that the years of maximum rainfall at the Mauritius may be years of great dryness here. In fact, it cannot yet be said where the maximum solar effect is produced. Mr. Lockyer has pointed out that we must aim at attaining a thorough knowledge of the movements and changes of our own atmosphere, and then seek to establish a connection between them and other cosmical phenomena, such as terrestrial magnetism, the relation of which to the state of the sun's surface was pointed out by Sir E. Sabine twenty years ago.

With Weather Telegraphy and Storm Warnings the name of Admiral Fitzroy will always be associated. This country, however, was not the first to issue telegraphic weather intelligence to its seaports; for in the year 1860, when the possibility of introducing such a system was being discussed here in London, the step had actually been taken in Holland, at the instance of Prof. Buys Ballot. At the present time there is not a single European country, except Greece, which has not its own meteorological organization. In most cases telegraphic weather reports are published in the newspapers, while the example set by Le Verrier, about 1858, of the publication of a lithographed daily bulletin, has been followed by our own office, more than 600 copies of whose charts are issued daily to subscribers and for exhibition at seaports. Of late years Russia, too, has commenced the publication of a lithographed bulletin.

To see weather telegraphy on its grandest scale, we must cross the Atlantic, where, under the direction of Brigadier-General Myer, no less than three charts are issued every day by the Chief Signal Office of the United States at Washington. This undertaking is rendered possible by the fact that the whole organization is military, and that its efforts are almost entirely concentrated on the preparation of these reports, while the telegraphic system of the States is placed at the disposal of the Signal Office for a certain space of time every day. By this means it is possible to publish the chart and report simultaneously in all the principal cities of the States. At the outside, £4000 a year is spent in this country on weather telegraphy, while the vote for the Signal Office, or, to use its familiar designation in the *New York Herald*, for "Old Probabilities," in the United States, is no less than 250,000 dollars, about fourteen times as much.

In our system of stations the first thing noticeable is, that we are entirely exposed to the westward, the direction from whence most of our storms come, and that we have little prospect of improving our condition in this respect. Proposals have been made to moor vessels off our coasts, having telegraphic communication with the shore, and to use them as floating observatories. A trial made with H.M.S. "Brisk," at the entrance of the Channel, resulted in a total failure. The proposal has just been resuscitated in the United States by Mr. Morse, who proposes to moor buoys out at sea with observing turrets on them. The Portuguese Government intend to establish a reporting system between the Azores and the mainland, and an application has been made to the Meteorological Committee to contribute towards the expense, who at once replied that they would be ready to assist in this particular development of weather telegraphy to the extent of their powers.

Comparison between the 8 A.M. reports from Angra do Heroismo in the Azores and from Valencia has been made for the last $2\frac{3}{4}$ years, and there is not a single instance in which the progress of a storm from the Azores to these islands can be traced; the two barometrical curves pursue their respective courses almost entirely independently of each other, and so far from it being true, as has been asserted, "that no country would benefit by this intelligence (from the Azores) so much as Great Britain," the *primâ facie* evidence afforded by the diagrams is, that the balance of advantage to be gained by the proposed connection would fall to the Azores. It, however, is undeniable that it would be a great advantage to us to know daily what were the atmospheric conditions over the district of the Atlantic where the islands in question are situated.

Our experience of the value of Transatlantic reports has not been satisfactory. For three years reports have been received daily (free) from Heart's Content, through the liberality of the Atlantic Telegraph Company, but they have not been of much practical value; partly because the station was badly placed for wind observations, being in a land-locked bay, and partly because *uncorroborated reports from distant stations cannot be trusted.* Accordingly, when the committee were asked to pay for the transmission of the reports, they at once decided to discontinue them.

We now come to the practical portion of our subject, the actual *forecasting of the weather.* The only great principle which has been established of late years has been the entire dependence of the wind, as to both its direction and its force, on the barometrical gradient, and not on the absolute height of the barometrical column. This principle is known as Buys Ballot's law. The law is—"Stand with your back to the wind, and the barometer will be lower on your left hand than on your right." As a simple result of this fertile generalization, we find that there is no danger of a gale, unless the gradient, or difference between barometrical readings over a given distance, exceeds 0·6 in. per 50 miles in the district where the gale will be felt. The attempts which have been made to establish a numerical relation between the gradients and the wind-force have not yet been satisfactory, owing chiefly to the difficulty of eliminating the local conditions which affect the wind. We are also unable, as yet, to say what interval of time elapses between the establishment of the gradient and the setting in of the corresponding wind, and, on the whole, it must be said that, if we trust to the barometer alone, we shall not have sufficient warning of the approach of a gale.

There are several valuable deductions which follow from Buys Ballot's law. The wind may move either against or with watch-hands, and the former is the more usual direction of gyration. The former of these motions is termed cyclonic, and takes place round a barometrical minimum; the latter, anti-cyclonic, and takes place round a barometrical maximum. The weather depends on the relative positions and characters of these areas of defect and excess of atmospherical pressure, and the wind systems connected with them.

(*To be continued.*)

POISONOUS PROPERTIES OF THE RED BUCKEYE.*

The red buckeye (*Æsculus Pavia*, Lin.), a Sapindaceous plant which has its habitat in the Southern States of America, is there generally looked upon as a poison, and farmers frequently attribute the death of stock to their having eaten some part of the plant. Mr. E. C. Batchelor has therefore made some experiments with the seeds, the results of which he has recently given in his inaugural essay upon taking up his degree of graduate in pharmacy at the Philadelphia College. So far as his researches have gone, they show that the seeds are possessed of decided poisonous properties, residing chiefly in a glucoside found in the cotyledons. The symptoms following its administration are similar to those of strychnia poisoning.

The seeds which are from 1 to $1\frac{1}{2}$ inches long, and $\frac{3}{4}$ to 1 inch in diameter, lost 25 per cent. of their weight in drying. The testa, constituting 17 per cent. of the seed, has no odour, but an astringent and slightly bitter taste. It yielded 3 per cent. of a dark reddish-brown resin, tannic acid, some colouring matter, and a minute proportion of tasteless long prismatic crystals.

The cotyledons have a slightly disagreeable odour and an amylaceous taste, slightly sweet at first, then bitter and acrid, with a peculiar and lasting drying effect in the fauces. They yielded by successive treatment a fixed oil (about 5 per cent.), a tenacious green mass, cane sugar and syrup ($2\frac{1}{2}$ per cent.), and a glucoside. The latter was obtained in light yellowish-brown shining scales, possessing a peculiar heavy odour, and an extremely bitter and acrid taste, with a very persistent drying effect on the fauces. Boiled with dilute hydrochloric acid it was converted into glucose and a compound obtained from a solution in alcohol in small yellowish-white tasteless odourless crystals having an acid reaction. The glucoside was insoluble in ether or chloroform, soluble in cold alcohol, more so in hot, freely soluble in water, yielding a frothy solution acid to litmus. Valerianic acid was obtained by distilling it with sulphuric acid.

The new glucoside differs from Argyræscin and Aphrodæscin found by Rochleder in *Æsculus Hippocastanum*. Sulphuric acid gives a rich yellow solution which a drop of water changes to a reddish-purple; upon raising the temperature purple flocks are deposited, and the odour of fatty acids is evolved. Its aqueous solution is not precipitated by acetate or subacetate of lead or baryta water. Less than half a grain administered to a full grown cat caused uneasiness in fifteen minutes, and alternate fits of stupor and muscular spasms, which lasted three days.

Besides the foregoing substances, the cotyledons yielded a minute quantity of a crystallizable acid, and 12 per cent. of starch. The seeds yielded 12 per cent. of ash, a qualitative analysis of which showed the presence of aluminium, magnesium, potassium, sodium, and iron (trace) as bases, and carbonic, hydrochloric, and phosphoric acids.

* Abstracted from the *American Journal of Pharmacy* [4], vol. iii. p. 145.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

A complimentary dinner was given on Thursday evening, at six o'clock, in McLean's Hotel, St. Vincent Street, by the President, Vice-President, and Council of the Glasgow Chemists and Druggists' Association, to the President, Vice-President, and Secretary of the Pharmaceutical Society of Great Britain, on the occasion of their first official visit to Scotland. Mr. Thomas Davison, President, in the chair; Mr. John Jaap, Vice-President, croupier.

The following gentlemen were present:—Mr. Haselden, President of the Pharmaceutical Society; Mr. Williams, Member of the London Council; Mr. Bremridge, Secretary and Registrar of the Pharmaceutical Society; Dr. Cowan, Professor of Materia Medica, Glasgow University; Dr. Simpson, Professor of Medical Jurisprudence, Glasgow University; Mr. Baildon, President of the North British Branch; Mr. Gilmour, Vice-President of the North British Branch; Mr. Mackay, Honorary Secretary of the North British Branch; Mr. Young and Mr. Ainslie, Edinburgh; Mr. McDonald (Glasgow Apothecaries' Company); Mr. Stanford, British Seaweed Company; Mr. Daniel Frazer, Member of the London Council; Mr. Rait Partick; Mr. Currie, Sauchiehall Street; Mr. Currie, Eglinton Street; Mr. Battie, Dumbarton; Mr. Duncanson, Stirling; Mr. Kinninmont; Mr. Fairlie; Mr. Greig; Mr. Whyte; Mr. Dun, etc. etc.

The Vice-President of the Pharmaceutical Society was unavoidably prevented from being present at the dinner.

Thirty-two gentlemen sat down to dinner. A fine band, under the charge of Mr. Adams, was in attendance, and played appropriate airs.

The Chairman, after giving the usual loyal and patriotic toasts, proposed the toast of the evening,—"The Pharmaceutical Society of Great Britain, coupled with Mr. Haselden, President, and Mr. Bremridge, Secretary."

In heartily welcoming the deputation—on the occasion of its first official visit to Scotland—to the good old City of St. Mungo, now in magnitude the second in the empire, the Chairman commented upon the desirability of the President and Council of the Pharmaceutical Society—it being a representative body—occasionally visiting their constituents as such, to enable them far more accurately to learn what was thought in remote places regarding the various matters brought under their consideration. He particularly referred to two points in which pharmaceutists of the commercial metropolis of the north were specially interested. These were, first, "That the true interests of the medical profession, as well as those of pharmaceutists and the general public, demand that the duties of the prescriber and pharmacist should be as far as possible separated." Second, "That when physicians and surgeons really find it necessary to keep open shop, they should at least be required to have a qualified dispenser." The necessity of the first point the chairman regarded as self-evident. With regard to the second point, the chairman said—"If the physician or surgeon requires to keep open shop, it is surely right that the person who dispenses in that shop should be a qualified person. It seemed altogether a strange procedure that laws—however well they may be made with the view of protecting the public, should apply only to the trained pharmaceutists, while mere boys, ignorant alike of pharmacy and elementary education, are permitted, under the wing of a medical practitioner's name, freely to dispense and sell the most poisonous agents. If the Parliamentary Committee who watch over such matters would feel assured of the support they would receive from Glasgow, he was sure they would not be long in being up and doing. The opportunity might soon occur in the introduction into the House of Commons of some bill on medical reform; and what greater boon could be conferred on pharmaceutists throughout the country than by pressing on the attention of Government the points he had named. Great advances had undoubtedly of late years been made in the position of pharmaceutists throughout the country, and certainly these had been chiefly attained through the instrumentality of the Pharmaceutical Society. He hoped, then, that new efforts would yield even greater advantages in the future."

Mr. Haselden and Mr. Bremridge, who were very well received, replied on behalf of the Pharmaceutical Society, commenting upon the desirability of belonging to the Society, and expressing the great desire, not only of themselves, but of the Council and Members of Committees, and of the Parliamentary Committee in particular, to do all that was possible for the benefit not only of members of the Society, but of all chemists and druggists throughout the kingdom; and concluding by returning thanks in eulogistic terms for the very cordial reception they had received, both at Edinburgh and Glasgow, as from every one with whom they had had the pleasure of associating from the moment of their arrival in Scotland.

The toast, "The Council of the Pharmaceutical Society in London," was proposed by Professor Simpson, and replied to by Mr. Williams and Mr. Frazer.

Mr. Stanford, in an able speech, gave the next toast, "The Medical Profession," which was ably responded to by Professor Cowan and Professor Simpson, both of whom made interesting speeches.

"The North British Branch of the Pharmaceutical Society" was proposed by Mr. Currie, and replied to by Mr. Baildon, President, and Mr. Gilmour, Vice-President.

"The British Pharmaceutical Conference" was proposed by Professor Cowan, and replied to by Mr. Williams.

"The Honorary Secretary of the North British Branch of the Pharmaceutical Society," proposed by Mr. Kinninmount, and replied to by Mr. Mackay.

"The Glasgow Chemists and Druggists' Association," proposed by Mr. Mackay, and replied to by Mr. Clarke, Secretary, and Mr. Fairlie.

"The Drug Trade in Glasgow," proposed by Mr. Williams, and replied to by Mr. McDonald (Glasgow Apothecaries' Company).

"The Chairman," by Mr. Young, replied to by Mr. Davison.

"The Croupier," by Mr. Ainslie, replied to by Mr. Jaap.

The *réunion* was entirely a success, everything passing off well, each one present seeming determined not only to please but to be pleased.

THE ANNIVERSARY DINNER.

It has been decided that the Annual Dinner of the Pharmaceutical Society, in connection with the presence in London of many members of the trade to attend the Annual Meeting, shall take place as before at the Crystal Palace, on Tuesday, the 20th of May next. The following is a list of the Stewards, from whom tickets can be obtained by those desirous of being present on the occasion:—

Atherton, John Henry	...Long Row, Nottingham.
Atkins, S. R....	...Salisbury.
Attfield, Professor ...	...17, Bloomsbury Square, W.C.
Baiss, A....	...102, Leadenhall Street, E.C.
Barker, W. R.	...143, New Bond Street, W.
Barnes, J. B....	...1, Trevor Terrace, Knightsbridge, S.W.
Barron, Frederick ...	...2, Bush Lane, Cannon Street, E.C.
Bathe, Robert Samuel	...10, Lisson Grove, N.W.
Baynes, James	...24, Waterworks Street, Hull.
Baynes, James, jun. ...	...17, Bloomsbury Square, W.C.
Beddard, John	...46, Churton Street, S.W.
Bell, R. E.	...161, East Street, Walworth, S.E.
Bentley, Professor ...	...17, Bloomsbury Square, W.C.
Betty, S. C.	...6, Park Street, Camden Town, N.W.
Billing, Thomas	...86, King's Road, Brighton.
Bird, Augustus	...Wood Lane, Shepherd's Bush, W.
Bottle, Alexander... ...	...37, Townwall Street, Dover.
Bourdas, Isaiah	...7, Pont Street, Belgrave Square, S.W.
Brady, Henry Bowman	...29, Mosley Street, Newcastle-on-Tyne.
Bremridge, Elias	...17, Bloomsbury Square, W.C.
Brierley, Richard... ...	...44, Market Street, Stalybridge.
Brown, William Scott...	...113, Market Street, Manchester.
Burbidge, Thomas ...	...16, Coleman Street, E.C.
Butt, E. Northway ...	...13, Curzon Street, Mayfair, W.
Carteighe, Michael ...	...172, New Bond Street, W.
Cornish, Henry Robert	...24, Market Place, Penzance.
Cracknell, Charles ...	...217, Edgware Road, W.
Davenport, J. T.	...33, Great Russell Street, W.C.
Deane, Henry	...Clapham Common, S.W.
Down, Dr. J. Langdon H.	...39, Welbeck Street, Cavendish Square, W.
Evans, Henry Sugden...	...60, Bartholomew Close, E.C.
Faulconer, R. S.	...272, Walworth Road, S.E.
Flux, William	...3, East India Avenue, Leadenhall St., E.C.
Francis, George Baggett	...5, Coleman Street, E.C.
Frazer, Daniel	...113, Buchanan Street, Glasgow.
Gale, Samuel...	...338, Oxford Street, W.
Garner, Thomas	...75, Allan Road, Stoke Newington, N.
Garratt, J. C.	...Rugby.
Giles, R. W.	...52, Royal York Crescent, Clifton, Bristol.
Goss, Samuel...	...Barnstaple.
Greenish, Thomas... ...	...20, New Street, Dorset Square, N.W.
Groves, Thomas B. ...	...80, St. Mary Street, Weymouth.
Hampson, Robert... ...	...205, St. John Street Road, E.C.
Harvey, Charles	...Giltspur Street, E.C.
Harvey, Edward	...6, Giltspur Street, E.C.
Haselden, A. F.	...18, Conduit Street, W.
Hemingway, Walter ...	...20, Portman Street, W.
Herring, John B.... ...	...40, Aldersgate Street, E.C.
Hills, Thomas Hyde ...	...338, Oxford Street, W.
Hodgkinson, William ...	...127, Aldersgate Street, E.C.
Hopkin, William King	...16, Cross Street, Hatton Garden.
Horner, Edward	...20, Bucklersbury, E.C.
Howden, Robert	...78, Gracechurch Street, E.C.
Hughes, John	...York Glass Co., West St., Finsbury, E.C.
Huskisson, H. O.... ...	...17, Swinton Street, W.C.
King, C. T.	...Tenter Street, Little Moorfields, E.C.
Kitchin, Archibald ...	...Whitehaven.
Lansdown, George ...	...3, Warwick Street, Charing Cross, S.W.
Lescher, F. Harwood ...	...60, Bartholomew Close, E.C.
Lockyer, George	...208, Deptford High Street, S.E.
Lynch, Thomas	...171A, Aldersgate Street, E.C.
McCulloch, Frederick ...	...13, Hart Street, Covent Garden, W.C.
Mackay, John	...119, George Street, Edinburgh.
Mackey, J. B.	...2, Bouverie Street, E.C.
Maltby, Joseph	...Lincoln.
Martin, T. C.	...11, Aldersgate Street, E.C.
Martindale, William ...	...University College Hospital, W.C.
Matthews, William ...	...12, Wigmore Street, W.
Mee, George	...79, Grosvenor Rd., Highbury New Park, N.
Morson, T. N. R.	...38, Queen Square, Bloomsbury, W.C.
Moss, John	...17, Bloomsbury Square, W.C.
Newbery, Lionel	...37, Newgate Street, E.C.
Paul, Dr.	...17, Bloomsbury Square, W.C.
Pound, Matthew	...60, Leather Lane, E.C.
Preston, Alfred	...88, Leadenhall Street, E.C.
Radley, W. Valentine ...	...74, Market Place, Sheffield.
Redwood, Professor ...	...17, Bloomsbury Square, W.C.
Roach, Pope	...8, St. James's Street, S.W.
Robbins, John	...372, Oxford Street, W.
Rossiter, Frederick ...	...20, George Street, Hastings.
Sandford, George Webb	...47, Piccadilly, W.
Savory, C. Harley ...	...143, New Bond Street, W.
Schacht, G. F.	...7, Regent's Place, Clifton, Bristol.
Schacht, William... ...	...6, Finsbury Place South, E.C.
Schweitzer, J.	...79, Pavilion Road, Sloane Street, S.W.
Shaw, John	...24, Great George Place, Liverpool.
Skinner, Thomas... ...	...Cirencester.
Smith, Nathaniel... ...	...Cheltenham.
Southall, William ...	...17, Bull Street, Birmingham.
Stacey, S. Lloyd	...300, High Holborn, W.C.
Starkie, R. S....	...4, Strand, W.C.
Stoddart, William W....	...Bristol.
Sutton, Francis	...Bank Plain, Norwich.
Thompson, John	...10, Aldersgate Street, E.C.
Tupholme, J. T.	...1, Coleherne Terrace, West Brompton, S.W.
Turner, John...	...Aylesbury.
Twinberrow, J. K. ...	...80, Wigmore Street, W.
Umney, Charles	...40, Aldersgate Street, E.C.
Walker, William Henry	...Southport.
Warner, Richard... ...	...20, Charterhouse Square, E.C.
Warrick, R. B.	...Old Swan Lane, Upper Thames St., E.C.
Watts, W. Manning ...	...32, Lower Whitecross Street, E.C.
Wavell, John...	...Ryde, Isle of Wight.
Wiggin, J.	...34, St. Matthew's, Ipswich.
Wilkinson, William ...	...263, Cheetham Hill, Manchester.
Williams, John	...16, Cross Street, Hatton Garden, E.C.
Wimble, Alfred	...62, Upper Stone Street, Maidstone.
Wood, C. H.	...300, High Holborn, W.C.
Wootton, A. C.	...44, Burghley Road, N.W.
Wright, G. H.	...103, Borough High Street, S.E.
Wyman, John	...122, Fore Street, E.C.

Tickets for the dinner may be obtained up to Thursday, May 15, from any of the Stewards, or from the Honorary Secretaries, Messrs. RICHARD BREMRIDGE and MICHAEL CARTEIGHE, 17, Bloomsbury Square, W.C. In order to make the necessary arrangements and prevent discomfort, members and their friends are requested to make application for their tickets *at once*.

The Pharmaceutical Journal.

SATURDAY, APRIL 26, 1873.

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

JUSTUS VON LIEBIG.

An diesem Apparate ist nichts neu als seine Einfachheit und die voll-kommene Zuverlässigkeit welche er gewährt: "in this apparatus there is nothing new but its simplicity and thorough trustworthiness." Such were the words of LIEBIG when announcing to the world his practical creation of organic chemistry. The man himself speaks out in this sentence. "Simplicity" and "trustworthiness" were not less the characteristics of the method than of its author. Versatile as was his genius, and various as were its products, he never proved false to those twin-requisites of science.

"Servetur ad imum
Qualis ab incepto processerit et sibi constet,"

was as much his motto as that of the Roman sage; and whether his work lay in the laboratory or in the lecture-room; in the domain of agriculture or in that of popular education, it combined, in a degree seldom matched in the history of inductive research, the "simplicity" and the "trustworthiness" which are at once the symbol and the test of truth.

In another part of the Journal we have entered, with sufficient fulness, into the narrative of LIEBIG'S personal career. The "exceeding great reward," which is the meed of chivalrous self-devotion in every honourable life service, was not denied him,—probably few *savants* of modern times have lived to reap a richer harvest of recognition. But of him, as of every great pioneer of science, it may justly be said, "his works do follow him," and long after the experiments, theories, and writings associated with his name have lapsed into obscurity, the impulse which he gave to chemical investigation will be felt for good. In a preeminent degree he was, what the first of living French chemists designated him—"a master of scientific initiative"; and even when his generalizations turned out to be premature, or when his inductions proved incomplete, he never forfeited the admiration of the scientific world for the fertility of resource which had suggested them, or for the candour with which he brought them into the critical foreground. Even when the judgment of contemporary *savants* was adverse, not a few of them have been known to share the sentiment of CICERO—*Errare malo cum* PLATONE *quàm cum istis vera sentire.*

"The verdict of foreigners," says MADAME DE STAEL, "is that of a contemporaneous posterity;" and, if the saying be true, the reputation of LIEBIG, when measured by the standard of English appreciation, will be great indeed. Who of us, in school-boy days, has not revelled in the 'Familiar Letters on Chemistry,' and passed to the severer enjoyment of those beautiful researches by which he made science the handmaid of husbandry and the prescriber of food in its universal application to human wants? Even in the very process of enriching our knowledge with his pregnant teaching the intellectual faculties were stimulated and strengthened by the severe, yet simple, logic by which his conclusions were reached; and in studying, for example, his treatises on agriculture, we reaped a mental harvest in the exercise, and felt the wholesome discipline of what BACON calls 'the Georgics of the mind.' But, passing from personal to public obligations, what Englishman will withhold his tribute of gratitude to the chemist who first taught how crops grow and how the exhausted earth may be reinvigorated; what food is best adapted for the frigid, the temperate, or the torrid zones; what principles control the development and renewal of the tissues; how life may be most agreeably prolonged, and death most effectually kept at bay?

With the votaries of our own profession in particular LIEBIG'S must ever be an honoured name. His contributions to pharmacy, though eclipsed by the more brilliant additions he has made to physiological and agricultural chemistry, are none the less substantial and enduring. It was in the pharmacist's laboratory that he made his first researches; it was under pharmaceutical auspices that his scientific genius received its earliest nurture. To his dying day he never forgot his young associations; and all throughout his career he showed the keenest interest in the progress and in the perfecting of pharmaceutical science. In conjunction with his relative GEIGER he produced a handbook of pharmacy which marks an epoch in the history of the art, and indirectly, by analyses and experiments innumerable, he gave an impulse to pharmaceutic method and manipulation which will never cease to be felt. But in this, as in so many other fields, the bequest of his example is his most precious donation to posterity; his "simplicity" and "trustworthiness" will be cherished as a κτῆμα εἰς ἀεί, as a heritage for ever. Chemistry may be revolutionized; her processes may be indefinitely improved upon; her findings reach a profundity and comprehensiveness undreamt of in contemporary philosophy. But among the votaries to whom she is indebted for the new life on which she appears to be entering, and who have sacrificed their energies to her welfare, she will ever cherish, with a fondness reserved for few, the name of JUSTUS VON LIEBIG.

APPOINTMENTS UNDER THE ADULTERATION ACT.

We learn from the *Lancet* that Dr. A. Hill has been appointed Public Analyst for Warwickshire; Dr. Stevenson, Professor of Chemistry at Guy's Hospital, and Dr. Sutton, have been appointed for the Shoreditch District; and Dr. E. B. Truman, Analyst to the Borough of Nottingham, has been also appointed Public Analyst to the County of Nottingham.

NOTTONIA GRANDIFLORA AS A REMEDY IN HYDROPHOBIA.

At a recent meeting of the Royal Horticultural Society, the subject of the application in the neighbourhood of Bombay of *Nottonia grandiflora* as a remedy in hydrophobia was brought forward, and a reference made to the statements of Major Wheeler in the *Times* not long since, to the effect that six men under his charge having been bitten, an infusion of the stem of the plant was administered to five who recovered, the sixth who refused to take it having died. To Dr. A. Gibson is due the credit of having introduced the properties of this plant to notice in India. It is a succulent belonging to the Compositæ, and is found in dry rocky places in the Madras Peninsula. The following notes on the administration and its effects is from the Pharmacopœia of India. "About four ounces of the freshly gathered stems, infused in a pint of cold water for a night, yield in the morning, when subjected to pressure, a quantity of viscid greenish juice, which, being mixed with the water, is taken at a draught. In the evening, a further quantity of the juice, made up into boluses with flour, is taken. These medicines are directed to be repeated for three successive days. From official documents placed at the disposal of the Editor by Dr. Gibson, it appears that the remedy has been tried in numerous cases, but as at the time of the infliction of the wound, caustic was applied locally in the majority of cases, it is difficult to determine how far the *Nottonia* operated, if at all, as a prophylactic. Further trials may solve the question."

PRELIMINARY EXAMINATION.

We are requested to state that the list of persons who were successful in passing the Preliminary Examination on the 7th instant will be published in the Journal of next week.

PROPOSED REVISION OF THE FRENCH PHARMACY LAWS.

A Committee of the French National Assembly having been appointed to consider the state of the laws relating to the exercise of medicine and pharmacy has reported in favour of their revision. The National Assembly, however, in a recent sitting decided not to act on the proposition of the Commission.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

April 16th, 17th, and 18th, 1873

Present—Messrs. Allchin, Barnes, Carteighe, Cracknell, Davenport, Edwards, Gale, Ince, Linford, Martindale, and Southall.

Dr. Greenhow was present on the 18th on behalf of the Privy Council.

MAJOR EXAMINATION.

Eleven candidates were examined. *Four* failed. The following *seven* passed, and were declared duly qualified to be registered as "Pharmaceutical Chemists:"—

*Watmore, James ....Wokingham.
*Adams, Frank ....Brighton.
Roberts, William Henry ....Bath.
Stansby, Charles John ....Derby.
David, John ....Newport, Mon.
Lincoln, John Thomas ....King's Lynn.
Crisp, Frederick Arthur ....Clapham.

MINOR EXAMINATION.

Sixty-nine candidates were examined. *Thirty-one* failed. The following *thirty-eight* passed, and were declared duly qualified to be registered as "Chemists and Druggists:"—

*Feaver, John ....Truro.
*Fox, Charles Edward ....London.
*Bolton, Felix Palmer ....Dover.
*Wallis, Owen ....Hastings.
Baines, Arthur ....Alsager.
Luke, Tom ....Penryn.
Branson, Frederick Woodward ...Northampton.
Keeble, Sam Henry ....Leeds.
Southerst, Marshall ....Haslingden.
Laverack, William Henry ....Bradford.
Equal. { Davis, Benjamin ....Leamington.
Equal. { Thompson, Thomas ....Knaresborough.
Peach, Richard Walter ....Billinghay.
Smith, James William ....Cambridge.
Neale, William ....Woodbridge.
Balkwill, Joseph ....Kingsbridge.
Hargrave, Spencer ....Manchester.
Teebay, John ....Preston.
Waring, Albert Wynne ....Bedford.
Pickard, Henry ....Barnstaple.
Herbert, Samuel ....Bristol.
Brewitt, Alfred ....Spalding.
Bolt, Richard Tanton ....Tavistock.
McCormick, Frank Henry ....Cheltenham.
Equal. { Hopkinson, Stephen ....London.
Equal. { Lucas, Joseph Michael Mark ......Gravesend.
Equal. { Hulme, George ....Longton.
Equal. { James, John ....Hereford.
Equal. { Lord, John Edward ....Rawtenstall.
Hutchinson, George ....South Shields.
Clifford, Thomas Andrews ....Chelsea.
Ransom, Thomas ....Spalding.
Sherriff, George ....South Norwood.
Richardson, Thomas Plowman ...Blackburn.
Holroyd, Arthur ....Hull.
Bateman, Fred. Augustus Newton.Great Yarmouth.
Robinson, James Hedley ....North Shields.
Cowley, Henry Williamson ....Nottingham.

The above names are arranged in order of merit.

* Passed with Honours.

PRELIMINARY EXAMINATION.

The undermentioned Certificates were received in lieu of this Examination :—

Certificate of the Law Society of the United Kingdom.

Howard, Robert ....Clitheroe.

Certificate of the University of Cambridge.

Naylor, William A. H. ....Manchester.

Certificate of the University of Oxford.

Villar, Arthur ....Staplegrove.

EXAMINATIONS IN EDINBURGH.

April 15th and 16th, 1873.

Present—Messrs. Ainslie, Aitken, Buchanan, Gilmour, Kinninmont, and Young.

A deputation from the London Council, consisting of the President, Vice-President, and Mr. Williams, accompanied by the Secretary and Registrar, was also present.

Professor Maclagan attended on the 16th on behalf of the Privy Council.

MAJOR EXAMINATION.

Four candidates were examined. *Three* failed. The undermentioned passed, and was declared duly qualified to be registered as a "Pharmaceutical Chemist:"—

Hyne, Harry ....Bristol.

MINOR EXAMINATION.

Twenty-one candidates were examined. *Twelve* failed. The following *nine* passed, and were declared to be duly qualified to be registered as "Chemists and Druggists:"—

*McCallum, Hugh ....Berwick.
Huggins, Robert..................Southampton.
Hudson, Frank ....Clitheroe.
Graham, William Woodrow ...Dalbeattie.
Stuart, Thomas Peter Anderson.Dumfries.
Paterson, Stephen ....Edinburgh.
Whitelaw, James ....Glasgow.
Lawson, John Robert............South Shields.
Miller, Kenneth ....Wick.

The above names are arranged in order of merit.

MODIFIED EXAMINATION.

Nine candidates were examined. *One* failed. The following *eight* passed, and were declared duly qualified to be registered as "Chemists and Druggists:"—

Cokayne, James ....Newark.
Colledge, William Robert ... Newbiggin-by-the-Sea.
Darling, William ....Manchester.
Fenton, William ....London.
Gallagher, James ....Edinburgh.
Hellowell, John ....Huddersfield.
Lawson, Robert ....Glasgow.
Paterson, William ....Glen Lean.

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* Passed with Honours.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

The Edible Starches of Commerce, their Production and Consumption.*

BY P. L. SIMMONDS.

(*Concluded from p.* 833.)

Under the name of "Beychundee" a starchy product is prepared by the Gonds and sold in the bazaars of Jubbulpore. It is not an arrowroot, but bears some resemblance to it when pounded. It is obtained from the stem of some wild jungle plant.

In Akyab a kind of arrowroot, called by the natives Rembowah, is prepared from a root called Pemban-oo, obtainable in large quantities, and sold at four rupees the maund. It may probably be Penda-loo (*Batatas edulis*), but is most likely to be Pen-bwa (*Maranta*). Starch is obtained in Travancore, from the round yam (called Chana in Cochin), *Arum Rumphii*, or *Amorphophallus campanulatus*. Imitation sago is made, in Mergui, from *Tacca pinnatifida*.

In Ceylon there was found great difficulty, at first, in inducing the people of the villages to plant the cassava and arrowroot. While only 50 lbs. of tapioca were made by the natives in 1852, 66,000 lbs. were supplied at 1856; so with arrowroot, the production increased from 50 lbs., in 1852, to 6,900 lbs., in 1856; and now, instead of importing arrowroot, exports are made from Ceylon.

In India a fecula is obtained from the young roots of the Palmyra palm (*Borassus flabelliformis*, Linn.), which serves as food to the natives. This palm is very extended over India, and is one of the most interesting trees for study, from the numerous products obtained from it. At Goa they prepare a farina and fecula from the wild palm. Sago is obtained from *Caryota urens*, in Mysore, and pearl sago, tapioca, and tapioca flour were sent to the Paris and other Exhibitions from Mysore, Singapore, and Penang.

The trunk of the Japan fern-palm (*Cycas revoluta*, Thunberg) is rich in sago-like starch.

In a paper which I read before the Society in 1861, "On the Trade and Commerce of the Eastern Archipelago," I gave the following details on the manufacture and commerce of sago.

"Singapore is at present the chief place of manufacture and the principal mart for granulated sago and 'sago flour,' as it is termed in commerce, but which is, in fact, the fecula, or ungranulated starch. The granulated fecula, or sago, of a dirty brown colour, used to be exported from the Archipelago in small quantities, but when the trade to Europe was thrown open, in 1814, the Chinese of Malacca began to prepare a superior starch, known in commerce under the name of pearl sago.

"There are four or five species of palms which yield sago; those most cultivated are, however, the *Sagas Konigii* and the *Sagus lævis*. These palms are found in every part of the Malayan Archipelago and Philippines as far as Mindanao, wherever there is a genial soil for them, and this consists of a marsh or bog, composed of decayed vegetables, near the sea. They are most abundant in the eastern parts of the Malay Archipelago, at the Moluccas and neighbouring islands, with New Guinea and Borneo, and in the Philippines at Mindanao. In all these sago is more or less the bread of the inhabitants. These palms propagate themselves by lateral shoots as well as by seed, and they die after producing fruit.

"The sago tree, when cut down and the top severed from it, is a cylinder about 20 inches in diameter, and from 15 to 20 feet in height. The contents would, therefore, be nearly 26 bushels, and, allowing one-half for woody fibre, there will remain 13 bushels of starch.

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* Lecture delivered before the Society of Arts, March 26, 1873, Mr. T. Greenish, F.C.S., M.R.C.S., in the chair.

"It may give some idea of the enormous rate of this produce, if it be considered that three trees yield more food-matter than an acre of wheat, and six times more than an acre of potatoes. It is far from being either so palatable or nutritious as it is prolific, and is never preferred, even where it is most abundant, to rice.

"All the raw sago manufactured at Singapore is brought from islands to the eastward, principally from the north-west coast of Borneo and the north-eastern of Sumatra, with its adjacent isles, from Siak to Indragari, but a considerable portion comes from places more than 1,000 miles distant."

This article is very easily prepared for exportation in its raw state; the tree is cut down, then the pith or cellular tissue is taken out and made up into bundles. In this form some 20,000 tons are annually imported at Singapore, where it is prepared by the Chinese, who clear the meal or farina from the fibres of the pith, or cellular tissue, when the flour is either made up for exportation in its natural state, or is granulated into pearl sago.

The imports of sago have steadily increased in England since the abolition of the duty which was formerly levied.

In 1830 the import and consumption of sago in the United Kingdom was only 3,000 cwt.; in 1841 it was 52,000 cwt.; in 1850, 90,000 cwt.; in 1860, 179,825 cwt.; in 1870 the aggregate of sago and tapioca received from Singapore was 344,000 cwts., of the value of £283,541.

In Singapore tapioca manufacture has been very successful, but the crop is said to entirely exhaust the soil in five years.

From Penang as much as 10,000 cwt. of tapioca and arrowroot is shipped annually to Great Britain and the United States.

In the colony of Labuan the sago traders have largely increased their business, owing to the Sultan of Borneo having removed some of the obstructions to the transit of sago in the neighbouring rivers, and it is not improbable that this island may yet become the centre of the sago manufacture of the Eastern Archipelago. In 1867 sago was imported into Labuan of the value of £9,811; in the following year the trade increased one hundred per cent., the value of the imported sago being £19,841, and the process of manufacture added £8,764 more to the value of the sago.

In Celebes all the inhabitants feed upon sago of a very coarse quality, which may be said to grow spontaneously, affording abundance of subsistence to the inhabitants. The sago plantations are situated in the valleys between the mountains, in swampy ground. There are several kinds of sago-trees, some of which will not produce any useful fecula or starch for the first sixteen years. It is collected from trees of eight years up to thirty-two or thirty-five years of age, after which the tree becomes perfectly hollow, and rots away from the top downwards. A sago-tree of ten years' growth will be about 27 feet high, and from 5 to 8 feet girth at the bottom, and is continually yielding its crop. When the substance of the edible sago is 3 to 5 inches thick they cut it, and this will be in two or three months, according to the nature of the soil, and the oftener it is cut the faster it grows.

Australian Arrowroots, etc.

Attention has of late years been much directed to the production of arrowroot in several of the Australian colonies, facilities having been afforded by the culture and distribution of the several plants from the excellent botanic gardens of Melbourne, Sydney, and Brisbane.

Canna Achiras (Gillies) native of Mendoza, is one of the few extra-tropical Cannas eligible for arrowroot cultivation.

C. glauca (Lin.), and *C. coccinea* (Roscoe), yield, with some other Cannas, the particular arrowroot called *tous les mois*. *C. flaccida* (Roscoe) of Carolina is probably also available for arrowroot.

C. edulis (Edwards), the Aderia of Peru, is one of the hardiest of the arrowroot plants, for seeds, even if many years old, will germinate, and are commonly called Indian shot.

This species has been extensively introduced into Australia, and, according to Baron Müller, yields an excellent starch at Melbourne, Western Port, Lake Wellington, Ballarat, and other localities, from plants supplied by the Melbourne Botanic Garden.

The Rev. Mr. Hagenauer, of the Gipps Land Aboriginal Mission station, obtained 220lbs. of arrowroot from one-eighth of an acre of this Canna. The gathering of the roots in Australia is effected about April. The plants can be set in ordinary ploughed land. Captain James Hall, of Hastings, also prepared starch largely from this root. The starch grains, it is well-known, are remarkably large.

Maranta nobilis appears to be the species chiefly cultivated for arrowroot in New South Wales. There were seven exhibitors of arrowroot from it at Paris in 1867: Mr. E. S. Hill, Mr. D. L. Waugh, Mr. John Higgins, Mr. E. W. Rudder, Mr. W. C. Hetherington, Melville, Mr. G. T. Lodis, Wiley Flat, near Singleton, and Mr. H. Moss, Shoalhaven; the last three received bronze medals for their products.

In 1870 there were 84 acres of land under arrowroot in New South Wales, from which 13,567 cwt. of arrowroot was obtained, being 18,251 cwt. less than was made in the previous year from only 31 acres of land.

From Queensland, 26,368 lb. of arrowroot, valued at £548, were exported in 1869, the first shipment of a few packages having been made in 1860.

Good arrowroot used to be made in Norfolk Island, while it was a convict settlement, but I am not aware whether the production is maintained since the Pitcarn Islanders have been transferred there.

Arrowroot is made from *Zamia angustifolia* in the Bahamas, etc.

Under the local name of Coonti an arrowroot is prepared in Florida from the fecula of *Zamia integrifolia*. A fecula was also formerly prepared in Florida by the Indians from the saw palmetto *Chamœrops serrulata*.

Arrowroot prepared in Queensland from *Encephalartus* (*Zamia*) *spiralis* was shown in 1872 at the London Exhibition.

At the Paris Exhibition, in 1867, starch made from the seed of the bean tree, or Moreton bay chestnut (*Castaneospermum Australe*), was shown by the New South Wales Commission and Mr. T. Bawden, of Grafton, Clarence River district, which was highly commended. The seeds are said to be abundant, and the manufacture inexpensive. This large tree is found in abundance in the bushes from the Macleay River south to Cape York to the north. On examination under the microscope of the samples I obtained there, I feel convinced that this starch is not from a leguminous seed at all, but is merely a fraudulent substitution of cassava starch under a new name.

Mr. C. Moore, the colonial botanist, also exhibited it, and received a bronze medal from the Paris jury for this new starch. I should like to have the point cleared up as to there being any *bonâ fide* production of this leguminous starch in the colony.

Starches of the Pacific Islands.

A considerable production and commerce is carried on in various feculas in many of the Pacific Islands. One or two species of *Arums* especially are utilized. *Arum macrorhizon*, Linn., grows wild in Tahiti, and the rhizomes are occasionally eaten, but the *Arum esculentum*, Linn., the *Colocasia esculenta* of Ray, known under the name of *Taro*, is that most largely cultivated and esteemed for its starch, which is an article of food of prime necessity. The natives enumerate no less than thirteen varieties. The rhizomes range in weight from two to four pounds, but there is great variation, some varieties producing very small roots and others very large. They contain much fecula combined with a bitter principle, which is dissipated by heat. In preparing the starch, care has to be taken not to rub the pulp on the sieve with the hand, or a blistering effect will be produced. The yield of starch is as much as 33 per cent.

Another plant, largely cultivated, is the *Tacca pinnatifida*, Forster, which is indigenous to the sandy shores of the South Sea Islands, and is known in Oceanea, but especially in Tahiti, under the native name of *Pia*. This plant is, however, now widely diffused. It is met with in China and Cochin China, according to Loureiro. It is cultivated in the Moluccas, Arracan, and other parts of India, and at Zanzibar. It is found in large quantities in Cook's Archipelago, the Hervey Islands, at Raiatea, Huahine, Bora-Bora, Maupiti, the Hawaiian Islands, the Samoas, Tonga, the Feejee Islands, etc. The tubercles have much resemblance to the potato, but unlike that root the fecula is found chiefly in the centre and not towards the exterior. The proportion of starch yielded is 30½ per cent.

There is a large consumption of this starch in Tahiti, especially for children and invalids, and a considerable export of it under the name of arrowroot. The principal part of that which enters into commerce is made in the islands of the adjoining archipelago, Raiatea, Huahine, Bora-Bora, and Maupiti, where it can be purchased for 3*d*. to 3½*d*. per lb. In the Hervey Islands it is sold at 2*d*.; and Tubuai and Raratonga produce it even cheaper. At Tahiti it retails, or did a few years ago, at 4½*d*. to 5*d*. per lb.

From it the main supply of the Feejee arrowroot is prepared. The Tacca starch is much valued in medicine, and particularly esteemed in cases of dysentery and diarrhœa. Its characteristics are readily recognized under the microscope. A Tacca occuring on the Sandwich Islands yields a large quantity of the so-called arrowroot exported from there. Other species, including those of *Ataccia* (*Tacca*) *integrifolia*, occur in India, Madagascar, Guinea, and Guiana, all deserving tests in reference to their value as starch plants.

Starch is made from several species of yam (*Dioscorea sativa* and *bulbifera*), but it is difficult to extract, owing to the ligneous character of the roots, which require to be soaked in water for two days before rasping, and the bitter principle has to be removed by washing and torrefication.

A few other starches are obtained. The cassava or manioc is never sold or cultivated, although its starch used to form a common aliment mixed with that of the *Tacca*. From the bread fruit (*Artocarpus incisa*) about 17 per cent. of fecula is obtained.

African Arrowroots.

On many parts of the West African coast arrowroot and cassava are grown and prepared. The Canary Islands, Liberia, Lagos, Sierra Leone, and other districts produce it, but not in any quantity for shipment.

The Cape Colony and Natal—especially the latter—have given much attention to arrowroot production. *Maranta arundinacea* is the species grown. I have not the recent statistics of the acreage under arrowroot in Natal, but in 1864, from 226 acres, the quantity obtained was 2,347 cwt. It is chiefly in the counties of Durban, Victoria, and Tugela that the cultivation centres, but the quantity varies considerably, for 61 acres in Tugela, yielded 1,220 cwts.; 66 acres in Victoria, 639 cwts.; and 98 acres in Durban, 488 cwts. In 1866, 2,835 cwts. were produced.

The prices ruling in the colonial market in 1867 were 30*s*. to 40*s*. per cwt., but it realised 67*s*. 6*d*. in some instances. The freight to London was 45*s*. per ton.

I was a little puzzled for some time at the incidental mention of Madagascar arrowroot in this country, as it is scarcely an article of commerce, but I have traced out that 7 cwt., valued at 35*s*., were sent from the east coast of Madagascar to the Mauritius in 1868, and 552 cwts. 2 qs. 17 lbs. of starch of other kinds, valued at £286. *Canna indica*, a native of India, has been introduced and naturalised in the Mauritius, and the *Maranta arundinacea* is also grown there, exhibitors of this arrowroot having sent samples to the Paris Exhibition in 1867.

I have thus skimmed over the surface of this wide and interesting field of inquiry, contributing my mite towards the general fund of information which is so useful on commercial topics, and I trust it will lead to some discussion and added information on the character, quality, and uses of the various starches touched upon.

CHEMICAL SOCIETY.

Thursday, 17th April, 1873; Dr. Odling, F.R.S., President, in the chair.

When the usual business of the Society was completed, the President called upon Dr. Debus, F.R.S., to deliver a lecture "On the Heat produced by Chemical Action." During his discourse the speaker considered the relation existing between the chemical affinity of the metals and the amount of heat they develop during oxidation or combination with chlorine, iodine, etc., and also the various interesting conclusions which may be drawn from the thermic results obtained by the solution of salts, especially noticing that, in double decomposition taking place in solution, those compounds are always produced which develop the greatest amount of heat.

The meeting finally adjourned until Thursday, 1st May, when papers will be read "On Zirconia," by Mr. J. B. Hannay, and "On a New Class of Explosives," by Dr. H. Sprengel.

Parliamentary and Law Proceedings.

Misuse of a Liniment.

In a reference to a report published last week at p. 837 under the above head, and taken from a provincial newspaper, we are requested by Dr. John Lonie to state that "the liniment was taken about midnight on February 24th, and the person's death took place on Saturday, March 29th, 1873."

Charge of Embezzlement against a Druggist.

At the Wincanton (Somerset) petty sessions, on Monday, April 14, John Robinson, chemist and druggist, who for many years had acted as postmaster at Bruton, was committed for trial on a charge of embezzlement. The hearing of the case occupied a considerable time, but the facts are briefly as follow:—A young woman named Jane Hill deposited £6 in the Post Office Savings Bank at Bruton last December. As her book was not returned in the usual manner, after repeated applications to prisoner, she wrote to the Comptroller of the Savings-bank department, and an inquiry was set on foot. This resulted in prisoner's apprehension on the charge named above. When he was first confronted by the Government inspector, he was preparing some medicines, and at once mixed up and drank some chemicals, which were supposed to have been of a poisonous character, and he became seriously ill. He was committed for trial. Defendant has been a tradesman in Bruton many years, and had brought up a large family most respectably.—*Pulman's Weekly News.*

Prosecutions under the Adulteration Act.

At the Glasgow Central Police Court, on Friday, April 18, Daniel Gibson, butter merchant, was charged with having in his shop sold two half-pounds of American butter, which butter was knowingly mixed with other matters so as to increase its weight, contrary to the provisions of the Act to prevent the Adulteration of Food and Drink. The sanitary inspectors proved seeing the butter in Gibson's window, and, suspecting something wrong, bought two separate half-pounds, at 5*d*. per pound, which were handed, sealed up, to Dr. Thorpe, the city analyst, for examination. Dr. Thorpe said that he had very carefully analysed one of the samples given him (the other, still sealed up, being produced in Court) and found 19·5 per cent. of curdy and farinaceous matter, and 19·4 per cent. of water. For the defence a number of butter merchants were called, who considered the butter good, as American; and it was proved that two samples from the same kit had been given to Dr. Wallace for analysis. Dr. Wallace said he had analysed them, and found in one 1·1 per cent. of curdy matter, and in the other 1·5 per cent. There was also salt and water which he did not estimate. There was no farinaceous matter in the samples. The magistrate held that there were great difficulties in the way of comparing the analyses, and as to whether the different samples were the same butter; but he was satisfied that a guilty knowledge of the adulteration on the part of Gibson had not been proved. The case was then dismissed.—*Glasgow Herald.*

At the Clerkenwell Police Court, on Friday, April 18, Charles Deveson, a dairyman living in the Hornsey Road, appeared in answer to a summons which charged him with having adulterated milk for sale. The inspector of nuisances stated that he went to defendant's shop and purchased a quart of milk, and told him it would be analysed. When examined the milk was found to be adulterated, the analyst being of opinion that two-thirds of it was water; the look of the milk would show that it was not pure. In cross-examination he stated that the lactometer could "easily be cheated." The magistrate imposed a fine of £5 and costs.—*Times.*

Review.

CONTRASTS. Dedicated to the Ratepayers of London. Strahan and Co. 1873.

"Ignorant impatience of taxation" is a phrase which probably owes more of its vitality to alliteration than to truth, and it is a question whether it be not more correct to say that to ignorance is due the patience with which taxation is borne. For in the book which under the title of 'Contrasts' is dedicated to the London ratepayer, there is enlightenment amply sufficient to cause him to reverse the original dictum. Written by a man who, unlike the needy knifegrinder, has a tale to tell, and who persists in telling it in his own deliberate fashion, there is a tone about it which prepares the reader to give credence to the startling "contrasts" that are occasionally placed before him, because he feels that if the author should not be always correct in his conclusions he is at least well informed in his subject. And that it is no new theme with him there is evidence in the fact that we recognize a considerable portion of one section of the work as having appeared anonymously some four years since in the pages of a now defunct magazine to which the author occasionally contributed. As there were some rather surprising statements in the original article, we have been curious enough to compare them with those given in the book, and find that they are substantially the same, and we suppose therefore that their correctness has not been impeached.

Out of so much that is of the greatest interest to the heavily taxed ratepayer it is difficult to make a selection, but perhaps the following will present parochial relief in a new light to some of our readers. A dock-labourer, earning 18*s.* per week, is from some cause thrown out of work. He has a wife and four young children, and after various struggles they have to go into the workhouse. Our author says—"Instead of admitting them, it would have been better policy for the guardians to have said to the man, 'My dear fellow, give yourself no further uneasiness about your family. You say you can earn 18*s.* a week; go and smoke your pipe, loaf about the streets, spend your time in the public house or anywhere you like .... Your money will be paid you regularly every Saturday till work becomes plentiful again.'" The reason given being that on an average every man, woman, or child in the workhouse costs the ratepayer 10*s.* a week. Some forcible contrasts are drawn between well managed industrial schools and orphanages, where the cost ranges from £13 to £15 a child, and the pauper schools at Anerley, Plashet, and Hanwell, where the average is £25 a head annually. And many a ratepayer who has to struggle to keep the wolf from the door would endorse the words of the report attributed to a Holborn ratepayer who had been deputed to visit the Hanwell Schools.

But although rather hard upon parochial authorities, including the vestry, with its characteristic debate of three hours upon the material of a beadle's button, some contrasts are drawn in which they appear in a favourable light, and it is shown that the guardians—and ratepayers too—have suffered pretty considerably through the legislation following the *Lancet* investigation of workhouse infirmaries. An attempt is made to test the justice of the outcry against workhouse infirmaries by comparing the proportion of recoveries in them with those in hospitals. Putting aside ordinary cases,—because since the hospitals receive a larger proportion of acute cases, they would naturally have a larger proportion of deaths,—reference is made to the statistics of the lying-in wards, and it is found that the mortality in the lying-in charities is five times greater than in the workhouse infimaries. To quote an extreme instance, our author states that during the six years the model wards in a well-known hospital were open—in the building of which everything that skill could suggest had been lavished,—the mortality averaged about one in twenty-three, while during the same time in eleven metropolitan workhouses there were 2,413 deliveries without one death. But in answer to the public panic, Mr. Gathorne Hardy's Act was passed, and now we have the Metropolitan Sick Asylums to use, to look at, and to pay for. A footnote calls attention to the fact that patients confined in workhouse infirmaries are attended by women.

Other contrasts are presented in extracts from the original charters of some of our public hospitals, public schools, and livery companies, and the manner in which those institutions are managed at the present day; showing how money enough to relieve all our necessitous sick and educate all our poor children has been diverted from its original purposes. One hospital, originally endowed for very similar purposes to our present sick pauper asylums, with its cost of £800 per bed, is contrasted with another that cost £30 per bed. The enormous cost of education in our endowed charities is compared with that of education of at least equal quality in well-managed schools. But room will not allow the enumeration of all the topics dealt with. The book itself should be read by every person interested in the subject.

Obituary.

JUSTUS VON LIEBIG.

The forebodings respecting Baron Liebig have been but too painfully realized, and about the time on Friday afternoon when the lines in last week's Journal announcing his dangerous illness reached the hands of some of our readers, that great chemist breathed his last. Few names of scientific men are nearly such familiar "household words," even in their own country, as that of Liebig is throughout the civilized world. The general public in this country is more than usually appreciative of the great loss science has suffered, while amongst men of scientific training pharmacists are peculiarly interested from the fact that the deceased spent a portion of his youth in a pharmaceutical establishment, and was an Honorary and Corresponding Member of the Pharmaceutical Society of Great Britain.

Born in 1803 at Darmstadt, Liebig studied in the Gymnasium of his native city. From his earliest years he had shown an aptitude for natural science, especially chemistry. At the age of fifteen, therefore, his father placed him in a pharmaceutical establishment at Pappenheim. At the end of a year, however, he proceeded to the University at Bonn, and from thence to Erlangen, where he took his degree of Doctor of Medicine.

About 1822, while not yet of age, he was sent to Paris at the expense of the Grand Duke of Hesse, where he prosecuted his studies and was received on friendly terms by the most celebrated French chemists. How vivid an impression was made upon the young student by the kindness which he received in Paris, was shown in an address delivered by him before the Bavarian Academy of Sciences, nearly half a century afterwards, and at the close of the dreadful war between his own country and France. "When I went to Paris to study chemistry," he said, "accident drew Alexander von Humboldt's attention upon me, and a recommending word of his induced Guy-Lussac, one of the greatest chemists and physicists of his time, to propose to me, a youth of twenty, to continue and complete under his assistance an investigation of mine; he placed me in his private laboratory as pupil and assistant; the whole course of my life was thereby decided. Never shall I forget the kindness with which Arago, Dulong, and Thénard met the German student; and how many of my German compatriots might I name, who, like myself, thankfully recollect the active assistance in the pursuit of their scientific studies given to them by French *savants!*"

The "accident" that drew Humboldt's attention to Liebig was a memoir which, in 1823, he communicated to the French Academy of Sciences, entitled 'Sur l'Argent et le Mercure fulminant;' and one result of his labours in Guy-Lussac's laboratory was an 'Analyse du Fulminate d'Argent,' published in their joint names. Humboldt did not cease to be interested in his young countryman, and chiefly by his recommendation Liebig was appointed Professor Extraordinary of Chemistry at Giessen at the age of twenty-one. Two years afterwards he became Ordinary Professor of Chemistry in the same university. Here, with the assistance of the Government, he so developed the teaching of practical chemistry and raised the renown of the school, that the laboratory was sought by students from all parts of the world, and some of his pupils,—such as Will and Fresenius, Hofmann, Playfair, Blyth,,—have in their turn won world-wide reputations.

But the professorial chair did not absorb all Liebig's energies, and memoirs that may be numbered by hundreds, and in every one of which his ability and industry were made increasingly manifest, came from his pen. In 1837 he attended a meeting of the British Association, where he read a paper on the Composition and Chemical Relations of Uric Acid, which attracted considerable attention, and, at the request of the Association, he undertook to draw up two reports, one on Organic Chemistry, and another on Isomeric Bodies. The matured result of this engagement appeared in 1842, as a Report on Organic Chemistry applied to Physiology and Pathology, which was published in the British Association Reports of that year. His 'Familiar Letters on Chemistry in its Relations to Physiology, Dietetics, Agriculture, Commerce, and Political Economy' rapidly passed through several editions in England and America, and were also translated into Italian. In their English form many persons in this country first became acquainted with the author's views upon the chemistry of agriculture, which have in recent years so powerfully influenced farming operations. In these letters also he put forth his views upon the Food question, and described the preparation of the aqueous extract of meat with which his name is now so widely associated. Doubts as to the correctness of his conclusions and misunderstandings as to what he really did say having arisen, Liebig in a recent communication to this Journal, and probably nearly the last that came from his pen, defended his views with all his old force and clearness. Another important subject dealt with by Liebig was Fermentation, and in a memoir read before the Academy of Bavaria he disputed the theory of the eminent French chemist Pasteur as to its origin; a translation of this memoir, sanctioned by the author, was published in this Journal. Pasteur took up the challenge, at a meeting of the French Academy, and the subject has been there discussed with a heat unusually scientific, and has developed so many ramifications as to make it almost impossible to follow them. Liebig also assisted Poggendorf in his 'Dictionary of Chemistry' and Geiger in his 'Manual of Pharmacy.' But we cannot enumerate the various productions of his pen. He is said to have been the sole author of nearly three hundred memoirs, and from thirty to forty were issued jointly with other chemists, such as Dumas, Guy-Lussac, Mitscherlich, Pelouze, Pfaff, Rose, and Wöhler. Many of them appeared in the *Annalen der Chemie und Pharmacie,* of which he was a joint-editor.

Recognition of the value of his scientific labours came to him from all quarters. Professorial chairs, both in this country and on the Continent, including that at Heidelberg vacated by the death of Gmelin, were offered to him, but were declined, until in 1852 he accepted office in the University of Munich. In 1840 he was chosen a foreign member of the Royal Society and received the Copley medal. In 1845 he was made a baron by the Grand Duke of Hesse-Darmstadt. He was also elected an honorary or corresponding member of most of the learned societies in Europe and America.

The final honours were paid to Baron Liebig in a public funeral which took place on Sunday last. He was buried at Munich, where it is intended to raise a monument to his memory.

DR. H. BENCE JONES, F.R.S.

It is our painful duty this week to record the death of two distinguished men whose lives were devoted to the advancement of chemical, medical, and pharmaceutical science, and who, by the countenance and support they gave to the Pharmaceutical Society in its early days, contributed to its successful progress and permanent establishment. Thirty years ago it was no small benefit to the struggling but rising Institution in Bloomsbury Square, that such men as Liebig and Bence Jones were among those who, by their presence as visitors in the then recently formed laboratories of the Society, tended to stimulate and encourage the little band of working students, some of whom have since attained to eminence in their profession. The visit of Professor Liebig to our Laboratory, his inquiry into all the operations in progress by the students, and his instructive remarks and explanations on every subject brought under his notice, must be fresh in the memory of those who were present on the occasion. Although less prominently, yet more frequently, about the same time, Dr. H. Bence Jones, then rising to eminence as a chemist as well as physician, visited the laboratories of the Pharmaceutical Society, and often carried on experiments and investigations there with his friend Mr. Fownes, who occupied the chair of chemistry in the Institution. The working laboratory of the Pharmaceutical Society was at that time a new and unique institution in this country, the establishment of which was soon afterwards followed by those of the College of Chemistry under Professor Hofmann, and the Birkbeck Laboratory at University College under Professor Fownes. In all these provisions for the advancement of chemical knowledge Dr. Bence Jones took a deep interest, indicating his attachment to this department of science, and his thorough knowledge of chemistry and aptitude for chemical investigation were applied especially in the direction of physiology and therapeutics. For many years he had a chemical laboratory in his house, and an accomplished chemical assistant constantly engaged in carrying out his investigations. After the premature death of his friend Professor Fownes, Dr. Jones became one of the editors of Fownes's 'Manual of Chemistry,' with which his name has been so long associated. For many years he has taken an active part of the management of the Royal Institution, and continued to act as its Honorary Secretary until ill-health obliged him to resign. As a man of science and fellow of the Royal Society he has occupied a high position, and as physician he has had an extensive practice, yet with his many professional engagements he has found time for literary and other pursuits. Not only has he written the well-known biography of Faraday, but he has often given his attention to pharmaceutical subjects, being an advocate for the simplification of medicines, and for giving them a less repulsive character than they have hitherto generally possessed. Dr. Jones died on the 20th inst., after a long and latterly severe illness.

Notice has also been received of the death of the following:—

On the 15th of April, 1873, Mr. John Owles, Pharmaceutical Chemist, of Yarmouth, aged 67. Mr. Owles was a Justice of the Peace, and had been a Member of the Pharmaceutical Society since 1842.

On the 17th of April, 1873, Mr. John Fells, Pharmaceutical Chemist, of Clapham. Mr. Fells had been a Member of the Pharmaceutical Society since 1853.

On the 28th of March, 1873, Mr. Henry Stephen Duggan. Mr. Duggan was a Member of the Pharmaceutical Society from 1841 to 1866, in which latter year he retired from business. He died at his residence near Hereford, in his 57th year.

On the 15th April, 1873, Mr. John Hubert Fryer, Chemist and Druggist, of Tavistock Street, Plymouth.

On the 17th of April, 1873, Mr. Nicholas Bickford, Chemist and Druggist, of Exmouth, Devon.

We are requested to state that the date of the death of Mr. William Fingland was incorrectly given last week. It should have been 19th of March, 1872.

BOOKS RECEIVED.

NOTES ON THE PHARMACOPŒIAL PREPARATIONS (B. P. 1867); specially arranged for the Use of Students preparing for Examination. By W. HANDSEL GRIFFITHS, Ph.D., L.R.C.P.E., etc. London: Ballière, Tindall, and Cox. 1873.

SYLLABUS OF MATERIA MEDICA FOR THE USE OF TEACHERS AND STUDENTS. By ALEXANDER HARVEY, M.D., and ALEXANDER DYCE DAVIDSON, M.D. London: H. K. Lewis. 1873.

Notes and Queries.

COD-LIVER OIL IN COMBINATION WITH IRON.—An emulsion is by far the best method of incorporating cod-liver oil with other medicines. Iron is often introduced. This is easily done by adding a soluble salt to the mixture. In the following formula a concentrated solution of pyrophosphate of iron is used, which keeps well, and is a very useful addition to the list of cod-liver oil mixtures.

℞	Pulv. Acaciæ	℥i
	Pulv. Sacch. Alb.	℥ss
	Aquæ	℥iv
	Alcohol	℥i
	Ol. Morrhuæ	℥v
	Sol. Ferri Pyrophosph. . .	gtt. cc
	Ol. Amygdal. Amar. . . .	gtt. v.

M. ft. emuls.

—W G. MOFFIT, in *Amer. Journ. Pharm.*

Correspondence.

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

THE BENEVOLENT FUND.

Sir,—In a letter published in your Journal last week signed "*J. B. B.*," the annual subscriptions to the Benevolent Fund are stated to be, from "London members more than £400, country members (about) £500;" making together £900.

I should be glad to see that amount reached, but turning to the balance sheets published in the PHARMACEUTICAL JOURNALS, Vol. I., Third Series, p. 945, and Vol. II., p. 929, I find that in 1870 the whole annual subscriptions amounted to £586 16*s.* 9*d.*, and in 1871 to £594 3*s.* 6*d.* The statement of 1872, to be published next month, will show an advance, but will still be considerably less than the sum put down by *J. B. B.*

GEORGE W. SANDFORD.

Piccadilly, April 21*st*, 1873.

Sir,—I felt rather pleased on the 12th to read Mr. Sandford's reply to my remarks in the Journal of the previous week; but although I entertain a high opinion of his judgment, I must still differ from him. Mr. Sandford advocates the principle of paying annuitants by the interest of invested capital; I believe in the devotion of *subscriptions* to the same purpose. I hardly fancy that chemists would allow their subscriptions to fail of meeting the wants of any number of deserving annuitants of their own body. The large missionary societies of the present day allow their many agents to depend for sustenance upon annual subscriptions; I fancy it would be safe for us to imitate them. They do not wait to do noble work until they shall have invested capital at about 3 per cent., sufficient to give them income enough for their purpose.

Anyhow, I have the opinion of the Editor of the Journal with me, as the leading article of January 6th, 1872, p. 551, will prove; for there we read, "that annual subscriptions should be devoted exclusively to relieve the wants of present applicants,"* and not to swell an already enormous fund.

And now to reply to a letter in the Journal of to-day by a "Subscriber;"—since he has my name, it would have given me pleasure to have known his, and I think he would have been wiser to have given it. With regard to my trifling donations in 1871 and 1872, I am afraid I was then perhaps slightly careless concerning the appropriation of donations; but since I found that so large a percentage was added to capital, I considered other objects more deserving. The words "long since" were used to denote that my opinions had not been formed from letters, recently in the Journal, of writers entertaining my views. In reference to "Subscriber's" second paragraph, I will state the first case that occurs to me. Some time since we had two annuitants to vote for; three to choose from, who were all approved. Could we have taken £30 from that year's subscriptions, as well as from those of following ones, that third person might have been made happy.

A change in the right direction, I am glad to say, has occurred; for I find that at their last meeting the Council voted £110 to the relief of applicants, whilst in 1871 the whole sum devoted was the paltry amount of £77.

My friend is hardly just in charging me with sneering at

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* Our correspondent is not justified in drawing this inference from the passage in question. In its entirety it stands thus:—"There are two plain facts that cannot be too well understood. A sum of £12,000 is invested in our Benevolent Fund, and at this we rejoice. The interest provides for twelve annuitants, *but* there are thirteen. One annuity is therefore paid out of the annual subscriptions, which should be exclusively devoted towards meeting the numerous claims for temporary assistance. £1000 is therfore urgently required as an investment, in order to allow the operations of the charity to flow in their proper channel."—ED. PHARM. JOURN.

the founders, for whilst, at any rate, I honour them for their self-denial, I only differ concerning the wisdom of the use to which they applied their contributions.

The argument in the next clause is somewhat absurd; for if facts prove that the present system has proved favourable to this locality, they will equally show that my system would have answered just by that much the more favourably to other localities.

In the last paragraph of "Subscriber," he insinuates that I am attacking the present Fund, with the design of taking away the property of present recipients. By no mens is this the case; my aim is solely to prevent the continual increase of a fund already somewhat unwieldy.

In conclusion, I trust that with a little forbearance on both sides, much good will accrue to the Fund by the sharp discussions concerning its best use.

WALTER B. CLARK.

Leicester, April 19th, 1873.

Sir,—With others, my thoughts have been directed to the above question. I cannot agree with all Mr. Clark's views, or fully realize Mr. Sandford's reply. The impression given by Mr. Sandford is that all applicants have been elected or relieved.

If my memory serves me correctly, before the election takes place, the Council makes a selection and recommends four or five candidates they believe most worthy of relief. Two are elected, two or three are unsuccessful; perhaps these receive a small grant each. In addition, there are the other applicants from which the Council made their selection,—what becomes of them? Do they each receive a small grant? Are they one and all a sort of unrecognized annuitants of a second scale, waiting their turn to be elected to the recognized permanent list?

The permanent fund has now increased sufficiently for a more liberal course being adopted. Five or even six annuitants might be elected annually at an annuity of £40 instead of £30, and yet leave a surplus.

I do not think the permanent fund is sufficiently large to discontinue any further increase, but would like to see it increased for some years.

J. B. B. gives the annual subscriptions at £900 in round numbers; let 10 per cent. of this be added, with all life subscriptions, legacies, and donations, to the permanent fund. By this means more present help would be given to the necessitous; the permanent fund still increasing, and when sufficiently large, any surplus funds might go to form an orphanage or some other charitable institution.

I have been tempted more than once to withdraw my subscription from the Society and give it to one of the unsuccessful candidates, but have not done so, seeing that our management is economical.

The income, according to *J. B. B.*, arising from £13,000 is very small: other benevolent societies invest in ground rents, or place the money on mortgage and receive 5 per cent. on their capital. T. J. W. T.

TINCTURA AURANTII RECENTIS.

Sir,—With regard to Dr. Symes's remarks on this preparation at page 821 in your last issue, I beg to state that I did not claim to be the originator of the idea of making it with the fresh peel, but I first suggested its introduction into the Pharmacopœia (see PHARM. JOURN., Vol. XI., 2 ser., p. 604).

WM. MARTINDALE.

University College Hospital, April 23rd, 1873.

[*** Dr. Symes appears to have overlooked the fact that the discussion he criticized had exclusively reference to the introduction of certain preparations into the Pharmacopœia Appendix. Mr. Martindale's remarks on tinct. aurant. rec. are obviously to be understood in that sense, and not as indicating that this preparation is any novelty.—ED. PHARM. JOURN.]

PHARMACY IN IRELAND.

Sir,—Having been personally engaged in the practice of pharmacy in Ireland for several years back, I have read with considerable interest the communications of your correspondents Messrs. Alex. Anderson and J. T. Holmes on that subject; and as the statements set forth by the former gentleman are very much what I have found to be fact, I cannot refrain from writing a few lines, not only in support of those statements, but also by way of reply to Mr. Holmes's letter in your issue of the 19th instant. Not that I judge Mr. Anderson incompetent to reply on his own account, but writing as I do from the midst of Irish pharmacy, my facilities for acquiring a correct knowledge of matters must be greater than his can be, writing as he does from the opposite side of the channel. That a great amount of misunderstanding does exist in the minds of English chemists with regard to the position occupied by chemists and druggists in Ireland is a fact beyond dispute, and one which I have experienced over and over again while conversing with chemists on the sister island; but an explanation of it is not far to be looked for, if we do not descend to the puerile interpretations of Mr. Holmes about *social* position, but hold to the matter of their position as *pharmacists*, which is evidently that meant by Mr. Anderson. Now the chemist and druggist of Great Britain has until very recently been allowed to pursue the duties of his calling as dispenser of physicians' and surgeons' prescriptions without any legal interference, much in the same manner as any ordinary tradesman, and he seems to have formed the impression (on what grounds it is not my present business to show) that the present chemist and druggist in Ireland is now much in the same position that he himself was previous to the passing of the Pharmacy Act. Now this is quite a mistake, and it is here the misunderstanding exists, for the Irish Apothecaries' Company has been a legally-constituted body for many years, having received its first act of incorporation in 1791. It possesses the power to enforce examinations, and of course prohibits all persons from entering the practice of pharmacy (that is, to keep open shop) until they have first obtained a diploma of competency from their Society. Such being the case, we have two sets of pharmacists in Ireland, if, indeed, the second can justly be called by that name at all; the first, being the licentiates of the Apothecaries' Hall,* "are the only persons who can legally keep a shop for the compounding and vending of medicines, and are the only practitioners in Ireland who can recover for medicines prescribed by themselves or furnished on the prescriptions of others." The second is a class of persons who keep open shop for the wholesale or retail only of drugs, having no legal authority to dispense a single prescription. This is evidently the class referred to by Mr. Anderson, when he states that much misunderstanding exists in England regarding their position; and I believe it to be also the class referred to by Mr. Holmes, when he states that they are *fully* as competent as their English brethren. May I be allowed to ask from whence do they attain to this competency, since they have never been trained to the most important part of a pharmacist's duty, namely, the correct dispensing of a physician's prescription. Mr. Anderson states that the Irish apothecary is the Irish pharmacist proper. Such is fact, beyond doubt; and if Mr. Holmes will look into his extract given of Mr. Anderson's letter, he will find that the statement he makes and that made by Mr. Anderson are entirely different, and that such a class of pharmacists does exist as Mr. Anderson states, namely, licentiates of the Apothecaries' Hall, who, having recognized the fact that the practice of medicine and that of pharmacy ought to be vested in separate individuals, have accordingly given up the former (which they legally possess) and devoted themselves to the latter. I can assure Mr. Holmes is no fallacy, and am prepared to give him the names of at least four such within a circuit of half a mile from where I now write, and that in one of the largest and most flourishing towns in Ireland; and such will be found to be no petty shopkeepers.

I trust your readers will now comprehend a little more clearly the position of the chemist and druggist in Ireland (not the licentiate apothecary), when they will be able to judge for themselves with what amount of justice Mr. Holmes founds his claim that they, as a body, should, on a *nominal* examination, be admitted to the privileges that have been the just and legal right of the apothecary for upwards of eighty years, and to gain which he has had to expend no small amount of his time and money. Such would seem to us to be indeed "injustice to Ireland." And of one thing we feel confident, namely, that the Pharma-

* See 'Digest of History and Legal Rights of the Irish Apothecary,' published with list of members.

ceutical Society, as a body, will be no party to the bringing about of any such a state of matters; and let us believe that our Irish Apothecaries' Company will be alive to the interests of its members, as also its duty to the Irish public.

I leave Mr. Anderson to reply to those parts of Mr. Holmes's letter that more immediately concern himself.

J. B.

Belfast, April 21st, 1873.

Pharmacy in Queensland.

Sir,—May I ask how it is that we do not see any advertisements for assistants for Queensland, although greatly needed, according to the statement made by Messrs. Burgoyne, Burbidges, and Co. in last Saturday's Pharmaceutical Journal. Doubtless what they say is correct, but perhaps it may be accounted for if the Queensland chemists give but small salaries, although competent men are required. I have been looking out for an engagement abroad, but do not intend taking one unless a liberal salary is given me.

An Assistant.

A few Remarks on the Brighton Early Closing Meeting.

Sir,—It seems from the opinions expressed at the above meeting, that the majority think something should be done to shorten the hours of labour. If the chemists would agree to issue circulars to their customers (and give them away over the counter also) stating that they would close at a certain hour, after which time necessary medicines would be supplied at the shop or side door at an extra charge, say 25 per cent., I think they would soon find a solution of the difficulty, and one that would repay them for the accommodation. I have seen it carried out with success. Of course the same hour would not do for all neighbourhoods.

Mr. Armitage thinks we should close earlier, and stated that where the assistants work late they have time allowed in the daytime; it may be so in Brighton, but he would find it very different in other towns.

Mr. Glaisyer's remarks may be true, but there are many assistants who do not feel satisfied with merely passing an examination; they wish to confirm their work by keeping up in the different branches of study, and if overworked, can hardly feel fit to apply themselves as they ought.

We are coming to the time when these things will have to be done, and it is only putting off the evil day. Assistants are getting scarce, and the coming ones will not like long hours after paying a lot of money to pass examinations, especially for the present wretchedly low remuneration. It is necessary that the employer and employed should agree on the matter, if they wish to work happily together; for, after all, the principal should remember his assistants are independent of him to a certain extent, and by combining might effect what they require, at great inconvenience to himself. I hope such a proceeding will never be necessary, and feel sure the majority of assistants have sense enough not to wish to try it without great pressure were put upon them. Chemists' assistants, like other animals, require fresh air, besides time for study, a thing many masters seem to forget. I hope to see the day when they will be treated as well as drapers' assistants, both in time and remuneration.

Every labourer is worthy of his hire; and I am sure no one works harder for or is more worthy of his pay than the chemist's assistant.

C—ford.

A Caution.

Sir,—Will you be good enough to caution your readers against the wiles of a designing lady. I do not refer to either of the three who are now disturbing the harmony of the Council, but to one who affects to know but little of English or English ways. She introduces herself as the representative of a French house which has recently brought out a new kind of night-light, called by them "Self-generating Oil Gas-lamp." It is made of metal resembling tinned iron, and in shape is like the half of an egg-shell, which has been cut in two transversely. A small piece of glass tubing passes through the bottom, and is fastened by means of resin. She knows the names of all the leading English chemists, and tells her intended victim that she has been particularly requested by one or two chemists, well known to himself, to call on him. If he takes the bait and purchases, he will find to his cost that the "new invention" is perfectly useless, and the existence of the firm a myth. She has evidently taken in the Pharmaceutical Journal, as also she has your obedient servant,

Silas Daniel.

Ramsgate, April 16th, 1873.

J. Jones.—Where the "hardness" of water results from the presence of carbonate of lime, the process known as "Clark's Process" for softening water has been successfully adopted. It consists in adding a suitable proportion of lime, which combines with the free carbonic acid which previously held the carbonate in solution, and is precipitated, together with the other carbonate of lime originally present.

"*Inquirer*."—No person who was not of full age and had not been, for a period of three years prior to the passing of the Pharmacy Act, actually engaged and employed in the dispensing and compounding of prescriptions as an assistant to a chemist and druggist, and who did not, before the 31st of December, 1868, forward to the Registrar appointed under the Act certificates to that effect in accordance with Schedule E, is entitled to pass the Modified examination.

Pharmaceutical Women.—Referring to Mr. H. J. Lutwyche's letter on the subject of pharmaceutical women, F. A. L. expresses an opinion that it is a most unfair and ungallant thrust at the ladies; and the advice he offers in the matter is, that one who seems to evince so much capability in the best manner of preparing for table the popular vegetable of which he speaks should no more let his talents as a *chef-de-cuisine* be thrown away in a pharmacy, but should give them full opportunity of expanding by taking up the profession of a man-cook, as by so doing he would not only benefit himself, but would make way for such ladies who prefer the operations of pharmacy to the boiling of vegetables. As regards the "many occurrences" which Mr. Lutwyche thinks make a pharmacy unfit for women, F. A. L. thinks they would not see greater horrors (?) in a chemist's shop than they would in their capacity as nurse or doctor.

[*** We think that the discussion of this question should now cease, at least as far as our "Correspondence" columns are concerned, until after the Annual Meeting.—Ed. Ph. Journ.]

W. White.—Professor Flückiger's new work may be obtained for 12*s*. through Messrs. Asher, of Bedford Street, Covent Garden.

"*Cruciferæ*."—(1) *Ballota nigra* (Labiatæ). (2) *Alliaria officinalis* (Cruciferæ).

"*Inquirer*."—The persons you mention would obtain tickets upon application.

"*Inquirer R*."—(1) The Minor is entirely a *vivâ voce* examination. (2) No.

C. N. C.—The provisions of the Adulteration Act, which are intended to prevent admixtures for increasing either the bulk or weight, constitute only one portion of the Act. It also applies to admixtures of anything injurious or poisonous, and this section of the Act would probably often apply to articles that are intentionally coloured.

C. G. B.—Probably Attfield's, Roscoe's, or Fownes's Manual of Chemistry would suit your purpose, either of which could be obtained through a respectable publisher.

The following journals have been received:—The 'British Medical Journal,' April 19; the 'Medical Times and Gazette,' April 19; the 'Lancet,' April 19; the 'London Medical Record,' April 16; 'Medical Press and Circular,' April 18; 'Nature,' April 19; 'Chemical News,' April 19; 'Gardener's Chronicle,' April 19; the 'Grocer,' April 19; 'Journal of the Society of Arts,' April 19; 'Grocery News,' April 19; 'Produce Markets Review,' April 19,

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Communications, Letters, etc., have been received from Mr. L. V. Rees, Ms. T. Tipping, Mr. Clayton, Mr. J. R. Jackson, Mr. E. Keating, F. A. L., "A Constant Reader."

THE PHARMACY OF THE UNITED STATES' PHARMACOPŒIA.

BY WILLIAM MARTINDALE, F.C.S.,

Dispenser, and Teacher of Pharmacy to the University College Hospital.

The fifth decennial revision of the 'Pharmacopœia of the United States of America' is the work of a committee appointed by a Convention held for that purpose at Washington in May, 1870. As it has attracted some attention from pharmacists on this side of the Atlantic,—especially the Galenical, or more correctly the pharmaceutical, as distinct from the chemical portion of it,—a survey of this part of the work from our point of view may be of interest to British pharmacists generally.

As compared with the previous edition, the "scope of the work has been extended rather than abridged," without, as is stated, at the same time "losing sight of the conservative character necessarily pertaining to a National Pharmacopœia. Such a work must necessarily follow in the wake of advancing knowledge; it is no part of its mission to lead in the paths of discovery. It should gather up and hoard for use what has been determined to be positive improvement, without pandering to fashion or to doubtful novelties in pharmaceutical science." How far the committee has been guided by such an apprehension of its duties will remain to be seen; that it *has* been so guided is evident, for, although in the United States the different syrups of the phosphates are in such large demand, there is not an official process given for making one of them.

In this edition of the work 82 new preparations have been added, and 7 contained in former editions have been omitted from it. Four entirely new classes of preparations have been introduced into it. These are respectively—*chartæ* 2, *glycerita* 5, *suppositoria* 9, *succi* 2. In addition to these Galenical preparations, 22 fluid extracts, 5 solutions, 2 tinctures, 4 troches, and 6 ointments have been added to the previously existing classes. Towards the end of the preface there is a little self-laudation about the anxious thought and research the committee has given to the revision, and complaint is made, no doubt justly, about the meagreness of the details which characterized the majority of the reports submitted to it, as generally presenting criticism rather than amendment in the old processes, and in the cases of new medicines indicating but little their mode of preparation. Then follows this significant *finale*:—"The committee would recommend, in view of subsequent revision, that the reports of medical and pharmaceutical bodies which are interested in the perfection of our national standard, should be made full and explicit in details, and leave to the committee the task of verification and testing rather than that of original investigation." This ought to be a timely hint to those interested who are keeping in view the next complete revision of our 'British Pharmacopœia.'

Therapeutics are apparently more closely studied in America than with us; and, although the practice of medicine may be yet quite empirical, still, if truth be arrived at by such means, it is a great boon to suffering humanity. With regard to the pharmacy in the present work, this must speak for itself as much as possible in what I have to state.

The troy ounce—printed as one word, *troyounce*—and its submultiple, the grain, are the only weights used; the terms *pound*, *drachm*, and *scruple* are not used in the formulæ, these weights being replaced by their equivalents in troyounces or grains. The measures are the old *wine pint* (of sixteen fluidounces), and its submultiples the fluidounce, fluidrachm, and minim. The term *gallon* is not used in the formulæ. Their fluidounce is about one-twentieth greater in capacity than ours; it weighs, of distilled water at 60° F., 455·7 grains. The Fahrenheit thermometer is employed, and a *gentle heat* is defined at any temperature between 90° and 100°. We have the somewhat equivocal expression "a moderately warm place" employed, in which to macerate the fluid extracts; the temperature of this is not mentioned.

The following instructions are given for conducting *percolation* or the *process of displacement*,—they are nearly the same as those given in the previous edition. The process is defined as:—

"The kind of filtration . . . ." which "consists in subjecting a substance or substances, *in powder*,* contained in a vessel called a *percolator*, to the solvent action of successive portions of a menstruum, in such a manner that the liquid, as it traverses the powder in its descent to the recipient, shall become charged with the soluble portion of it, and pass from the percolator free from insoluble matter. When the process is successfully conducted, the first portion of the filtered liquid, or *percolate*, will be nearly saturated with the soluble constituents of the substance treated; and, if the quantity of menstruum be sufficient for its exhaustion, the last portion will be nearly destitute of colour, odour, and taste.

"The percolator should be either conical, or nearly cylindrical with a conical termination at the smaller end, and provided internally with a porous or colander-like partition or diaphragm, resting transversely immediately above its neck, for the support of the powder. Ordinary glass funnels, varying in capacity from one to eight pints, are to be preferred for most of the operations requiring percolation in this Pharmacopœia; but percolators may also be made of earthenware or tinned iron, especially of the latter material when required of large size. Tinned iron, however, should not be used when the liquid acts chemically on the material. In the several formulas in which percolators are used, their form and material will always be designated when there is a preference in these respects. In cases in which these variations of the instrument are indifferent, the term percolator simply will be employed. When a funnel is used, a circular piece of muslin or of lint, pressed into the neck by means of a cork with notched sides, forms a good diaphragm; but in all cases a similar piece of muslin, moistened slightly with the menstruum, should be interposed between the diaphragm and the powder, to prevent the passage of the fine particles of the latter. The substance to be subjected to percolation, after having been reduced by sifting to a uniform powder of the fineness indicated in the formula, is to be put into a basin with the specified quantity of the menstruum, and the two rubbed together until the powder is uniformly moistened. A portion of the powder is now to be carefully placed upon the diaphragm, prepared as above directed, and pressed gently until the muslin, resting against the sides of the percolator just above the neck, is covered with a uniform layer. The remainder of the powder is then to be transferred to the percolator, and compressed evenly and firmly, and the levelled surface covered with a circular piece of moistened muslin or paper, so that the liquid poured upon it may penetrate equally, and not disarrange the powder. The percolator being now properly supported, with its neck in a bottle previously marked for the quantity or quantities of liquid to be percolated, the menstruum is to be poured on the muslin until the space above is nearly filled; and

* These italics are mine.

a layer of it must be constantly maintained above the powder, so as to prevent the access of air to its interstices, until all has been added, or until the requisite quantity of percolate has been obtained. If the fineness of the powder and its arrangement in the percolator have been properly attended to, the percolate will pass out, by drops, with greater or less rapidity, according to the size of the percolator; but if, by reason of accidental imperfection in the powder, or in the packing, the liquid pass more rapidly than this, the neck of the percolator should be obstructed by means of a cork until the requisite slowness has been attained. When the dregs of a tincture are to be subjected to percolation, after maceration with all the menstruum, the liquid portion should be drained off, the solid portion packed in a percolator as before described, and the liquid gradually poured on until all has passed the surface, when, immediately, a sufficient quantity of the original menstruum should be poured on to displace the absorbed liquid, until the prescribed quantity of the tincture has been obtained.

"*Fineness of Powders.*—As different degrees of fineness are necessary in powders, according to their nature and mode of treatment, the special degree required is designated in the several formulas.

"For this purpose the terms very fine, fine, moderately fine, moderately coarse, and coarse are used; the powder passed through a sieve of eighty or more meshes to the linear inch being designated as *very fine*; through one of sixty meshes, *fine*; through one of fifty meshes, *moderately fine*; through one of forty meshes, *moderately coarse*; and through one of twenty meshes, *coarse*."

Substances that are likely to swell much after packing, although they may have been moistened previously with the menstruum, are generally ordered to be packed in a conical percolator, *e. g.* four troy-ounces of bitter orange peel in moderately fine powder, moistened with two fluid ounces of diluted alcohol, are directed to be packed in a *conical* percolator, and diluted alcohol *q. s.* added, that the required product, 32 fluid ounces, may be obtained. A *cylindrical* percolator is ordered to be used for the preparation of tincture of aconite, the powdered root of which is not liable to swell under the influence of alcohol.

Mr. Ince once cynically remarked that French pharmacy, judged by the Codex, might be summed up in one word—*sugar;* American pharmacy might be summed up in—*percolation.* The process undoubtedly has many advantages over simple maceration, but the committee rides its hobby too far when it directs *bitter orange peel* to be used in the state of "*moderately fine powder*" to enable it to be percolated in making the tincture. What aroma or flavour,—for which it is generally used,—such a tincture will possess our readers may judge for themselves. The process of percolation which has been described above can be conducted with cleanliness and little chance of contamination, yet with doubtful economy. But the principal objection, as I hope to show more fully hereafter, is the difficulty of getting the drugs into a sufficiently fine state of powder without, in many cases, their undergoing great deterioration, and also much likelihood of contamination in the process of powdering. The Committee of Revision having come to the conclusion that the percolation of a drug in any state, except in the finest powder possible for it to be percolated, does not exhaust it, has therefore ordered the drugs to be used in that condition only. But as the powdering of many substances will necessarily have to be done on a large scale, such processes will be the means of throwing the preparation of these medicines into the hands of manufacturers, who will be distinct from retailers and dispensers of medicines. The same may be said of a great number of the Galenical preparations, the fluid extracts more particularly. This, although in many cases the division of labour may tend to perfection, will not, I think, be in the interest of the pharmacist and the public. The pharmacist likes a home-made preparation on which he will stake his professional and business integrity; the public also will suffer, for, owing to the competition in trade, and there being no tests easily devisable for the strength and purity of such preparations, the public, through the retail pharmacist, will often be supplied with what is comparatively worthless.

The principal solvents employed in making the preparations are:—

1. *Water.*—"Natural water in the purest attainable state." Excepting in rare cases where it is absolutely necessary to have distilled water, common water is directed to be used for all Galenical preparations, even for making the decoctions, infusions, tinctures, extract, and fluid extract of the cinchonas, where one would have thought the use of distilled water was clearly indicated.

2. *Distilled Water.*—This is directed to be used in making most of the chemical preparations.

3. *Alcohol.*—"Spirit of the specific gravity 0·835,"—that is, absolute alcohol with 15 per cent. of water; it is 57·5, O. P., and is therefore a little stronger than our *rectified spirit.*

4. *Diluted Alcohol.*—"Alcohol mixed with an equal measure of distilled water," sp. gr. 0·941. This is absolute alcohol with 61 per cent. of water. It is weaker than our *proof spirit* which contains 51 per cent. of water.

5. *Stronger Alcohol.*—"Spirit of the specific gravity 0·817,"—absolute alcohol with 8 per cent. of water.

6. *Glycerin.* Sp. gr. 1·25.—This is the same as our official glycerine. It is largely used as a solvent, mixed with alcohol and water in various proportions, in making the fluid extracts and a few other preparations; and as much depends upon its purity, the following qualitative tests are given:—"When mixed with twice its bulk of cold sulphuric acid it does not produce a brown colour. When diluted with water it affords no precipitate with hydrosulphate of ammonium, ferrocyanide of potassium, nitrate of barium, oxalate of ammonium, or nitrate of silver."

7. *Acetic Acid.* Sp. gr. 1·047.—This contains 36 per cent. of the monohydrated acid, and is slightly stronger than our *acidum aceticum*, which contains 33 per cent. only. In making the *aceti*, diluted acetic acid, 1 to 7 of distilled water is employed; but *distilled vinegar*, it is stated, may be substituted for it in making these preparations.

8. *Sherry Wine.*—This is used as a solvent in all the *vini*, but no definition is given of it or of *Port Wine*, which is also official.

These, or mixtures of them, are the solvents generally used: their strength should be borne in mind in making any comparative investigations as to the merits of their preparations in comparison with our own. The new favourite, which, like several of the articles in the materia medica list, is a "peculiar"*

* It is difficult to conceive how the term "peculiar" is at all descriptive of the substances to which it is applied. Camphor is said to be "a *peculiar* concrete substance;" amylic alcohol "a *peculiar* alcohol;" guaiac resin "a *peculiar* resin;" yeast "a *peculiar* insoluble product of fermentation;" musk "a *peculiar* concrete secretion;" creasote "a *peculiar* substance;" and castor, spermaceti, and yellow wax are all "*peculiar.*"

one, has been referred to. It is a mixture of alcohol, glycerin, and water, generally in the proportions of 8 parts fluid of alcohol, 3 of glycerin, and 5 of water.

(To be continued.)

RECENT PROGRESS IN WEATHER KNOWLEDGE.*

BY ROBERT H. SCOTT, F.R.S.,

Director of the Meteorological Office.

(*Concluded from p.* 849.)

A storm may be produced by an increase of pressure as well as by a decrease, and some most destructive storms—most destructive because they hardly give any warning of their approach—are caused by an increase of pressure on the eastern shores of the North Sea, while a depression is advancing over these islands. The storm of February 6, 1870, which levelled the harbour works at Wick, belonged to this class. Their direction is south-easterly.

Almost all our storms are related to barometrical depressions, and not to elevations. The reason of this has yet to be explained by mathematicians. If, therefore, we knew about an advancing depression, the shape (including gradients in all directions), direction, and rate of motion, and whether the disturbance was increasing or diminishing in intensity, we should be able to form a fair judgment as to what parts of the coast would be most likely to feel a gale, and from what points of the compass. There is hardly one of these particulars of which we can gain a sufficient knowledge until the storm is well upon us, so that the issue of warnings to our exposed western and northern coasts will ever be a matter of great difficulty and uncertainty.

As regards the direction of motion of storms, we have some progress in knowledge to report. Professor Mohn, in his Storm Atlas, has assigned for a few storms the direction and rate of advance, and has shown how both these elements are modified as the storm moves across Scandinavia into Russia. An English meteorologist, Mr. Ley, has also paid attention to the subject; and in his recent work, 'The Laws of the Winds in Western Europe,' has given charts of the mean paths of depressions for certain months of the year.

Both these investigators refer the direction of motion to the distribution and condensation of vapour in the atmosphere; and Mr. Ley maintains that the depression itself is generated by excessive rainfall, and that its advance is due to the same cause. We are hardly prepared to admit the truth of this statement in its entirety; the area covered by our daily weather reports is too small for us to be able to test the matter thoroughly, and but few of the foreign stations give either vapour tension or rainfall. Moreover, the magnitude of the depressions affords an argument against their being simply due to the condensation of vapour; for on November 22, 1869, barometrical readings were reduced to the extent of nearly an inch from what they had been on the 21st, over an area of about 200,000 square miles. To take a recent instance, on the 20th of January, the deficit of atmospherical pressure amounted to about $\frac{1}{20}$th of its total amount over the United Kingdom, the readings ranging between 28·0 and 28·5, instead of between 29·5 and 30·0.

We know that the direction of motion is ruled very much by the position of the areas of high pressure, which are of considerable superficial extent, and, as a rule, are not subject to much motion of translation. The depressions appear to skirt round these areas of high pressure, and not to advance into them. As an illustration of the effects of an area of high pressure on our weather, it may be remarked that one of the worst signs for us of the danger of a south-westerly gale is to find the barometer over the south of France high and rising.

The simplest idea of the general motion of these areas of depression is, that they follow each other in the main stream of air, which sweeps round the permanent area of low pressure near Iceland, much in the same way as eddies in a running stream. Many of the depressions appear to be modified in their character by the contour of the land. More than once a storm which has apparently struck the land about Valencia, travelled northwards until it found an opening in the coast-line, such as Donegal Bay, and then crossed to the Irish Sea, or else skirted round Ireland and crossed the Lowlands of Scotland.

In some cases which we are as yet quite unable to anticipate the disturbance changes the direction of its motion entirely, and returns for a time on its former path. This was in a marked way the case with the storm of April 21, 1872, which came down over Ireland, between Valencia and Armagh, swept round along the north coast of France up to Havre, recoiled and passed north of Portland and Falmouth to the south of Ireland, and eventually travelled out to sea across Ireland, nearly in the direction along which it had arrived. Such a storm as this sets us quite astray, and makes our warnings quite wrong. Another circumstance which complicates the study of storms is, that depressions increase or decrease in their intensity, and of the rate of this change we are quite ignorant.

Of storms which are mainly due to a rise of pressure, one, in February, 1871, may be selected for an illustration. This depression advanced from the westward, but hardly assumed the character of a storm until the morning of the 10th of February, when its centre lay over the north of England. Now, between the 9th and 10th the barometer over the North Sea had risen briskly, so that when the new depression came it found the conditions favourable to high gradients and south-east gales on its eastern side. Its appearance was quite unexpected; for even at 6 p.m. on the 9th there were little signs of it, and, moreover, its force at 8 a.m. on the 10th was moderate compared with its fury later in the day. The centre finally passed over London, and the whole phenomenon passed on to the Continent, where it is untraceable, in consequence of the absence of reports, owing to the war.

Easterly gales are, on the whole, difficult to foresee; they come with little warning; and this is not solely attributable to the deficiency of information from Eastern Europe, for since we have received warnings from that region, we have hardly had an instance of a warning which preceded the gale. In most instances the easterly storm was on the north side of a depression travelling eastwards, and began first at our western stations. Such was the storm of Sunday, Feb. 2, which set in as an east gale at Pembroke, and subsequently extended to stations lying to the eastward. Some of these easterly storms do apparently advance from the eastward, and to this class belongs the fearful storm of Nov. 12-13, in the Baltic. The ravages of this storm were mainly caused by the fact, that a continuance of westerly winds had dammed back the water at the Skager Rack, and then, when the wind chopped round to east, the narrow channels between the Danish Islands could not discharge the water quickly enough. The unavoidable result was an inundation.

What are now the signs of a storm, and when do we issue warnings? We are perforce driven to use the barometer mainly, as it is an instrument more closely related to the direction and force of the wind than the thermometer, and one whose daily range is trifling; but if we trust it alone, we shall hardly ever be certain about a storm, and the thermometer will not help us much. We have other signs, such as shifts in the direction of the wind, increase of sea, and all the manifold local indications given by the character of clouds and the transparency, etc., of the air, invaluable as collateral information, but requiring a practised eye to discern them.

If it were possible to place the meteorological office, with its present telegraphic facilities, on the west coast of Ireland, we might fairly hope to foretell five-sixths of the storms which strike us. On two separate occasions the lecturer, being in that district knew perfectly well from the look of the sky that a storm was coming some hours

* Abstract of a Lecture delivered at the Royal Institution of Great Britain, Friday, February 14th, 1873.

before the barometer began to fall, and consequently long before the office in London could issue warnings.

Some storms do not give even so much warning. That of Feb. 10, 1871, is one instance, and that of Nov. 22, 1872, when the 'Royal Adelaide' was lost on Chesil Bank, is a recent case. On that day at noon the telegraphic reports showed an apparent improvement in the weather on that of the previous day, so the drums on our south coast were lowered. At night the gale came, and of course the comments on the office were not favourable. But one of our best sea observers, Captain Donkin, who was out in that gale, being asked whether he had anticipated the storm from the look of the sky, answered :—

"With respect to the weather on the 22nd November, I may say that at noon I was standing in towards the land, between Falmouth and Plymouth, and a pilot cutter came alongside, and if I had had the least apprehension of such a gale as followed being near at hand, I should have taken a pilot and gone into Plymouth. The appearance of the weather at the time was fine, though the glass was falling, though not low at the time for S.W. wind and unsettled weather."

This will show that we cannot foretell all storms by means of telegraphy. We are beginning to recognize other signs of disturbance of the atmosphere generally as indications of a storm, but these can hardly as yet be considered as scientifically exact. Among these may be mentioned the circumstance which Professor Mohn has noticed, that warning of south-westerly gales for the coast of Norway is given by a rise of temperature at Dovre at a height of 2100 feet above the sea. In these islands we have little prospect of availing ourselves of this source of information, as our telegraphic stations are all at low levels.

Another principle is that pointed out by Mr. Meldrum, that storms are generated between two currents of air flowing in opposite directions, the easterly winds being on the polar side of the westerly.

It may seem a comparatively simple matter to say whether or not a warning was issued in time ; but it is really not so easy a matter, as storms are exceedingly local, so that two observers situated close to each other may differ seriously as to whether there has been a gale or not. Every effort has been made to keep a check on the correctness of warnings for the last three years ; that is, on whether or not intelligence of gales has been given in time to be of practical service to seamen. The result has been for the years 1870–71, that 46 per cent. of the warnings have been followed by gales, and about 20 per cent. in addition have been justified by the occurrence of strong winds after they were hoisted, showing a total percentage of successful warnings of nearly 70 per cent. For the first six months of 1872 the percentage of gales for which warnings were issued in time has risen above 60, and the total percentage of successes to nearly 80, owing to the postal telegraphic arrangements having gradually become more perfect, and the exchange of information with the Continent being now more regular.

THE PRESENCE OF ALCOHOL AND ACETIC ACID IN MILK.*

BY M. A. BÉCHAMP.

The author on a former occasion attempted to show that milk necessarily contains microzymes, which, by a purely physiological action, produce the agents of spontaneous coagulation. From the known action of microzymes in general, he concluded that besides lactic acid, coagulated milk must also contain alcohol and acetic acid ; but if so, why should not milk contain them physiologically? The present note has for its object to show that cow's milk does, at the moment of being drawn from the cow, contain both these bodies ; and, subsidiarily, that, the same cause operating before and after coagulation, alcohol and acetic acid ought to augment in the coagulated milk.

Fresh milk was added to a slight excess of oxalic acid, and immediately submitted to distillation in a chloride of calcium bath, the temperature of which was maintained at 120° C. Nineteen twentieths of the milk were distilled; the clear liquid had always an acid reaction, and to it was added excess of pure carbonate of soda. Little more than one-tenth was then collected, which was concentrated by distillation and rectification over carbonate of potash. In the case of coagulated milk it was thrown upon a filter and the whey collected and distilled as above.

A pretty considerable quantity of fresh milk was operated upon to obtain a measurable quantity of alcohol. This was distinguished (1) by burning with the characteristic flame; (2) by its oxidation products when treated with a mixture of bichromate of potash and sulphuric acid ; (3) by the formation of crystallized acetate of soda ; (4) by the formation of acetate of silver.

Acetic acid was obtained from the sodic residues from which the alcohol had been separated. It was distinguished principally by the formation of acetate of soda, which salt crystallized under its usual form down to the last drop. No trace of any of the acids superior to acetic acid was ever found.

The same phenomena have been met with in the alcohol and acetic acid of milk coagulated spontaneously while sheltered from the air. Butyric acid, or other volatile acid homologues, which are products of the decomposition of albuminous matters, were sought for, but none were found ; crystals of acetate of soda being formed down to the last drop.

This being the case, it was an interesting point to ascertain whether alcohol and the volatile acids are present in milk coagulated by lamb's rennet. M. Béchamp found alcohol, acetic acid, and a little caproic acid.

In order to decide whether the results permitted of generalization, alcohol and acetic acid were sought for in ass's milk. The animal was milked close to the laboratory and the milk distilled. Like that from the cow it was found to contain alcohol and acetic acid. M. Béchamp, therefore, ventures to assert that these bodies exist in the milk of all herbivorous animals, but that of carnivorous animals requires investigation.

Some estimates were made of the amount of alcohol and acetic acid present in fresh milk, in order to compare them with the quantities present in coagulated milk. The alcohol was indirectly determined by the acetic acid yielded by its oxidation, and this acid and that already formed in the milk were determined by a titrated solution of caustic soda. The proportions of alcohol and acid were found to vary very considerably.

The author does not think that the alcohol and acetic acid are, in the same sense as other chemical elements of milk, products of the milk-secreting organism ; he is rather of opinion that they are formed in some way in the mammary gland, by the action of microzymes upon the glycogenous matters of the milk, the evidence being that they exist only in small and variable quantities, which are increased naturally outside the udder, without the intervention of organic ferment other than microzymes.

The author considers that these results accord with the generalizations he has drawn from former investigations. The microzymes of every origin that he has studied possess the same power of forming alcohol and acetic acid, not only from glycogenous matters, but also from substances which are not convertible into sugar, such as tartaric, citric, muric, and lactic acids. These same microzymes engender alcohol and acetic acid in ripening fruits, producing it in greater abundance if, by bruising, the cells which contain the microzymes are broken, and they come into more immediate contact with the juice. M. Béchamp also considers that the theory of Liebig as to the alterability of albuminoid matters in the phenomenon of fermentation is a great chemical and physiological error. He says that in the fermentation of eggs and the souring of milk the albuminoid matters remain intact, and preserve all their essential properties.

* 'Comptes Rendus,' vol. lxxvi. p. 836.

The Pharmaceutical Journal.

SATURDAY, MAY 3, 1873.

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

THE THIRTY-SECOND ANNIVERSARY OF THE PHARMACEUTICAL SOCIETY.

ON the first page of this week's Journal will be found the official notices in reference to the Anniversary Meetings of the Pharmaceutical Society for 1873. The Annual General Meeting of the members of the Society is to be held on Wednesday, May 21, at eleven in the forenoon, when the Report of the Council for the year will come under the consideration of the meeting. Until it is published, speculation as to what topics for discussion may be found in it would be useless, though probably the Council will see fit to follow the precedent of last year by ordering a copy of the Report to be sent to each member previous to the Annual Meeting. One subject, however, will doubtless appear in it,—the admission of women as members of the Society,—and this will be certainly one of the subjects discussed at the Annual Meeting, since Mr. HAMPSON has given a notice of motion that raises the whole question.

Should the Bye-laws which have now been under consideration at two meetings of the Council be confirmed at its meeting next week, a Special General Meeting of the members will have to be held at the close of the Annual Meeting, for the purpose of considering, and, if thought proper, confirming and approving such new or altered Bye-laws as may be submitted by the Council.

The Conversazione will, by the kind permission of the Lords of the Committee of Council on Education, again be held in the South Kensington Museum, and it is, as usual, to take place on the evening of the same day as the Annual Meeting. Tickets of admission may be obtained by all Members, Associates, and Apprentices or Students of the Society; and in order to obviate unnecessary trouble, a ticket has been sent to each member residing in London. Any other person connected with the Society, or Registered Chemist and Druggist, will have a ticket forwarded to him upon application to the Secretary at 17, Bloomsbury Square.

With regard to the Annual Dinner in connection with the Anniversary, which is to take place at the Crystal Palace on the evening of the previous day, we are requested to say that the tickets are now ready, and may be obtained from the Honorary Secretaries or any of the Stewards. A list of these gentlemen was printed in these columns last week, and is repeated in the advertising section of the present issue, with the addition of a few names which were then inadvertently omitted and a list of the Committee.

THE ADULTERATION ACT IN RELATION TO CHEMISTS AND DRUGGISTS.

THE action now being taken throughout the country under the Adulteration Act has given rise to a number of questions relating to the business of the chemist and druggist; and we have received numerous inquiries from provincial correspondents as to the scope and operation of the Act. A letter of this kind will be found in the "Correspondence" columns of the present number, and we must confess that it raises a question of some difficulty. So far as the wording of the Adulteration Act goes it might perhaps be maintained that it does not apply to cases such as that mentioned by our correspondent any more than to cases of substitution, which have been supposed to be placed entirely outside the provisions of the Act by the definition therein given of adulteration as being either the mixture with any articles of food or drink or any drug, of any injurious or poisonous ingredient or material, or of any other substance, with intent fraudulently to increase their weight or bulk. But though this may be a technical defect in the framing of the Act, we are disposed to consider that the sale of articles sophisticated by substitution or of inferior strength, would certainly be contrary to the spirit as well as the intention of the Act.

It may, however, be pointed out that the Pharmacy Act renders it a punishable offence for any person to "compound any medicines of the British Pharmacopœia except according to the formularies of the said Pharmacopœia;" and although the term "laudanum" is not in fact a pharmacopœia term, it is still so widely understood as indicating the tincture of opium of the Pharmacopœia that we should feel much doubt as to the safety as well as the propriety of deviating from the formula therein prescribed.

EXTRA-OFFICIAL PHARMACEUTICAL HONOURS.

WE quote the following extra-official utterance from a Staffordshire newspaper which has been kindly forwarded to us by a correspondent:—

"Mr. ——, son of Mr. ——, of ——, passed on Tuesday the examinations of the Pharmaceutical Society of Great Britain, gaining two certificates of merit and highly complimented in chemistry."

To those familiar with the conditions of the examinations it will be evident that certificates of merit are not granted as stated, but the name and address that we suppress appear a considerable way down in a recent Minor examination list. We quite agree with our correspondent that such an "impudent fabrication" deserves exposure.

FROM the *Neues Repertorium für Pharmacie* we learn the twenty-fifth anniversary of the connection of Dr. FRESENIUS with the Chemical Institute and Laboratory at Wiesbaden is to be celebrated in the early part of May by a festival, at which many of his former students will attend. An influential committee has been formed to make suitable arrangements, at the head of which is Professor NEUBAUER, for many years a colleague of Dr. FRESENIUS.

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

The following is the result of the Preliminary examination, held on the 7th April:—

England and Wales.

Three hundred and sixty-one candidates presented themselves for examination, of whom *one hundred and seventy-four* failed. The following *one hundred and eighty-seven* passed, and have been duly registered as Apprentices or Students:—

Equal.
Bradley, Joseph Bourne .... Dudley
Wood, Charles Henry .... London

Playford, Robert Henry .... Horsham

Clarabut, Frank Stone .... Folkestone

Blythe, William Graves .... Goole

Thornton, John .... Aldridge

Equal.
Fowler, Edwin .... London
Ottey, Thomas .... Wycombe

Rogers, Oliver .... Upper Norwood

Laxon, Matthew .... Wisbeach

Roughton, William .... Loughborough

Equal.
Ballard, John Spencer .... Hereford
Dingle, James Hender .... Penzance

Equal.
Cæsar, Julius .... Cosham
Mainwaring, George William ... Dudley

Ronca, Alfred .... Upper Norwood

Equal.
Baker, William Brain .... Banbury
Loan, James .... Oxford

Dobson, George .... Kingswood

Equal.
Morgan, Thomas William ...... Hereford
Vinson, William .... Lewes

Tutton, James .... Northampton

Equal.
Thomas, James .... Rhyl
York, Thomas .... Cambridge

Equal.
Curtis, Thomas .... Holbeach
Furness, Thomas .... Chesterfield
Hibbins, Thomas Henry .... Stamford

Equal.
Finney, Arthur Cook .... Gainsborough
Wakefield, John .... Birmingham

Sharp, John .... Sunderland

Equal.
Chifney, George Pearmain ...... Mildenhall
Cresswell, Henry Peter .... London

Equal.
Kerry, Ebenezer .... Hastings
Thomas, John .... Carmarthen
Wallace, George William .... Sunderland

Equal.
Hall, James George .... Norwich
Wilkinson-Newsholme, Geo. T. Huddersfield
Sutcliffe, George Hargreaves ... Bacup
Wellburn, John .... Scarborough

Equal.
Worsley-Benison, Frederic Hy. Chepstow
Heading, Herbert Henry .... Ely
Hurst, Charles Herbert .... Littleborough

Equal.
Smithson, Thomas Henry .... Bradford (Yorks.)
Williams, David .... Swansea

Equal.
Jackson, William Hodgkinson .. Crediton
Leslie, John Morrison .... (Port Elizabeth)

Equal.
Hind, Thomas .... Lincoln
Shilton, Stephen .... Cockermouth
Summerhill, Thomas Henry ... Wolverhampton

Dix, Frederick .... Lynn

Equal.
Davies, Owen .... Llanelly
Lapthorn, George .... Taunton
Read, John Henry .... London
Sykes, Henry .... Huddersfield

Williams, Robert Edwin .... Cheltenham

Equal.
Hewat James C. .... Chertsey
Oldham, Frank .... Wisbeach

Holloway, Edwin Arthur .... Leominster

Equal.
Bolton, Joseph Hook .... London
Phillpot, Arthur .... Plymouth

Harris, George .... Moseley

Equal.
Pritchard, Richard .... Llandovery
Rickinson, Valentine .... West Hartlepool
Woodland, John .... Rochester

Equal.
Davies, Thomas .... Liverpool
Tunley, William Henry .... Guernsey

Smith, William Octavius .... Gosport

Equal.
Davies, Hugh .... Liverpool
Merrikin, William .... Boston
Howell, Edmund .... Oxford

Equal.
Gain, Edmund .... Southsea
McConnal, Allan .... Dudley
Wright, Robert .... South Shields

Equal.
Brewer, John .... Blackburn
Cockcroft, Alfred .... Richmond (Yorks)
Mitten, Flora .... Hurstpierpoint
Smith, Charles Albert .... Gosport
Soutter, David .... Grimsby
Thompson, John Henry .... Southampton

Lowdell, Frederic .... Brighton

Equal.
Cumber, Henry .... Guernsey
Dove, George .... Sherburn
Mears, Henry .... Bridgwater
Mitchell, Charles Archibald ... London
Snoxell, Samuel .... Guildford

Greathed, William Thomas W. Doncaster

Equal.
Blackwell, Josiah .... St. Austell
Crook, Herbert .... Gravesend
Gilkes, William Henry .... Banbury
Gregson, James Kenyon .... Blackburn
Story, George Arthur .... Bourne

Equal.
Bulcock, John Wardle .... Clitheroe
Cooley, Walter Bromley .... Wolverhampton
Hartill, Ambrose .... Lower Gornal
Mays, Robert Man .... South Shields
Wilson, Henry .... Rhyl

Barrat, Reuben .... Kingston-on-Thames

Equal.
Dobson, George Turner .... Holsworthy
Elborne, William .... London
Garner, Thomas .... Boston
Rumsey, James Window .... Crickhowell
Sibthorp, Stephen Shurmer ..... Liverpool
Smith, William .... Grantham
Thompson, Thomas .... Bedworth

Equal.
Lee, William Walter .... Wandsworth
Williams, John .... Oswestry

Equal.
Ashmead, John Stubbings ...... Clifton
Wilson, John Thomas .... London

Equal.
Collis, William Blow .... Arundel
Golding, Frederick James ...... Bath
Lovely, Ernest .... Shepherd's Bush
Smith, Frederick Adolphus ...... Macclesfield

Equal.
Boyden, John Augustus .... Wisbeach
Craske, Thomas Augustus ...... Tunbridge Wells

Equal.
Allatt, Arthur Edward .... Bradford (Yorks.)
Elliot, Joseph .... York
Heynes, William Henry .... Woodstock
Hornby, Henry G. .... Leeds

Everard, Horace .... Leicester

Equal.
Berrill, Robert Andrew .... Doncaster
Billing, John Henry .... Liverpool
Coles, Joseph .... Rye
Eddy, John Miller .... Plymouth
Hinds, William .... Coventry
Isaac, John Percy .... Sevenoaks
Phillips, John James .... Hyde
Sampson, George .... Chesterfield

Equal.
Brisley, George .... Margate
Gleadowe, John Webster .... Boston
Thomason, Thomas Watson ... Birmingham
Wild, George Frederick .... Hyde

Smith, Henry .... Holbeach

Fawn, Frederick Charles .... Bristol

Equal.
Bennett, Isaac Booth .... Hyde
Clarke, George .... Newport, Mon.
Foster, James Edward .... Bridgwater
Hayes, James Roberts .... Lynn

Equal.	Pittuck, Frederick W.	Helburn-on-Tyne
Equal.	Pritchard, Lewis Thos. Richard	Neath
Equal.	Pritchard, Owen	Bangor
Equal.	Biddiscombe, Charles	London
Equal.	Holmes, George	Sheffield
Equal.	Williams, Joseph Phillip	Neath
Equal.	Smith, Alfred	Birmingham
Equal.	Williams, Benjamin	Pembroke Dock
Equal.	Glew, Samuel	Worksop
Equal.	Naish, Robert Elwell	Gosport
Equal.	Waddington, Herbert	Thornton
Equal.	Williams, Walter Thomas	Sawbridgeworth
Equal.	Hubbard, Alfred Coath	Walsall
Equal.	Taffs, Albert Brooks Vobe	Rye
Equal.	Berry, Henry Burton	Gloucester
Equal.	Cross, John Thomas	Brighton
Equal.	Smith, Richard Henry	Leeds
Equal.	Turner, James	Seaforth
Equal.	Fisher, Allen Kay	Eastbourne
Equal.	Wright, Edwin	Ipswich
Equal.	Guess, Alfred	Leighton Buzzard
Equal.	Gulliver, William Inchle	London.
Equal.	Thompson, James	Berwick-upon-Tweed
Equal.	Barlow, Joseph Alexander	Rochdale
Equal.	Corden, F. W. W.	Streatham
Equal.	Bowman, Edward James	London
Equal.	Clark, Edward John	Swansea
Equal.	Dobson, George	Birkenhead
Equal.	Fargher, Henry Spencer	Warrington
Equal.	Hallawell, William	Manchester
Equal.	Martin, Henry Stephen	Brighton
Equal.	Williams, Thomas Robert	Ipswich
Equal.	Ashworth, Richard	Manchester
Equal.	Baigent, George Henry	Aldershot
Equal.	Bower, Henry	Norwich
Equal.	Derby, Samuel Hill	Salford
Equal.	Dunn, William Arthur	Newark
Equal.	Fairhurst, Hugh Ranicar	Southport
Equal.	Godsell, Philip George	Great Malvern
Equal.	Jones, John	Liverpool
Equal.	Jones, Theophilus	Liverpool
Equal.	Knibb, William	Nottingham
Equal.	Langridge, George Thomas	London
Equal.	Newton, George Robert	Sleaford
Equal.	Pickering, John Harrison	Grantham
Equal.	Sainsbury, Horatio B.	Leamington
Equal.	Smith, Edwin	Manchester
Equal.	Tibbles, John Thomas	Mount Sorrel
Equal.	Veitch, Andrew	Shildon
	Savage, John Welch	Wells

Scotland.

Sixty-two candidates presented themselves for examination; of these *twenty-six* failed. The following *thirty-six* passed, and have been duly registered:—

	Beeby, John	Falkirk
	Donald, David	Perth
	Law, William Thorburn	Falkirk
	Ballingall, Peter	King's Kettle
	Mackie, George	Banff
	Stewart, Alexander	Rhynie
Equal.	Marshall, Alfred James Alex.	Edinburgh
Equal.	Murdoch, James William	Dumfries
	Macguffoy, Robert	Dumfries
	McIntyre, Ewen	Edinburgh
	Laing, James	Brechin
	Galloway, Peter	Aberdeen
	Cluckie, André	Greenock
	Johnston, Robert E.	Edinburgh
	Collinson, Frederick William	Alnwick
	Watt, George William	Huntly
	Riach, Peter	Leith
	Sanderson, Robert Turnbull	Glasgow
	Craig, William Wanes	Duncanstone
	Thomson, John	Edinburgh
	Fowler, Donald	Inverness
	Crichton, Alexander	Burntisland
Equal.	Forrest, James	Falkirk
Equal.	Mair, Alexander	Edinburgh
	Aitken, William	Edinburgh
	Rowand, Robert	Glasgow
	Kay, William	Cumnock
	Dougal, William	Glasgow
	Walker, Alexander	Cullen
Equal.	Gorrie, Daniel	Perth
Equal.	Will, William Watson	Montrose
	Wilson, William Wallace	Glasgow
	Weighill, Thomas Armstrong	Sunderland
Equal.	Greig, James	Glasgow
Equal.	Swanson, Rose	Aberdeen
	Maben, Thomas	Hawick

The following is a list of the Towns at which the Examinations were held, with the numbers of Candidates annexed:—

England and Wales.

	Candidates. Examined.	Passed.	Failed.
Aberdare	2		2
Altrincham	1		1
Banbury	2	2	
Bangor	2	1	1
Barmouth	1		1
Barnstaple	1		1
Basingstoke	1		1
Bath	2	1	1
Bideford	1	1	
Birkenhead	2	1	1
Birmingham	6	4	2
Blackburn	4	3	1
Bolton	2		2
Boston	3	3	
Bradford	2	2	
Brighton	7	5	2
Bristol	8	3	5
Bury St. Edmunds	1	1	
Cambridge	8	5	3
Carmarthen	4	1	3
Cheltenham	2	1	1
Chesterfield	2	2	
Cockermouth	1	1	
Chippenham	2		2
Coventry	4	2	2
Doncaster	2	2	
Dover	1	1	
Droitwich	1		1
Dudley	3	3	
Durham	3	1	2
Eastbourne	1	1	
Exeter	1	1	
Eye	1		1
Fareham	2	1	1
Farnham	1	1	
Folkestone	1	1	
Gainsborough	4	1	3
Goole	1	1	
Gosport	3	2	1
Grantham	2	2	
Grimsby	2	1	1
Guernsey	3	2	1
Halifax	2		2
Harrogate	1		1
Hartlepool	1	1	
Hastings	7	3	4
Hereford	4	3	1
Huddersfield	3	2	1

	Candidates. Examined.	Passed.	Failed.
Hull	2		2
Huntingdon	2		2
Ipswich	2	2	
Kendal	2		2
King's Lynn	3	2	1
Leamington	3	1	2
Leeds	5	2	3
Leicester	4	1	3
LeightonBuzzard	1	1	
Leominster	1	1	
Lewes	1	1	
Lincoln	1	1	
Liverpool	14	7	7
Llandovery	1	1	
London	51	23	28
Loughborough	3	2	1
Louth	1		1
Macclesfield	1	1	
Manchester	20	11	9
Margate	1	1	
Merthyr	1		1
Neath	1	1	
Newark	1	1	
Newport, Mon.	3	2	1
Northampton	2		2
Newcastle-on-Tyne	1	1	
Norwich	2	2	
Norwood	2	2	
Nottingham	6	1	5
Oswestry	1	1	
Oxford	2	2	
Pembroke Dock	1	1	
Penrith	1		1
Penzance	1	1	
Plymouth	2	2	
Preston	1		1
Reading	1		1
Retford	1	1	
Rhyl	4	2	2
Richmond (York)	1	1	
Rochdale	2	1	1
Rochester	8	2	6
St. Ives (Cornwall)	1		1
St. Austell	1	1	
Scarborough	2	1	1
Sheffield	7	1	6
South Shields	2	2	

	Candidates. Examined.	Passed.	Failed.		Candidates. Examined.	Passed.	Failed.
Shrewsbury	3		3	Swansea	6	4	2
Sleaford	1	1		Southsea	4	2	2
Southampton	4	1	3	Taunton	5	3	2
Southport	3	1	2	Torquay	1		1
Spalding	2	2		Tunbridge Wells	1	1	
Stamford	4	2	2	Walsall	2	2	
Stalybridge	1		1	West Bromwich	2		2
Stockport	3		3	Windsor	1	1	
Stockton-on-Tees	1		1	Wolverhampton	2	2	
Stoke-on-Trent	1		1	Woodstock	1	1	
Stourbridge	1	1		Worcester	1	1	
Stowmarket	1		1	Worthing	1		1
Stroud	1	1		Wycombe (High)	1	1	
Sunderland	3	2	1	York	6	2	4

SCOTLAND.

Aberdeen	8	3	5	Falkirk	1	1	
Banff	4	3	1	Forfar	1	1	
Berwick	1	1		Glasgow	10	5	5
Dumfries	2	2		Greenock	1	1	
Dundee	2		2	Kilmarnock	2	1	1
Dunfermline	1	1		Lochgilphead	1		1
Edinburgh	20	12	8	Montrose	1	1	
Elgin	2	2		Perth	5	2	3

The questions for examination were as follows:—

Time allowed: Three Hours.

LATIN.

Translate into English two at least of the Latin sentences and answer the questions:—

1. Ariovistus ad postulata Cæsaris pauca respondit; de suis virtutibus multa prædicavit; transisse Rhenum sese, non suâ sponte, sed rogatum et arcessitum a Gallis; non sine magnâ spe, magnisque præmiis, domum propinquosque reliquisse.

2. Ita prœlium restitutum est, atque omnes hostes tergaverunt, neque priùs fugere destiterunt, quàm ad flumen Rhenum millia passuum ex eo loco circiter quinquaginta pervenerint. Ibi perpauci, aut viribus confisi, transnatare contenderunt, aut lintribus inventis, sibi salutem repererunt.

3. Coque Succum per sextam horæ partem et cola. Huic adjice Saccharum et liqua. Denique ubi Syrupus refrixerit, Spiritum admisce.

4. Capiat cochlearia duo magna statim; iterentur post horam, si tussis accreverit.

5. How many declensions of Latin substantives are there, and how are they known? Give examples.

6. To what questions do the Nominative, Genitive, and Accusative Cases severally answer? Give one example in Latin for each.

7. Decline the adjective *æger*.

8. Give the endings, singular and plural, of the Present Tense, Indicative Mood, First and Fourth Conjugation, Passive Voice.

9. Parse "Natus est Augustus consulibus Cicerone et Antonio.

ARITHMETIC.

10. A gentleman dying left £45,247 between two daughters; the younger was to have £15,000, £1500, and twice £15, what was the elder sister's fortune?

11. If the salary of an officer be £48 per annum, what should he receive for 232 days?

12. If £100 gain £5 interest in 12 months, what sum will gain £20 in 8 months?

13. Multiply $430\frac{6}{10}$ by $18\frac{2}{7}$.

14. Divide 715 by ·3075.

ENGLISH.

15. In the structure of words what is a prefix? Give examples of words having Latin prefixes.

16. Give the Past Tense and Past or Complete Participle of the following Irregular Verbs:—*Eat, chide, drive, lead, see, shake, slink, spin, ride, rive.*

17. What is meant by the *root* of a word? and illustrate by two examples.

18. What form of expression besides the Nominative Case may be the subject?

19. What is the result of two negatives coming together? and correct the following:—Nobody did me no good.

20. Write from fifteen to twenty-five lines upon *one* only of the following subjects:—

A. Good Writing.
B. Arithmetic.
C. Pride.

ERRATUM.

Page 852, col. 2, line 38, *instead of* "Neale, William," *read* "Neale, John."

BENEVOLENT FUND.

SUBSCRIPTIONS RECEIVED DURING APRIL, 1873.

LONDON.

	£	s.	d.
Barnard, John, 338, Oxford Street, W.	1	1	0
Beddard, John, 46, Churton Street, S.W.	1	1	0
Brown, Henry F., 40, Aldersgate Street, E.C.	0	10	6
Burgess, Willows, and Francis, 101, High Holborn, W.C.	2	2	0
Coles, Ferdinand, 248, King's Road, Chelsea, S.W.	0	10	6
Davy, Yates, and Routledge, Southwark, S.E.	2	2	0
Dewar, Mary Ann, 154, Upper Whitecross Street, E.C.	0	10	6
Fenn, John Thomas, 83, Regent Street, Westminster, S.W.	0	5	0
Field, William, 83, Brompton Road, S.W.	1	1	0
Gale, Samuel, 338, Oxford Street, W.	1	1	0
Goddard, George Edward, 37, Chapel St., Belgrave Sq. S.W.	1	1	0
Handley, Charles, 45, High Street, Stoke Newington, N.	0	10	6
Hardy, Samuel Croft, 338, Oxford Street, W.	0	10	6
Herrings and Co., 40, Aldersgate Street, E.C.	2	2	0
Hickey, Evan Lewis, 199, King's Road, Chelsea, S.W.	0	10	6
Hills, Thomas Hyde, 338, Oxford Street, W.	3	3	0
Hora, Henry Whinfield, 58, Minories, E.	1	1	0
Jones, Frederick, 175, Kentish Town Road, N.W.	0	5	0
Knight, James, New Park Road, Brixton Hill, S.W.	0	10	6
Lidwell, Joshua Edward, High Street, Notting Hill, W.	0	10	6
Middleton, Francis, 338, Oxford Street, W.	1	1	0
Muskett, Albert Charles, 64, Park Street, Southwark, S.E.	0	10	0
Pattison, George, 139, St. John Street Road, E.C.	1	1	0
Rowntree, Thomas, 1, Westbourne Road, Barnsbury, N.	0	10	6
Sandy, Frederick William, 390, Walworth Road, S.E.	0	10	6
Sangster, Arthur, 66, High Street, St. John's Wood, N.W.	1	1	0
Steel, Frank William, 283, Liverpool Road, N.	0	10	6
Tipping, Thos. J. W., 12, High Street, Stoke Newington, N.	0	10	6
Tomlinson, Thomas, 6, Lower Seymour Street, W.	1	1	0
Townsend, Charles, 40, Aldersgate Street, E.C.	0	10	6
Turner, Charles Ernest, 63, Great Russell Street, W.C.	0	10	6
Warner, Charles Heath, 55, Fore Street, E.C.	1	1	0
Wickham, William, 509, New Cross Road, S.E.	0	10	6
Wretts, John Robert, 338, Oxford Street, W.	0	5	0
D. S.	0	10	6
E. A. W.	0	7	0

COUNTRY.

	£	s.	d.
Aberdare, Thomas, Watkin J.	0	10	6
Abergavenny, Ackrill, George	0	10	6
Ampthill, Allen, George	0	10	6
Atherton, Warburton, Thomas	0	5	0
Barking, Fitt and Son	0	10	6
Bath, Barnitt, Francis	0	10	6
,, Merrikin, John B.	0	5	0
,, Pooley, John C.	0	5	0
,, Tylee, John P.	0	10	6
Beckenham, Day, Thomas S.	0	10	6
Berkeley, Bell, Edward C.	0	10	6
Bewdley, Newman, Robert	0	10	6
Birmingham, Churchill, John	0	10	6
,, Foster, Alfred H.	0	5	0
,, Pegg, Herbert	0	10	6
,, Snape, Edward	0	10	6
,, Southall, Son, and Dymond	1	1	0
Bishop's Castle, Davies, Edward	0	10	6
Blackheath, Lavers, Thomas H.	1	1	0

	£	s.	d.
Bolton, Blain, William	0	10	6
Boston, Allen, Thompson	0	5	0
,, Marshall, Robert	0	5	0
Bridge (near Canterbury), Thomas, James	0	5	0
Bridport, Beach and Barnicott	1	1	0
,, Beach, James	0	10	6
,, Tucker, Charles	0	10	6
Brighton, North, George T.	0	10	6
,, Smith, William	0	10	6
Bromley (Kent), Baxter, William W.	0	10	6
,, ,, Shillcock, Joseph B.	0	10	6
Burslem, Blackshaw, Thomas	0	10	6
Burton-on-Trent, Wright, George	0	10	0
Buxton, Barnett, Alexander	0	10	6
Canterbury, Gardner, Austen W.	0	5	0
Cardiff, Williams, Thomas	0	10	6
Carlisle, Todd, Joe	0	5	0
Chatham, Crofts, Holmes C.	0	10	6
,, French, Gabriel	0	10	6
,, Tribe, John	0	10	6
Chertsey, Boyce, George	0	5	0
Chester, Grindley, William	0	10	6
,, Hodges, William	0	5	0
,, Mills, John	0	5	0
Chesterfield, Greaves, Abraham	0	5	0
Chipping Sodbury, Jones, Richard	0	10	6
,, Wheeler, John	0	5	0
Chislehurst, Beaumont, Charles F. J. B.	1	1	0
Cirencester, Skinner, Thomas	1	1	0
,, Smith, Charles S.	1	1	0
Coleford, Cheese, Henry	0	5	0
Cottingham, Lister, George	0	10	6
Crewkerne, Pearce, Joseph	0	5	0
Crickhowell, Christopher, William	0	5	0
Dartmouth, Rees, William H.	0	5	0
Denbigh, Edwards, William	0	5	0
Doncaster, Dunhill, Son, and Shaw	1	1	0
,, Howorth, James	0	10	6
,, Slack, William	0	5	0
Dudley, Dennison, Matthew	0	5	0
,, Hollier, Elliott	0	10	6
Edinburgh, Ainslie, William	0	10	6
,, Buchanan, James	1	1	0
,, Duncan, Flockhart, and Co.	1	1	0
,, Gardner, James	0	10	6
,, Gilmour, William	0	10	6
,, Macfarlane and Co.	2	2	0
,, Macfarlane, Andrew Y.	0	5	0
,, Mackay, John	1	1	0
,, Noble, Alexander	1	1	0
,, Robertson, James	0	10	6
Exeter, Collett, Charles B.	0	5	0
Fairford, Manning, Henry	0	5	0
Faversham, Underdown, Frederick W.	0	10	6
Fordingbridge, Haydon, Frederick Walter	0	5	0
Glasgow, Currie, John (*Sauchiehall Street*)	0	5	0
,, Fairlie, James M.	0	5	0
,, Frazer, Daniel	1	1	0
,, Glasgow Apothecaries' Company	1	1	0
,, Greig, William	0	10	6
,, Harrower, Peter	0	5	0
,, Kinninmont, Alexander	0	10	6
,, Murdoch Brothers	0	10	6
,, Pettigrew, John W.	0	5	0
Gloucester, Stafford, William	0	10	6
Goole, Hasselby, Thomas J.	0	5	0
Great Malvern, Burrow, Messrs.	1	1	0
Harrogate, Coupland, Joseph	0	10	6
,, Greenwood, Charles	0	10	6
,, Greenwood, John	0	10	6
Hastings, Miller, Frederick	1	1	0
,, Rossiter, Frederick	0	10	6
Haverfordwest, Saunders, David P.	0	10	6
Hawkhurst, Stainburn, Joseph	1	1	0
Hay, Davies, John L.	0	5	0
Hertford, Lines, George	0	10	6
Highbridge, Brown, William	0	10	6
Hirwain, Sims, Joseph	0	10	6
Horsham, Williams, Philip	1	1	0
Howden, Saville, John	1	1	0
Huddersfield, Fryer, Henry	0	10	6
,, King, William	0	10	6
Hulme, Hart, James	0	10	6
,, Ritson, John	0	5	0
Ipswich, Anness, Samuel R.	0	10	6
,, Callaway, Lemuel	0	10	6
,, Chapman, Henry	0	10	6
,, Eyre, Benjamin A.	0	5	0
,, Grimwade and Co.	1	1	0
,, Marchant, Charles F.	0	5	0
,, Taylor, John	0	5	0
Jedburgh, Rawdin, Joseph	0	5	0
Kaffraria, Daines, Thomas	0	10	6
Kilmarnock, Borland, John	0	10	6
,, Rankin, William	1	1	0
Kingsbridge, Balkwill, William	0	10	6
Landport, Hackman, Leonard L.	0	10	6
Launceston, Eyre, Jonathan S.	0	10	6
Leamington, Barnitt, John	0	10	6
,, Caswell, Edward	0	10	6
,, Cutting, James	0	10	6
,, Davis, Henry	0	10	6
,, Jones, Samuel U.	1	1	0
,, Pullin, William H.	0	10	6
,, Stanley, Herbert	0	10	6
,, Wright, William F.	0	10	6
Leatherhead, Hewlins, Edward	0	10	6
Leicester, Cooper, Thomas	0	10	6
,, Harvey, William R.	0	10	6
,, Salisbury, William B.	0	10	6
Leyland, Hackforth, Frederick	0	10	6
Liverpool, Blundell, John	0	10	0
,, Buck, Richard C.	0	5	0
,, Coupland, Henry	1	1	0
,, Fergusson, John	1	1	0
,, Greenall, Alfred	0	5	0
,, Hunt, Thomas	0	10	6
,, Jones, Owen L.	1	1	0
,, Jones, William	0	5	0
,, Tanner, Alfred E.	0	10	6
Llanelly, Hughes, Edward	0	10	6
Loddon, Ellis, Thomas W.	0	10	0
Loughborough, Paget, John	0	5	0
Louth, Hurst, John	0	10	6
,, Hurst, John B.	0	10	6
Lymington, Allen, Adam U.	0	5	0
,, Peat, Walter	0	10	6
Machynlleth, Rees, Edward	0	5	0
Malvern Wells, Wakefield, Cecil H.	1	1	0
Manchester, Leete, William W.	0	10	6
,, Terry, Thomas	0	5	0
Margate, Candler, Joseph T.	0	10	6
Merthyr, Rees, Thomas	0	5	0
Norwich, Woodcock, Page D.	0	10	6
Norwood, Upper, Birch, Henry C.	1	1	0
Nottingham, Atherton, John H.	0	10	6
,, Beardsley, John	0	5	0
,, Jackson, Roberts	0	5	0
,, Mayfield, John T.	0	10	6
,, Parr, Samuel	0	10	6
,, White, Frank	0	10	6
,, Williams and Fitzhugh	1	1	0
,, Woodward, William	0	5	0
,, Smith, William	0	5	0
Oundle, Turner, Robert	0	10	6
Partick, Rait, Robert C.	0	5	0
Perth, Reid, Neil	0	5	0
Portobello, Kemp, David	0	10	6
Portsoy, Clark, James	0	10	6
Pwllheli, Pughe, Rice O.	0	2	6
Ramsgate, Balch, Edward	0	5	0
,, Morton, Henry	0	5	0
Reading, Bailey, John B.	5	0	0
Redditch, Mousley, William	0	5	0
Richmond (Yorks.), Thompson, Thomas	0	10	6
Rochdale, Booth, James	0	10	6
,, Lord, Ellis	0	5	0
,, Robinson, Ralph	0	5	0
,, Taylor, Edward	0	5	0
,, Whitehead, John	0	5	0
Rochester, Harris, Henry W.	0	10	6
Romford, Pertwee, Edward	0	10	6
Rothesay, Duncan, William	0	5	0
,, Macintosh, Archibald	0	5	0
Royston, Matthews, Ernest	0	10	6
Rhyl, Jones, Ellis P.	0	10	6
St. Alban's, Martin, Henry G.	0	10	6
,, Roberts, Albinus	1	1	0
St. Day, Corfield, Thomas J. T.	0	10	6
Salford, Peatson, Henry R.	0	5	0
Salisbury, Madge, James C.	0	10	6
Saltash, Matthew, William H.	0	4	0
Saltburn-by-the-Sea, Taylor, William	0	5	0
Scarborough, Fryer, Charles	0	10	6
Shaftesbury, Powell, John	0	5	0
Sheffield, Clayton, William	0	10	6
,, Crawshaw, Henry	1	1	0
,, Cubley, George A.	0	10	6
,, Ellinor, George	0	10	6
,, Hudson, Fretwell	0	10	6
,, Jennings, John E. H.	0	10	6
,, Maleham, Henry	0	10	6
,, Priestley, Henry	0	10	6
,, Radley, William V.	0	10	6
,, Wilson, Edward	0	10	6
Sittingbourne, Rook, Edward	0	10	6
Slough, Griffiths, Richard	0	10	6
Southsea, Rastrick and Son	0	10	6
Spalding, Asling, Brelsford	0	5	0
,, Swift, Francis	0	10	6
Spilsby, Rainey, Edward	0	10	6
Stafford, Averill, John	1	1	0
,, Averill, Henry Allcock	1	1	0
Stone, Slater, Thomas	0	10	6

	£	s.	d.
Stowmarket, Sutton, Charles W.	0	5	0
Stratton St. Mary, Cooper, Frederick T....	0	5	0
Strood, Picnot, Charles	1	1	0
Sutton Coldfield, Smith, William	0	10	6
Taunton, Grose, Nicholas M.	0	10	6
Tipton, Briggs, James ...	0	5	0
Torquay, Bridgman, William L....	0	5	0
Trowbridge, Dyer, Henry	0	10	0
Uttoxeter, Johnson, J. B.	0	10	6
Wakefield, Chaplin, John L...	0	10	6
,, Duffin, Thomas ...	0	10	6
,, Taylor, John	0	10	6
Ware, Medcalf, Benjamin	0	10	6
,, Medcalf, Benjamin P.	0	10	6
Waterloo, Pheysey, Richard	1	1	0
Weaverham, Manifold, John J....	0	10	6
Whitby, Stevenson, John	0	10	6
Worcester, George and Welch	1	1	0
,, Witherington, Thomas	1	1	0
Yeadon, Blatchley, Thomas...	0	5	0

Provincial Transactions.

BRISTOL PHARMACEUTICAL ASSOCIATION.

The Seventh General Meeting of the session was held at the Museum and Library, Bristol, on Friday, April 4th.

The President, Mr. Townsend, occupied the chair, and briefly introduced Mr. Carteighe, of London, who delivered a lecture, of which the following is an abstract:—

On the Diffusion and Occlusion of Gases.

BY MICHAEL CARTEIGHE, F.C.S.

Dalton's experiments on the diffusion of gases, published in 1801 and 1803, were explained and referred to by way of introduction to Graham's more exhaustive researches on the subject.

The experiments of the latter physicist and chemist on free diffusion, diffusion through porous septa, *e. g.* plaster, graphite, etc., were shown, and the methods demonstrated by which the velocity of diffusion and diffusion volumes of the more important gases were determined.

The now well-known law, viz. that the volume of a gas diffused in a given time is in an inverse ratio to the square root of its specific gravity, *i. e.* the lighter the gas the greater its diffusibility, was explained, and the experimental data upon which it is founded exhibited by diagrams. The lecturer then defined atmolysis or air analysis, and showed the experiment by means of which the volume of oxygen in atmospheric air can be increased from 21 to 25 per cent. by the passage of a slow current of air through a series of tobacco pipe stems, owing to the superior diffusibility of the nitrogen. Similarly the more diffusible hydrogen of electrolytic gas can be in great part separated from the less diffusible oxygen.

The nature of diffusion and its bearing upon the constitution of matter were explained in the following terms:—

The pores of artificial graphite appear to be so minute, that a gas in mass cannot penetrate the plate at all. Molecules only can pass; and they may be supposed to pass wholly unimpeded by friction, for the smallest pores that can be imagined to exist in the graphite must be tunnels in magnitude to the ultimate atoms of a gaseous body. The sole motive agency appears to be that *intestine* movement of molecules which is now generally recognized as an essential property of the gaseous condition of matter.

According to the physical hypothesis now generally received, a gas is represented as consisting of solid and perfectly elastic spherical particles or atoms, which move in all directions and are animated with different degrees of velocity in different gases. Confined in a vessel, the moving particles are constantly impinging against its sides and occasionally against each other, and this contact takes place without any loss of motion, owing to the perfect elasticity of the particles. If the containing vessel be porous, like a diffusiometer, then gas is projected through the open channels by the atomic motion already described and escapes. Simultaneously the external air is carried inwards in the same manner, and takes the place of the gas which leaves the vessel. To this atomic or molecular movement is due the elastic force with the power to resist compression possessed by gases. The molecular movement is accelerated by heat and retarded by cold, the tension of the gas being increased in the first instance and diminished in the second. Even when the same gas is present both within and without the vessel, or in contact with both sides of our porous plate, the movement is sustained without abatement,—molecules continuing to enter and leave the vessel in equal number, although nothing of the kind is indicated by change of volume or otherwise. If the gas in communication be different, but possess sensibly the same specific gravity and molecular velocity, as nitrogen and carbonic oxide do, an interchange of molecules also takes place without any change in volume. With gases opposed of unequal density and molecular velocity, the permeation ceases to be equal in both directions.

The movement of gases through the graphite plate appears to be solely due to their own proper molecular motion, quite unaided by transpiration. It seems to be the simplest possible exhibition of the molecular or diffusive movement. This pure result is to be ascribed to the wonderfully fine porosity of the graphite. The interstitial spaces appear to be sufficiently small to extinguish capillary transpiration entirely. *The graphite plate is a pneumatic sieve, which stops all gaseous matter in* MASS, *and permits* MOLECULES *only to pass.*

The permeation through the graphite plate into a vacuum, and the diffusion into a gaseous atmosphere, through the same plate, are due to the same inherent mobility of the gaseous molecule. They are the exhibition of this movement in different circumstances. In interdiffusion we have two gases moving simultaneously through the passages in opposite directions, each gas under the influence of its own inherent force; while with gas on one side of the plate, and a vacuum on the other side, we have a single gas moving in one direction only. The latter case may be assimilated to the former if the vacuum be supposed to represent an infinitely light gas.

We may speak of both movements as gaseous diffusion; the diffusion of gas into gas (double diffusion) in the one case, and the diffusion of gas into a vacuum (single diffusion) in the other. The inherent molecular mobility may also be justly spoken of as the diffusibility or diffusive force.

The diffusive mobility of the gaseous molecule is a property of matter fundamental in its nature, and the source of many others. The rate of diffusibility of any gas has been shown to be regulated by its specific gravity, the velocity of diffusion varying inversely as the square root of the density of the gas. This is true, but not in the sense of the diffusibility being determined or caused by specific gravity. The physical basis is the molecular mobility. The degree of motion which the molecule possesses regulates the volume which the gas assumes, and is obviously one, if not the only, determining cause of the peculiar specific gravity which the gas enjoys. If it were possible to increase in a permanent manner the molecular motion of a gas, its specific gravity would be altered, and it would become a lighter gas.

It is conceivable that the various kinds of matter, now recognized as different elementary substances, may possess one and the same ultimate or atomic molecule existing in different conditions of movement. The essential unity of matter is an hypothesis in harmony with the equal action of gravity upon all bodies. We know the anxiety with which the point was investigated by Newton, and the care he took to ascertain that every kind of substance—metals, stones, woods, grain, salts, animal substances, etc., are similarly accelerated in falling, and are therefore equally heavy.

In the condition of gas, matter is deprived of numerous and varying properties with which it appears invested when in the form of a liquid or solid. The gas exhibits only a few grand and simple features. These, again, may all be dependent upon atomic or molecular mobility.

If we imagine one kind of substance only to exist—ponderable matter—and further, that matter is divisible into ultimate atoms uniform in size and weight, we then shall have one substance and a common atom. With the atom at rest, the uniformity of matter would be perfect, but the atom possesses more or less motion, due, it must be assumed, to a primordial impulse. This motion gives rise to volume. The more rapid the movement the greater the space occupied by the atom, somewhat as the orbit of the planet widens with the degree of projectile velocity. Matter is thus made to differ only in being lighter or denser matter. The specific motion of an atom being inalienable, light matter is no longer convertible into heavy matter. In short, matter of different density forms different substances—different inconvertible elements, as they have been considered.

Moreover, these more or less mobile, or light and heavy forms of matter, have a singular relation connected with equality of volume. Equal volumes of two of them can coalesce together, unite their movement, and form a new atomic group, retaining the whole, the half, or some simple proportion of the original movement and consequent volume. This is chemical combination. It is directly an affair of volume, and only indirectly connected with weight. Combining weights are different, because the densities, atomic and molecular, are different. The volume of combination is uniform, but the fluids measured vary in density. This fixed combining measure weighs 1 for hydrogen, 16 for oxygen, and so on with the other elements.

This hypothesis admits of another expression. As in light we have the alternative theories of emission and undulation, so in molecular mobility the motion may be assumed to reside either in separate atoms and molecules or in a fluid medium caused to undulate. A special rate of vibration or pulsation originally imparted to the portion of the fluid medium enlivens that portion of matter with an individual existence, and constitutes a distinct substance or element.

Again, molecular or diffusive mobility has an obvious bearing upon the communication of heat to gases by contact with liquid or solid surfaces. The impact of the gaseous molecule upon a surface possessing a different temperature appears to be the condition for the transference of heat, or the heat movement, from one to the other. The more rapid the molecular movement of the gas, the more frequent the contact, with consequent communication of heat. Hence, probably, the great cooling power of hydrogen gas as compared with air or oxygen. The gases named have the same specific heat for equal volumes; but a hot object placed in hydrogen is really touched 3·8 times more frequently than it would be if placed in air, and 4 times more frequently than it would be if placed in an atmosphere of oxygen. Dalton, many years ago, ascribed this peculiarity of hydrogen to the high "mobility" of that gas.

The passage of gases through colloid septa was next considered, and the rates of passage of certain gases through india-rubber compared with those of ordinary diffusion. These are shown in the following table:—

	Rates of Passage through India-rubber.	Diffusion Velocities.
Nitrogen	1·00	1·01
Marsh gas	2·15	1·34
Oxygen	2·55	·95
Hydrogen	5·5	3·80
Carbonic acid gas	13·58	·81

Gases may be partially separated from one another by passing through india-rubber just as, by passing through a porous plate and the stems of tobacco pipes, a partial analysis of mixed gases can be effected.

Oxygen passing through india-rubber two-and-a-half times more rapidly than nitrogen, it was demonstrated that by passing air through an india-rubber bag into the vacuum of a Sprengel exhauster, such air contained two-and-a-half times more oxygen than was originally contained in it.

The gases which pass most freely through india-rubber being those most freely absorbed by it, the process was defined as being due to—

1. The solution of the gas in the rubber.
2. The diffusion of the gas as a *liquid* through the thickness of the rubber.
3. The evaporation of the liquefied gas from the internal surface of the rubber.
4. The diffusion of the evaporated gas into the internal space.

There exist, therefore, three modes of gas transmission through a solid or semi-solid septum:—

1st. By a sufficient degree of pressure gases may be forced bodily, *i.e.* in masses, through the minute channels of a porous septum, or, in other words, may pass through such a septum by transpiration, of course, in the direction only of the preponderating total pressure.

2nd. As the channels of a porous septum become more and more minute, their resistance to the bodily transmission of gas becomes greater and greater, and the quantity of the gas forced through them less and less, until at last the septum is absolutely impermeable to transpiration under the particular pressure. But such a septum of which the individual capillary channels are so small as to offer a frictional resistance to the passage of gas greater than the available pressure can overcome, nevertheless, presents a considerable aggregate of interspaces through which the diffusion proper of gases, consequent on their innate molecular mobility, can take place freely in both directions.

3rd. A septum may be quite free from pores of any kind or degree of minuteness, and so far be absolutely impermeable to the transmission of gas in the form of gas. But it may, nevertheless, permit a considerable transmission of certain gases by reason of their prior solution or liquefaction in the substance of the septum. And while the mere passage of gas by transpiration or diffusion through a porous septum would take place in thorough independence of the nature of the material of the septum, in this last considered action, the transmission would take place by virtue of a sort of chemical affinity between the gas and the material of the septum. The selective absorption of the gas by the septum being a necessary antecedent of its transmission, it may be said that the gas is transmitted *because* it is first absorbed. Of course, in certain transmissions, two, or all three modes of action may come into play simultaneously.

The lecturer then explained the permeation of ignited platinum and iron to hydrogen and other gases, and the special property possessed by the former metal and palladium of allowing the hydrogen of coal gas to pass through them, while the marsh gas and other constituents were left behind. Graham's most interesting discovery that metals readily absorb those gases which they freely transmit, led to the consideration of the occlusion of gases.

Occlusion of Gases by Palladium and other Metals.

The absorption of hydrogen by ignited platinum, of oxygen by ignited silver, and of carbonic oxide and hydrogen by iron were referred to, and the evolution of these gases by again heating the respective metals in a vacuum was shown by means of a Sprengel pump. The evolution of five times its volume of hydrogen by meteoric iron, from the Lenarto fall, when heated in vacuo, seems to prove the highly condensed nature of the atmosphere in which this gas was absorbed. The spectroscope has shown that hydrogen is one of the constituents of the atmosphere of the sun and other heavenly bodies, and it is an interesting fact that we are able to extract the hydrogen from meteoric iron by heating in the vacuum of a Sprengel exhauster.

The lecturer then referred to the enormous amount of hydrogen absorbed by palladium, amounting in some cases to 980 times its volume, and mentioned the following three principal methods by which that metal can be charged with and freed from hydrogen:—1, by being heated and cooled in an atmosphere of the gas; 2, by being placed in contact with zinc dissolving in acid, *i. e.* with hydrogen in the act of evolution; 3, by being made the negative electrode of a battery. Correlatively, the charged metal can be freed from its occluded hydrogen: 1, by heating it in air or vacuo; 2, by acting on it with different feebly oxidizing mixtures; 3, by making it the positive electrode of a battery.

A piece of palladium wire was made the negative electrode of a battery for a minute or two; it was then dried and heated in a glass tube connected with a Sprengel exhauster. Gas was rapidly evolved, collected in the receiver, and shown to be pure hydrogen.

The lecturer also showed the ingenious experiment devised by Mr. Chandler Roberts, in which two slips of palladium foil, varnished on one side, are made to curl and uncurl as they become alternately the negative and positive electrodes of a battery, or are alternately charged with and discharged of hydrogen on the unvarnished surfaces.

It was explained that the curling and uncurling were due to the alternate expansion and contraction of the foil by its occlusion and evolution of the hydrogen, produced by the electrolysis of the water.

The lecturer concluded by referring to the nature of occluded hydrogen. That hydrogen is the vapour of a highly volatile metal has frequently been maintained on chemical grounds; and from a consideration of the physical properties of hydrogenized palladium Graham was led to regard it as a true alloy of palladium with hydrogen, or rather hydrogenium, in which the volatility of the latter metal was restrained by the fixity of the former, and of which the metallic aspect was equally due to both its constituents.

Although the occlusion of upwards of 900 times its volume of hydrogen was found to lower appreciably the tenacity and elective conductivity of palladium, still the hydrogenized palladium remained possessed of a most characteristically metallic tenacity and conductivity. In further support of this conclusion as to the metallic condition of the hydrogen occluded in palladium, may be mentioned Graham's singular discovery of its being possessed of magnetic properties, more decided than those of palladium itself, a metal which Faraday proved to be "feebly but truly magnetic." Operating with an electro-magnet of moderate strength, Graham found that while an oblong fragment of electrolytically deposited palladium was deflected from the equatorial by 10 degrees only, the same fragment of metal, charged with only 600 times its volume of hydrogen, was deflected through 48 degrees. Thus did Graham supplement the idea of hydrogen as an invisible incondensable gas by the idea of hydrogen as an opaque, lustrous, white metal, having a specific gravity between 0·7 and 0·8, a well-marked tenacity and conductivity, and a very decided magnetism.

NORWICH CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of the above Association was held at the Society's Rooms, on Friday, the 25th inst., Mr. Henry Thompson in the chair.

In opening the meeting, the Chairman said, although it was with great reluctance that he had undertaken the office of chairman, he could not but feel great pleasure in being called upon to fulfil such a pleasant task as that which had called them together on the present occasion. His own experience now extended over a considerable period of time. He was one of the oldest members of the trade in Norwich, and he had seen some of the body rise to eminent positions. He hoped that amongst the students to whom he should have the pleasure of presenting prizes, there would be some who would rise to even higher degrees of eminence than those he had then in his mind. The Secretary then read the report, stating that during the past session 53 meetings of classes had been held, namely, in Botany, 6; Chemistry, 33; Materia Medica, 7; Pharmacy, 7. Although the attendance had been small (only averaging eight throughout), a great deal of attention had been shown and considerable progress made. In consequence of this attention and regularity, the Council had decided to purchase four prizes with the funds so liberally placed at their disposal for this purpose by J. D. Smith, Esq., instead of three, as originally announced, and had awarded them as follows:—To Mr. De Carle and Mr. Woolnough (equal), Attfield's 'Chemistry.' Mr. Bayfield and Mr. King (equal), to the former, Barber's 'Companion to Pharmacopœia,' and to the latter, Wanklyn's 'Water Analysis.' Taking the report given by Professor Attfield on the results of the examinations as a criterion, the members had every reason to be satisfied with the teaching which had been kindly given by Messrs. Nuthall, Caley, Corder, Butler, and Mason.

The *vivâ voce* Examination in Botany, Chemistry, Materia Medica, Pharmacy, and Prescriptions, undertaken respectively by Messrs. Nuthall, Mason, Corder, Hill, and Fox, only brought four competitors into the field, and the result was—First prize, Mr. King, Miller's 'Chemical Physics.' Second prize (two), Mr. Tooke, Hofmann's 'Modern Chemistry,' and Fergusson's 'Electricity,' and Mr. Woolnough, Lindley's 'School Botany.' The examiners appeared to have been particularly well satisfied with the proficiency shown in Prescriptions, Chemistry, and Botany.

The prize (Valentin's 'Chemistry') offered by the Vice-President (Mr. E. Nuthall) for competition between the students of his own class, was contested for by seven candidates, and fell to Mr. Woolnough, with a total of 86 out of 100 marks. In deciding between the merits of the respective candidates, Professor Attfield took occasion to speak of the work done in a way satisfactory to the Society, and still more so to Mr. Nuthall, who had taken such pains to bring about this result. Professor Attfield said, "Permit me to add that these questions and answers give evidence of thoroughness of teaching. The progress that has been made is at least sound and lasting. In these days when mere 'preparation' for the examinations established by law is nowhere so unblushingly rampant as in British pharmacy, it is refreshing to an educator to meet with such illustrations of good training as those you have placed before me."

The Secretary then said that three students had passed the Minor examination during the past session, one of whom (Mr. Tooke) took the honourable position of first with honours, thereby gaining the prize of books given by T. Hyde Hills, Esq.

The Chairman then distributed the prizes to the successful candidates, at the same time making very encouraging and appropriate remarks. Before the meeting concluded, he (the chairman) wished to say a few words with respect to the small attendance mentioned in the report, which had unfortunately been the burden of their complaint since the starting of the Association. He had been at some pains to find out the cause of this inattention, with a view of learning if there was any other reason for it than the reluctance of many of the youths to submit themselves to a regular course of study, and he was bound to say that complaints had reached him that the courses of the classes were not such as appeared to promise good results. He had thought at the time that such complaints had arisen from the carelessness or ignorance of those who made the complaint, and such opinion was now thoroughly confirmed by the evidences of good teaching that they had before them that night. After alluding to the great advantages for study now provided by that and similar associations, he promised all the support he could render, both in person and purse, and concluded by inviting both the successful and unsuccessful candidates to sup with him on Tuesday, the 29th inst.

The meeting closed with a cordial vote of thanks to the examiners, and to Mr. Thompson for his able conduct in the chair. There was but a limited attendance.

HALIFAX CHEMISTS AND DRUGGISTS' ASSOCIATION.

The last meeting of the season was held on Thursday April 24, 1873; Mr. Jessop, President, in the chair After the minutes of the last meeting had been passed and a holiday on Whit Tuesday decided upon, Mr. B. Shaw moved the following motion, viz.:—"That it is desirable to form a Library of Medical and Dispensing Works suitable for reference out of the surplus funds of the Association." He stated that he happened to be in the same predicament as the Chancellor of the Exchequer was, with a surplus and the problem how best to dispose of it. The motion he proposed, he thought would be one good method of meeting the difficulty. He did not know the experience of others in the trade, but he himself found obscure points arose in dispensing which required clearing up. He had been occasionally applied to in difficulties of this kind, and while he was at all times willing to render any assistance in his power, as no doubt others in the trade were, he thought it would be more reliable to have a selection of works bearing upon dispensing to refer to. It need not be large by way of commencement, some one or two dozen volumes, and he would suggest the following half dozen as suitable, viz. 'Selecta è Prescriptis,' Beasley's 'Formulary of Medicines,' Squire's 'Companion to the British Pharmacopœia,' Attfield's 'Chemistry,' Squire's 'Hospital Pharmacopœias,' and the 'Throat Hospital Pharmacopœia.' The following more comprehensive works might afterwards be added, viz. Gray's 'Supplement,' Parrish's 'Pharmacy,' Hoblyn's 'Dictionary of Medical Terms,' Bentley and Redwood's 'Abridgment of Pereira's Materia Medica,' and Taylor's 'Jurisprudence.' He suggested also a printed "Chart of Antidotes to Poisons" for the use of the members, to be suspended in a conspicuous place in the shop for easy reference.

Mr. Hebden seconded the motion, which was carried unanimously.

Mr. J. B. Brierley moved that the following be appointed a sub-committee to select the books, appoint a librarian, draw up rules for the town and country members, and report to the next meeting, viz.—Messrs. Jessop, Brook, Hebden, Dyer, and Shaw.

This was seconded by Mr. Blade and carried.

The President then drew the attention of the meeting to the great advance made by the railway companies on the carriage of drugs, etc., and suggested a sub-committee be appointed to take such steps as may be deemed advisable to lay before the directors their strong objections to the high rates now charged. He had been informed on good authority, that if they took the subject up firmly they might probably get a reduction of half the recent advance. Mr. Hebden moved, and Mr. Brierley seconded that Messrs. Jessop, Dyer, and Farr be appointed to undertake the duty.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION AND SCHOOL OF PHARMACY.

A meeting of the Council of this Association was held in the rooms, 37, Blackfriars Street, on Tuesday evening, April 22nd, for the purpose of presenting the prizes in the various classes. The President, Mr. W. S. Brown, occupied the chair, and there was a good attendance of students.

The Chairman in opening the proceedings called on Mr. Siebold to read his report.

Manchester School of Pharmacy Report for the Session 1872—1873.

To the President and Council of the Manchester Chemists and Druggists' Association.

Gentlemen,—The first session of the Manchester School of Pharmacy commenced on October 8th, 1872, and terminated on April 16th, 1873. Three courses of lectures were delivered, viz., 25 lectures on Pharmaceutical Chemistry, on Tuesdays from 8 to 9 P.M.; 25 lectures on Materia Medica and Practical Pharmacy, on Fridays from 8 to 9 P.M.; and 15 lectures on Botany, on Fridays from 9 to 10 P.M. The number of students were 36 for the chemistry course, 31 for Materia Medica, and 29 for Botany, amounting to a total of 96 entries. Of the 44 students who availed themselves of the instruction provided, 23 attended all the three courses, 6 attended two, and 15 one course only. The attendance was very good and regular, the average number of absentees not exceeding four of whom two were prevented by uncontrollable circumstances from attending during the greater part of the session. The chemical lectures were illustrated by experiments as far as the present limited accommodation permitted, and it appears to me highly desirable that the necessary provision should be made for more extensive experimental teaching in future.

Questions and problems were regularly given to be worked out at home, and the answers supplied enable me to state that about 50 per cent. of the students have derived a real and lasting benefit from the lectures, whilst the remainder have failed to do so, partially owing to their own indifference and carelessness, and partially on account of their great want of rudimentary education. Of about one-third of all the students, I can fairly say, that they have given me the very greatest satisfaction. Most of our students never attended a course of scientific instruction before, and but few of them can boast of a sufficient amount of thoroughly sound school-training, which is so very important in the study of science. Taking these circumstances into consideration we may look upon the first session of our young school of pharmacy as a gratifying and encouraging success. In point of numbers our success has been very great indeed, and has proved that in a large provincial town like Manchester, a school of pharmacy can exist and flourish without any extraneous support whatever. When you did me the honour of appointing me as lecturer on Chemistry, Materia Medica, and Botany, and of thus placing into my hands the entire management of this school, I entered upon my duties with a sense of great responsibility, yet very cheerfully, and with a full anticipation of success. I had not forgotten the failure that attended our previous efforts to found a school of pharmacy in connection with Owens College; but teachers as a rule overrate the preliminary knowledge of our assistants, and their lectures are consequently not properly understood and appreciated. Being strangers to pharmacy, their teaching does not prove of sufficient practical value and applicability to the young pharmacist, or to the student preparing for the Major or Minor examination. So far Chemistry has generally been taught to pharmaceutical students in the provinces by scientific chemists possessing little or no knowledge of pharmacy, whilst the teaching of Materia Medica has generally been entrusted to medical men who have lectured on Pharmacology rather than on Pharmacognostics, just as if their pupils were students of medicine instead of students of pharmacy. Can it be a matter of surprise then that even in the largest provincial towns the efforts to establish schools of pharmacy have ended in failure. I do not hesitate to assert that the success of our newly-established school in Manchester is mainly, if not entirely, due to the fact that a practical pharmacist has filled the post of lecturer, and that this conviction is shared by the students whom I have had the pleasure of instructing. I will now resume my report, from which I deviated in favour of a subject which I believe merits serious consideration and a full discussion.

On Wednesday, March 19th, and on the following Wednesday, competitive examinations were held in chemistry, materia medica, and botany. The questions submitted are annexed to this report. Fourteen candidates competed for the chemistry prizes, fifteen for the materia medica, and twelve for the botany prizes. The awards were as follows:—

Chemistry.

1st prize to Mr. Arthur Joseph Pidd.
Equal. { 2nd „ to Mr. Frank Hudson.
2nd „ to Mr. Blacklock.

Materia Medica.

1st prize to Mr. John Blacklock.
2nd „ to Mr. Edward Gardner.

Botany.

1st prize to Mr. J. J. Macauley.
2nd „ to Mr. S. Challiner.

The answers supplied by nearly all the competitors were highly creditable, and bear testimony to the zeal and industry of their authors.

I trust that our future educational efforts will be crowned with ever-increasing success, and that our young school will ere long grow into an important and permanent centre of pharmaceutical education.

Chemistry Questions.

1. What is the difference between sulphates, sulphites, and sulphides?
2. If a mixture of six volumes of oxygen and four volumes of hydrogen be ignited by an electric spark, what will be the composition of the resulting gas?
3. How is acidum sulphuricum tested for impurities?
4. Write the notation for phosphate of sodium and pyrophosphate of sodium, and state how they can be distinguished by testing.
5. How much sulphate of magnesium, $MgSO_4 7H_2O$, will be required to make sixteen ounces of magnesiæ carbonas, B.P. $(MgCO_3)_3MgO, 5H_2O$. $Mg = 24$; $S = 32$; $C = 12$.
6. Give a full explanation of the process for making iodide of potassium, and state how it may be tested for impurities and adulterations.
7. How can potassæ citras be distinguished from potassæ tartras?
8. The specific gravity of acidum hydrochloricum, B.P., is 1·16. How much water will be required to reduce an acid of 1·19 sp. gr. to the Pharmacopœia strength?
9. Explain by an equation the mode of making ammoniæ carbonas.

Materia Medica.

1. How is scammony tested for impurities and adulterations?
2. State how the presence of opium may be recognized in a mixture?
3. How can true Vera Cruz jalap be distinguished from Tampico jalap?
4. How are the leaves of *Cynanchum argel* distinguished from senna?
5. How would you test powdered rhubarb for turmeric?
6. Name the plants from which the following drugs are obtained, and also their natural orders and habitats:—Althææ Radix, Hemidesmi Radix, Digitalis Folia, Uvæ Ursi Folia, Guaiacum.
7. Essential oils are often adulterated with spirits of wine; how would you detect that adulteration?

Botany.

1. Name and define the different kinds of underground stems.
2. State all the distinguishing features of exogenous and endogenous plants.
3. What is a perianth?
4. Give definitions of the terms raceme, corymb, and umbel.
5. What are hypogynous, tetradynamous, and monadelphous stamens?
6. Give a brief description of the leaves of *Atropa belladonna*.

The President then presented the prizes (consisting of standard works on chemistry, materia medica, and botany) to the successful competitors. He said it was highly gratifying to the Manchester Chemists and Druggists' Association to receive such a Report from Mr. Siebold. He need not say the establishment of these courses of lectures had received the most anxious deliberation of the Council. A previous attempt had ended in failure, mainly, he believed, for the reasons stated by Mr. Siebold, that the lectures given were not adapted to the requirements of the classes. The Association had been singularly fortunate in securing the services of a gentleman so able and at the same time so willing to undertake the duties of lecturer. Mr. Siebold had made a very great sacrifice of time, and, he believed, also a pecuniary sacrifice, as in all probability the private teaching of pharmaceutical students might have been more remunerative to him than his present office. He, the Chairman, believed that to Mr. Siebold was due the fact that the Manchester School of Pharmacy occupied a position this session unsurpassed throughout the provinces. The success of the classes was a subject of which the Association may be proud. He hoped that at no distant day they might be in a position to provide a complete course of laboratory instruction. This depended entirely on the more general cooperation of the chemists of the district. If the funds were provided, members might rely on their being spent in the promotion of that which he was not ashamed now to speak of as The Manchester School of Pharmacy.

Mr. J. T. Slugg said he would congratulate the losers as well as the winners of the prizes. The knowledge which all had an opportunity of gaining, and which, as Mr. Siebold had said, so many of the students before him *had* gained, was itself a prize. He would also congratulate Mr. Siebold on having so entirely gained the respect and confidence of his class; with these he was in a position to secure the progress of his pupils. He contrasted the advantages now offered to pharmaceutical students with those available when he was an apprentice forty years ago, and urged young men to seize these opportunities. He believed it was Lord Brougham who said, if he were only a shoeblack he would try and be the best shoeblack in the parish. Let every one feel that though he be only a druggist, he will try and be the best druggist in the country.

Mr. Siebold then briefly thanked the speakers for their kind and complimentary remarks, and the meeting terminated.

HULL CHEMISTS' ASSOCIATION.

At the last meeting of this Association, held at the Cross Keys Hotel, the President, Mr. Anthony Smith, in the chair, the question of the botanical class for the ensuing session was considered, and it was arranged that the President, Vice-President, and Secretary wait upon Mr. Niven, the curator of the Botanic Gardens, and make the necessary arrangements. The decision arrived at by the committee and Mr. Niven was that the class should commence on Wednesday, May 7th, at 7 A.M., and continue weekly for twenty weeks, the fee for which will be 10*s.* 6*d.* The annual examinations in connection with the chemistry and materia medica classes have been conducted by Mr. H. J. Parson, M.P.S., during the last week, and the competition for prizes resulted as follows:—Senior chemistry, Mr. D. P. Roberts; junior chemistry, Mr. J. T. Morley; senior materia medica, Mr. D. P. Roberts; junior materia medica, Mr. H. T. G. Wood.

LEEDS CHEMISTS' ASSOCIATION.

The sixth meeting of the present session was held in the Library, Church Institute, on Wednesday, March 19th, 1873, Mr. R. Reynolds in the chair.

The Chairman placed upon the table 'Pharmacopœia Germanica,' and 'Transactions of the American Pharmaceutical Association.' It was announced that the "Year-Book of Pharmacy' had been received as a donation to the library, and resolved that the thanks of the society be given to the Committee of the British Pharmaceutical Conference for the same.

Mr. E. Brown gave a brief review of the published 'Proceedings' of the American Pharmaceutical Association, remarking that the office of President of the Association was not without its toils as well as its honours, as this voluminous work testified, it becoming the province of the President to compile the transactions. The book is well and clearly printed, and is large for circulation to the members of an Association, numbering little over nine hundred. The Association seems to be very methodic in its operations, committees and sub-committees being appointed to each branch of its affairs; politico-pharmacy, commercial-pharmacy, scientific-pharmacy, and executive or shop-pharmacy, have each their organizations. Each state and city contributing to the association has or is its microcosm of the whole Union, in fact many pages of the 'Proceedings' are but official reports of the routine of arrangements, and that to an extent we were not prepared to expect in our Transatlantic brethren; but when we come to the actual reports of meetings, it is manifest that however much system pervades the conduct of the American Pharmaceutical Association, there is all the energy and freedom of a vitalized body in their transactions. The long distances between the several centres of operation, and the keen distinctions perceptible to the American mind, are quite adequate to solve what appears like so much red tape; but which, however cumbrous it may seem, bears useful fruit for the well-being of the constituency that organized it.

The 'Proceedings' report some instances of careful and scientific research, but are much more largely comprised of the results of practical observations and testings in regard to articles of every day use in the drug store and at the dispensing counter. The Americans suffer more even than we do from chronic inventopathy. "Something new" has charms with them more potent far than "established" remedies have with us, so that on their shelves there is a perpetual Sir Roger de Coverley in process,—the last but one of recent concoctions is already on the trams to the oblivious region of dead stock, having been displaced by the very last feat of ingenious admixture.

The class of articles that takes the first place in this panorama-medicamenta is elixirs, preparations of the cordial kind, sweet, spirituous, aromatic, and medicated, contrived so as to gratify the palate rather than to benefit the patient. The proprietors of these compounds introduce them to medical men, who, prescribing them, so induce a demand on the pharmacist and hence on the proprietor.

Much inconvenience arises from this oft introduction of new remedies, and the dispenser has not unfrequently to tax his ingenuity to devise a substitute for an article as foreign to his stock as might be the potions and perfumes indulged in by the Grecian gods. There is a species of honesty, however, in this practice of substitution that merits commendation. The dispenser in such a case sends to the prescriber, acquainting him he is minus the article prescribed, and asks what is to be used in its place, or if the doctor is out of reach, he makes the best guess he can, and afterwards informs the doctor of the deed. Necessity, it has been said, has no law; in these instances it may be said the rather to become law. The circumstances of the American pharmacist are in these affairs in many respects so unlike our own that we must not hastily condemn. To us, nevertheless, these practices carry a moral, on which each one may ruminate as experience suggests.

Not inaptly following observations on new remedies, we have reports on the drug market, and here is named as a "drug," *proprio nomine*, condurango, that so recently was the golden balm, now lying in discarded parcels begging a customer.

Professor Parrish's remarks on pharmaceutical education are well worthy our regard. They bear on the value of a sound general education prior to technical instruction, and urge that, where practicable, an advanced education before entry on the duties of the drug store and laboratory will, in the long run, place its possessor at a great advantage, even where he runs to or through the last of his teens before he manipulates with the mortar or the retort. There is here support for not lowering the standard of our Preliminary examinations. At the same time, Professor Parrish was as well aware as any one in this country, of the difficulties in the way of what he saw to be so desirable, and because he saw these practical difficulties, he asserted that the advantages of a classic education in the drug trade can be had only by a favoured few.

In the report of the committee on adulterations, our American friends make no suppression of names of the firms whence the examined articles are had,—a course we should not be ready to commend, one that, while it savours of open fairness, may be equally the cloak for much that is contrary to what is fair and open. In a very comprehensive report on seidlitz powders, it becomes manifest that these powders are for the most part *measured* in America, and consequently that they differ much in weight. Their composition, however, proved more uniform than might be expected, collected as they were from so many sources.

Turning from American to British pharmacy, Mr. Brown commented on the getting up and merits of the 'British Year-Book of Pharmacy,' remarking that brief marginal notes or headings in some departments would add to its value as a book of reference. The book does not take the same position as the American 'Proceedings,' is not a report only of an association, so it must not be compared with it on like grounds; yet as a means of information, the 'Year-Book' is far the more comprehensive. He then directed special attention to articles in the 'Year-Book' on German opium, placing on the table a sample of English opium, produced in Kent; also to articles on gum arabic, pepsine, tannin and glycerine, glyceroles of vegetable extracts, etc., commending the book to those present. In the course of his remarks, Mr. Brown referred to Messrs. Harvey and Reynolds' manual, entitled 'Notes on New Remedies,' which, he said, was quite abreast of the times in the matters treated of. He then gave a formula for the preparation of tinct. aurant. recent., a sample of which he also exhibited, adding some observations on the desirability of there being other dilutions of spirit than *proof spirit* for pharmaceutical use. Mr. Brown also drew attention to the utility of the tragacanth and glycerine mucilage, recently noticed in the PHARMACEUTICAL JOURNAL, and placed on the table samples of the mucilage and of several emulsions formed by its admixture with cod liver oil, castor oil, almond oil, etc.

An interesting discussion followed, in which Messrs. Reynolds, Teesdale, and others present took part, and on the motion of Mr. Reynolds, seconded by Mr. Yewdall, the best thanks of the meeting were given to Mr. Brown.

The seventh meeting was held in the Library, Church Institute, April 10th, 1873. The President, Mr. E. Brown, in the chair. The minutes of former meeting having been read and confirmed, Mr. Elfendale, hon. sec., read a short paper upon "Our Society." In the discussion which followed the reading of this paper, the President, Mr. Abbott, and Mr. S. Taylor repressed their opinions upon the questions introduced, and on the motion of Mr. Abbott, seconded by Mr. E. S. Payne, Associate, the thanks of the meeting were given to the author. This was the last meeting of the present session.

SUNDERLAND CHEMISTS' ASSOCIATION.

The annual meeting of the above Society was held on Wednesday, April 23rd, at the Palatine Hotel.

The report of the Council was read by the Secretary, and the balance-sheet by the Treasurer, showing a small balance in favour of the Society. The following officers were elected for the ensuing year—President, Alderman Thompson; Secretary, J. J. Nicholson; Treasurer, R. Robinson. Council—Messrs. J. Harrison, D. B. Sharp, H. Thompson, T. Nasbet, C. S. Lord, J. Mitchinson, H. Turnbull, T. Burn, J. Priestly, W. Sayer.

After the conclusion of business the members adjourned to a supper, provided in the Palatine Hotel.

Parliamentary and Law Proceedings.

The "Chlorodyne" Dispute.—Browne v. Freeman.

(*Before the Lord Chancellor for the Master of the Rolls.* —April 28, 1873.)

This was a bill filled by Dr. Collis Browne for an injunction to restrain the defendant, a chemist in the Kennington-road, from issuing certain advertisements and publishing certain testimonials in support of his assertion that his, and not Dr. Collis Browne's, is the original and only genuine chlorodyne. It was the third suit between the parties. The plaintiff began to supply the public with chlorodyne in 1855, having invented it, as he stated, in 1846, and used it with success in his practice in the East. The first bill was filed in May, 1862, to restrain the defendant from using the name of chlorodyne as descriptive of a medicine prepared by himself; but on the defendant putting in an answer, claiming to have discovered his preparation in 1844, and denying that he had ever advertised it, except as Freeman's chlorodyne, the plaintiff dismissed his bill. The second bill was filed in December, 1862, to restrain the defendant from advertising his own preparation as "the original chlorodyne, manufactured by the inventor, Richard Freeman." On the 11th of January, 1864, Vice-Chancellor Wood dismissed this bill on the ground that, as far as the name of chlorodyne went, the plaintiff had, by acquiescence in the use of it by other persons, lost the right to treat it as his own trade mark, and that the defendant had not actually represented that his chlorodyne was of the manufacture of the plaintiff; but as his Honour disapproved the course pursued by the defendant, he dismissed the bill without costs. There was no appeal from this decision. The rivalry between the parties was not decreased by this decision, for in December, 1871, the present or third suit was brought in consequence of some advertisements issued by the defendant, one of which was as follows:—

"The original chlorodyne and only genuine invented by Richard Freeman, pharmacist, entitled by the decision of Vice-Chancellor Sir W. Page Wood, January 11, 1862, to the sole right to use the word 'original' as a prefix to 'chlorodyne,' which decision was confirmed July 12, 1864." The plaintiff also complained of the defendant's representing that genuine chlorodyne is only sold under the protection of Government authority, with a stamp bearing the words "Freeman's Original Chlorodyne," and that without such stamp no chlorodyne is genuine; and that several testimonials to the efficacy of chlorodyne as a remedy for various disorders which were really given in favour of the plaintiff had been appropriated by the defendant and printed on the wrappers of his bottles.

Sir Richard Baggallay, Q.C., Mr. Fischer, Q.C., and Mr. B. B. Rogers, appeared for the plaintiff; Mr. Southgate, Q.C., and Mr. Stirling for the defendant.

The Lord Chancellor, stopping Mr. Southgate, said the advertising had gone on since 1864, and the plaintiff had lost by his acquiescence any right he might formerly have had to ask the Court whether the defendant's misrepresentation of the decree of Vice-Chancellor Wood did not amount to contempt of Court. It appeared to him that the suit was virtually concluded by the decision in the former suit that the plaintiff had not an exclusive right to the use of the word chlorodyne. The defendant's calling his preparation the original did not, as the Vice-Chancellor thought, amount to a representation that his preparation was in fact the manufacture of the plaintiff; and the words "only genuine," which were the only new feature in the present suit, merely involved a slander of the plaintiff's property, which might or might not be actionable; but, if actionable, would not be so as a mere trade assertion that one man's article is better than another's. Nor could his Lordship see any ground of complaint as regards the testimonials used by the defendant. He should, therefore, dismiss the bill. He might be impressed in the same way as the Vice-Chancellor was with regard to the conduct of the defendant, but he could not approve the course pursued by the plaintiff of filing another bill after the point had been substantially decided against him; so that the bill would be dismissed with costs.—*Times.*

Charge of Culpable Homicide again st a Doctor's Assistant in Glasgow.

At the Glasgow Circuit Court, on Saturday last, April 26, Robert Taylor M'Donald was chaged with culpable homicide, in so far as on the 14th January last, being employed as a dispenser of medicines by Thomas Smith, Cowcaddens Street, and having been requested by Jessie Stewart, otherwise Kean, to supply her with a halfpenny-worth of salts, or Epsom salts, and a halfpenny-worth of cream of tartar, which she had been sent to purchase for the now deceased Margaret Brown, warehouse girl, he "wickedly, recklessly, ignorantly, and culpably" sold her two packets containing binoxalate of potash, otherwise called salt of sorrel, and the said Margaret Brown having taken the contents of the packets, became ill, and died about half an hour afterwards. The prisoner, who had been liberated on bail, took his place in the dock, and pleaded not guilty. He was defended by Mr. Cooper. The first witness called was—

Mrs. Esther Brown, who deponed—Margaret Brown, the deceased, was my daughter. She was 17 years of age at the time of her death, and was in the employment of Messrs. Howat, Brown, and Co. On the morning of 14th January, she left for her work about eight o'clock. She was then well, and generally enjoyed good health. Nothing had occurred to vex her.

Jessie Stewart or Kean deponed—I worked with Margaret Brown at Howat, Brown, and Co.'s. On the morning of the 14th January I called for her at her mother's house, and we went out together. On the way she gave me 1*d.*, and told me to buy for her a halfpenny-worth of salts, and the same quantity of cream of tartar. I went to Dr. Smith's shop in Cowcaddens, and asked for the salts and cream of tartar. I think the prisoner was serving in the shop. He took something out of a clear bottle which he removed from one of the shelves. He put the medicine on a piece of paper and made it up into a parcel. I did not see him make up the other parcel. He took it from some place, but I cannot say where. One of of the parcels, I cannot say which, he labelled. He weighed the stuff that he took out of the bottle. The parcels were both white paper. On reaching the warehouse, I gave the parcels to Margaret Brown, who mixed the contents in a can of water and drank them about ten o'clock. The stuff in the parcels was white, like baking soda. Margaret drank all the stuff except a "wee drop" at the bottom of the can, and immediately said these were the queerest salts she had ever taken. About ten minutes afterwards she became ill and vomited, and died that forenoon.

Cross-examined by Mr. Cooper.—The medicine was lumpy—harder than baking soda. Maggie broke down the pieces with her scissors, and mixed them in water. On the 15th January, an officer took me in a cab to Smith's shop. I saw a man standing behind the counter. I was asked if that was the man, and I said I was not very sure. He was not the man. Another man came in afterwards, but I was not sure whether it was him. On another occasion I was taken to the shop by an officer, and was shown a packet taken out of a drawer. I was asked whether the packet I got from the man before was bigger or smaller, and I said I thought it was about the same size. (Shown the prisoner.) I am not sure that the prisoner is the man.

Sophia Mitchell or Fotheringham—I worked beside the deceased. On the 14th January last she showed me two white paper packets, and said they contained cream of tartar and salts. I afterwards saw her drink the contents of the packets, which had been dissolved in a can of water. She became ill about half an hour afterwards.

Margaret Horn, forewoman to Messsrs. Howat, Brown, and Co.—Margaret Brown worked under my charge. I saw her at her work on the morning of the 14th, when she appeared to be in her usual health and spirits. I never heard her complain of illness. About eleven o'clock she came to me and said she was "awful bad." She looked pale and sickly. She put up two mouthfuls of white froth. She said, "I took a dose of salts, and have been sick ever since." She died that forenoon. She was not a girl that I would think likely to take anything to injure herself.

Alexander Horn, foreman in the employment of Messrs. Howat, Brown, and Co.—I saw the deceased after death. Margaret Brown was a cheerful girl. She was six years in our service, and I am not aware that she had had a day's illness during that time.

Superintendent Brown, Central District, spoke to taking Jessie Stewart to Dr. Smith's shop on 15th Jan. Dr. Smith was then in the shop, and on entering she said she thought it was that gentleman who supplied her. Witness explained his object in calling, and Dr. Smith said he had not been in the shop in the morning. The girl then said she did not know that it was him. About twenty minutes afterwards the prisoner came in, and she said she thought he was the man. The prisoner said he did not recognize Jessie Stewart, but that he remembered selling to a girl a halfpenny-worth of cream of tartar and a halfpenny-worth of salve about the same hour in the morning. He said he had not sold any Epsom salts.

Dr. James Dunlop read the report of a *post mortem* examination of the body of Margaret Brown made by Dr. Samuel Moore and himself. The reporters, after describing minutely the internal and external appearances of the body, said there was no indication of preexisting disease, and their opinion was that she had died from the immediate effects of a large dose of irritant poison.

Cross-examined by Mr. Cooper—Two drachms of salts of sorrel might prove fatal to a person taking them, but not certainly fatal if proper medical treatment were obtained. In a French case, one and a half drachm proved fatal in an hour. He was not able to say how many drachms of salts of sorrel might be given for a halfpenny.

By the Court—Salts of sorrel is sometimes mistaken for cream of tartar.

Interrogated—Supposing a person in general good health were to take by mistake two drachms of salts of sorrel, and within fifteen minutes were to be seized with vomiting and illness, would you consider that a probable result of taking the two drachms?—Yes.

You would not be surprised to hear of the death of a person who had taken two drachms?—I would not.

Would a mixture of it with Epsom salts have any effect at all on its operation?—I think not. It is so rapid in its action.

Dr. Samuel Moore coincided in the report subscribed by Dr. Dunlop and himself.

Dr. John Clark read the report of an analysis of the stomach, etc., of the deceased, as made by himself. He was able to trace salts of sorrel in the stomach and bowels, but not in the liver or spleen. He had no doubt death was caused by the deceased taking salts of sorrel. The quantity which he found would not cause death; but taken in connection with what might be presumed to have been absorbed or given off in vomiting, it would prove fatal.

By the Court—In its powdered state, salts of sorrel is sometimes mistaken for cream of tartar. Two drachms of salts of sorrel might prove fatal.

Dr. James Ormiston Affleck—I have had occasion to observe the action of irritant poison. The smallest quantity of salts of sorrel which I know to have produced death is three drachms. I think two drachms quite capable of producing death.

James Miller, packing clerk in the employment of Messrs. Howat, Brown and Co.—Salts of sorrel is occasionally used in our warehouse for taking ink stains out of cloth. It is kept in my desk, and when necessary to be used it is applied by William Smith and myself. No one else is ever employed to do so. I keep the desk containing the salts of sorrel locked. The deceased had no access to it.

Dr. Thomas Smith—The prisoner was in my employment for a year, quitting it on the 30th of March last. He came to the shop about eight o'clock in the morning, and I went to it about ten o'clock. On the 14th January last, he opened the shop as usual, and I found him there about ten o'clock. He was the only person who dispensed medicine that morning (shown two pieces of paper). The larger paper would contain twopence worth of salts of sorrel, and the smaller one a pennyworth or a halfpenny-worth. We sell two drachms of salts of sorrel for a halfpenny. In a previous case the prisoner made a mistake while in my service. An order was given for 3 oz. of sal volatile, instead of which he gave 3 oz. of liquid acetate of ammonia.

The prisoner, in his declaration, said he was a native of Aberdeenshire, and was 24 years of age. He remembered selling a halfpenny-worth of cream of tartar to a girl on the 14th of January, but he was sure he did not supply her with any salts, and what he sold did not contain oxalic acid.

Several witnesses were called for the defence, but no point of interest was brought out.

Counsel having been heard, Lord Ardmillan summed up, giving it as his opinion that the point for the jury was whether the prisoner was "guilty" or "not guilty," and believing that the circumstances in no degree justified a verdict of "Not proven."

The jury, after a short absence, returned with a verdict of "Not Proven," by a majority of one.

The accused was thereupon dismissed.—*Glasgow Herald.*

Review.

My Garden, its Plan and Culture; together with a General Description of its Geology, Botany, and Natural History. By Alfred Smee, F.R.S. Second Edition. London: Bell and Daldy. 1873.

When, in the closing year of the sixteenth century, Queen Elizabeth visited Sir Francis Carew, at Beddington, that worthy knight, knowing her Highness's weakness for cherries, led her to a tree on which, by a cunning manœuvre, the ripening of the fruit had been retarded for at least a month after every other cherry in England had disappeared. The prim old young lady, surrounded by her courtiers, while daintily picking the ripe black fruit, or pausing to examine the first orange trees ever cultivated in England, which were grown in that garden, must have admired the beauties by which she was encompassed. But it is doubtful whether she looked upon a fairer scene than the Garden in the same parish which is the theme of the book before us. Probably its author is of the same opinion, and not satisfied with limiting the enjoyment of its charms to himself and his visitors, he has sought to share it with the public so far as carefully minute description and lavishly abundant illustration can impart it. Jonathan Tyers, who was lessee of Vauxhall for the greater part of the eighteenth century, after maintaining those gardens as a place in which "debtors, lords, and thieves" might run riot, retired to another garden at Denbigh, in which he designed an "awful and tremendous view" of the Valley of the Shadow of Death, in order to terrify libertines from their evil courses. But Mr. Smee's garden-pictures are of a very different kind, and the score of full-page illustrations in this book have rarely been excelled, either for the beauty of the scenes they depict, or the manner in which they are engraved on wood and printed.

But to speak of the book itself. It commences with a history of the district in Celtic, Roman, Anglo-Saxon, Mediæval, and modern times. It next describes the geology in a chapter where there are some interesting remarks as to the water supply from the chalk; the rising of the Bourne; and also upon the effect of the Croydon sewage experiment. Then comes the planning of the garden,—not the least interesting part of the book, as it is a subject the author has studied *con amore*,—and this is followed by a chapter on the principles of gardening. These principles are laid down in rather a gossipy manner, and sometimes a considerable latitude is required in construing the scientific information upon which they are based. For instance, in reference to dialysis, the reader is informed that "crystalloids—such as alkaline salts—pass through a layer of membrane, impervious to water, *as though it had no existence*;" and an epiphyte is said to encircle another plant and "pump out by dialysis all its salts." Again, we read, "the changes which take place in the interior of plants are caused by the action of light, which enables them to reduce the carbon products . . . . from the carbonic acid of the atmosphere," which is only part of the truth. Another chapter is devoted to garden tools and freely illustrated; in fact too much so, for there is nothing extraordinary in Mr. Smee's watering pot, or wheelbarrow, or several other of his tools, that makes them worthy of a woodcut. A good hint as to garden labels is to have the name embossed in sheet lead by printing on it with ordinary type. Frames and glasshouses are next treated of, and a "poor man's house" of extremely simple construction is described. With the exception of a well-written chapter by Miss Smee on the "Gardens of All Nations," the remainder of the book is taken up with short descriptions of the numerous living things in the garden, both animal and vegetable. Roses and aphides, blackbirds and blind-worms, ducks and duck-weeds, cabbages and butterflies, are all included within the range of the author's jottings, and the descriptions are in most cases assisted by well-executed woodcuts.

Our limits do not allow of an attempt to enter into a detailed description of this portion of the book, but there are one or two things worthy of note. The great impulse which has been given to horticulture in recent years—due in no small degree to the labours of the late Mr. Loudon—has not only improved and increased the number of varieties of indigenous plants, but it has caused nearly every land the sun shines upon to be searched for new treasures. Edward I.'s fruiterer's bill included only pears, apples, quinces, medlars, and nuts, and amounted to but £21 14s. 1½d. from Whit Sunday to November. Mr. Smee's garden contains more than three hundred varieties of the apple alone, and at least five times that number are known. In the fifteenth century, the English kitchen garden contained little besides cabbage, lettuce, spinach, beetroot, trefoil, bugloss, borage, celery, purslaine, fennel, smallage, thyme, hyssop, parsley, mint, a species of turnip, and small white onions; but the author of "My Garden" enumerates more than an equal number of salad plants alone, to say nothing of numerous legumes, roots, and tubers, cabbages, marrows, aromatic herbs, etc.

We may quote here the description of a process devised by Mr. Smee, Jun., for obtaining the delicate odours of pinks and other flowers. "He uses a glass funnel, with the narrow end drawn to a point. In this funnel he places lumps of ice with salt, by which a very low temperature is produced. The funnel is supported on an ordinary retort stand, and placed near the flowering plants, when water and the ethereal odour of the blossom are deposited on the exterior of the glass funnel, trickling down to the point, and droping at intervals into a glass vessel below. The scent thus obtained is very perfect and interesting, but is apt to become sour in a few days, unless some alcohol is added. . . . To obtain the odour in perfection, the blossom must be in its prime."

With Mr. Smee a standard rose is tabooed—one cannot wonder at it after seeing the picture of his pyramids—and he has evidently little liking for geometrical beds and ribbon borders, with their "inevitable geranium." Campbell sang—

"Ye field-flowers! the gardens eclipse you, 'tis true,
Yet, wildlings of nature, I dote upon you;"

and in the author he would have found a kindred spirit, for there appears to be as much care devoted at Wallington sometimes to the introduction of a wild plant as to the cultivation of those more popularly prized. But the student of nature invariably enjoys beauties which are passed over by ordinary eyes. Many a reader of Mr. Smee's beautiful book will be surprised to find how much food for study there is in a garden, and after perusing it to the last page will be able to understand the feeling which prompted the motto on the first—*Μεγάλα καὶ θαυμαστὰ τὰ ἔργα σοῦ, Κύριε ὁ Θεὸς ὁ παντοκράτωρ.*

BOOK RECEIVED.

Botanical Companion to the British Pharmacopœia. By Hyman Marks. Dublin: Fannin and Co. 1873.

Obituary.

Notice has been received of the death of the following:—

On the 2nd April, 1873, Mr. William Lingwood, Chemist and Druggist, of Edwardes Terrace, Kensington.

Notes and Queries.

SYR. FERRI ET QUINIÆ IODIDI.—In reply to *A. E. J.*, who asks for a reliable formula for Syr. Ferri et Quiniæ Iodidi, we insert the following, the second of which is from Dorvault's 'L'Officine:'—

Quiniæ Iodidi	gr. j
Acid. Acet. Dil.	♏ iij
Syr. Ferri Iodid.	℥ j.

M.

Place iodine, 5 parts, and iron wire, 2 parts, in water, 20 parts. Allow the reaction to go on until the colour disappears; filter, and mix with simple syrup, 1120 parts; then add sulphate of quinine, 1 part, dissolved in q. s. of dilute sulphuric acid.

Correspondence.

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

The Benevolent Fund.

Sir,—I have to thank Mr. Clark for his reply to my former letter, and to assure him that his wishes concerning me shall be gratified.

His allusion to forbearance convinces me that he is a courteous disputant, I only regret he has put the right thing in the wrong place. Forbearance more properly was due to the fund at which Mr. Clark has attempted to aim a deadly blow,* and in defence of our fund I shall strike out as vigorously as I am able.

He clears up what appeared some slight inconsistency in his previous dealings with the fund by an explanation that "his opinions had not been formed by the recent correspondence," they had in fact existed "for a long time," but were rendered inert by, "perhaps, a slight carelessness concerning the appropriation of the donations." No fair penitent could confess her shortcomings in a more self-excusing apologetic strain; but from a doctor of charity could we not have looked for more explicit and seemly credentials?

I presented figures in my first communication, which demonstrated how utterly Mr. Clark's pet local relief scheme would have failed in his own city of Leicester. The figures are not disputed; but the argument founded on them is declared "somewhat absurd," and for this reason, because the greater the failure there, the greater the success elsewhere.

This is a staggerer!

Misfortune is ever in our midst heeding not whatever limits we may define, nor is it in the habit, if my recollection is correct, of inquiring into the state of district relief funds before it casts its gloomy shadow on a household, in which, as in its lair, lurks the gaunt spectre destitution, a veritable social beast of prey, ready to spring upon the feeble, the sick, the aged. Hence true charity has ever boasted of her universality.

On the other hand what does Mr. Clark propose? A system (if so it can be termed) to work somewhat in this fashion: Want comes upon a chemist and druggist living in one of these local spheres of amiability, let us say in the district of Benevolentia-sine-Nummo, for there are many such. Is relief given or is he spurned? Neither the one nor the other. The poor man is left with want as his companion, and he is presented with a potfull of flattering unction which he may, if he possesses much philosophy, apply to his soul; for does it not suffice him to know, that whereas he is poorer, others are just so much the richer? possessing his share in addition to their own. "O charity, what blunders cannot be committed in thy name!"

Will Mr. Clark, if he has nothing better to say for his system, unite with us in consigning it to the depths of Erebus?

I met the censor's proposition with figures, I shall meet his own selected case with facts.

That I may not by any possibility misrepresent him, I quote his words—"Some time since we had two annuitants to vote for, three to choose from who were all approved. Could we have taken £30 from that year's subscriptions and from those of following years, that third person might have been made happy."

Here we behold the writer who, a fortnight ago, railed against annuities now complaining that the Council did not elect three instead of two candidates. I am pleased to see that Mr. Clark no longer conceals his liking for annuities. I may mention to him that, however desirable it may be to grant annuities, their number must be limited by circumstances. I am informed that the Council will, next October, grant at least two additional ones, and I should calculate, that by carrying on his votes to the approaching election, last year's third candidate is certain to succeed.

Ah! but during these long months of expectancy how has it fared with him? What have the Council done? It appears to me two courses were open to them. They might have assured Mr. K. that though he was left out in the cold the others felt all the warmer for it; or they might have been mindful of their duties as almoners, and given aid to the extent of their power.

On reference to the Benevolent Fund accounts, I see the Council from July 1872, to April 1873, that is within ten months, voted £35 to him.

Thus, according to the scale laid down by Mr. Clark, that a person can be made happy for £30 a year, the third candidate has been rendered even more than happy; and that by the method he proposed, by sums of money taken from the year's subscriptions. One is tempted to ask if it is by such ignorance of facts that hostility to the Benevolent Fund can prevail? Can this be the case, which, when challenged to proof, the accuser puts forth to convict the Council of a dereliction of duty? It really is so, and I am yet unconvinced that the Council is deaf to voices round, but if facts are truth, the accuser is blind to both.

I know too well what I am writing about to feel one moment's uneasiness for our present annuitants; they are in a position of security against all contingencies; it is based on the elegant simplicity of Government securities, which fact, like the meat in the soup, is the making of it.

I rather feared that a check to the influx of subscriptions and donations might be possible, if strictures such as I have endeavoured to answer had been left unnoticed; and I trust the facts cited may have drawn Mr. Clarke and myself more into unison of thought, and guided both of us to the same conclusions.

A Subscriber to the Fund.

* "I would ask in the name of all that is right and charitable, that members in each town should unite their subscriptions, taken from the Benevolent Fund, to relieve the destitute poor of their own neighbourhood."

The Pharmacy Act, 1865.

Sir,—Within a radius of one mile from my shop, I should say there are no less than forty or fifty small grocery and provision shops, the proprietors of which carry on a certain amount of trade, which I think ought to be strictly and exclusively confined to us, viz., the vending of medicinal substances and preparations bearing the names of paregoric, Godfrey's cordial, etc., containing no opium nor any ingredient comprised in the second part of Schedule A of the Pharmacy Act; thereby they keep outside the operation of the law.

I think this matter ought to be thoroughly investigated, and a stop put both to the sale of drugs by unregistered persons, and also to wholesale firms supplying the above-mentioned persons with the articles alluded to.

A Registered Chemist (by Exam.).

Leeds, April 25th, 1873.

A Question Respecting the Adulteration Act.

Sir,—A chemist in the country who sells a gallon or two of laudanum per week, in small quantities of from 1*d.* to 1*s.* worth, applied to me for information respecting the Adulteration Act. His proportion for making it is 8 oz. opii to the gallon of proof spirit, and as B. P. formula orders 12 oz. to one gallon, he is afraid when an inspector is appointed under the Adulteration Act, he possibly might be found in error. He asked for my opinion, and as I could not enlighten him as to whether making laudanum of weaker strength than B. P. was adulterating it, I promised I would try to get some information, and if I should not be trespassing on your kindness too much, I should feel obliged if you would give me the information in order to satisfy my country friend, who has been in the habit of selling laudanum of that strength for twenty years. The reason he has not made it hitherto in accordance with B. P. form, was from fear that his customers might be injured if it were stronger, as many are ignorant and would be unable to read a caution label if the strength was altered. Quaerens.

April, 1873.

A Trade Grievance.

Sir,—I trust you will find a few words on a commercial subject affecting the trade not out of place in your Journal. The gradual rise in every department of labour, material, and fuel, has so seriously affected the producers of proprietary articles that they are very generally raising their prices to the trade. The special hardship to the retailer is that the profits are fixed, not by themselves, but the proprietor or maker. If an ordinary article rises in cost, we put the increase on the selling price of the article, and thus the public, as should be the case, pay the increased value; but in the case of patent medicines and proprietary articles the price is fixed and advertised to the public. One finds now constantly in patent medicine invoices first one article and then another marked "maker's price advanced." I may mention Ridge's Food, Dinneford's Magnesia, Rowland's Kalydor, Lamplough's Saline, and many others, of which the selling price remains the same. I have in view a one shilling article which used to be invoiced at seven shillings and has gradually expanded to ten—where will it stop? I have no fault to find with any proprietor raising the price of his article to a remunerative amount; but why should the retailer bear all the burden of increased wages, extra cost of fuel, and advanced value of bottles? It is not fair—it is not reasonable. The producer should as has been done in the instances of Bond's Ink, and Du Barry's Revelenta, raise the selling price of the article, it would then be a question entirely between themselves and the general public. The remedy is in our own hands; it is true the proprietor advertizes and creates a demand for his goods; but how largely is he aided by the efforts of the retailer, who exhibit in their windows, expose upon, and push, over their counters these goods, to the detriment often of legitimate trade. I would advise all retailers to discourage and discountenance in every way the sale of articles which are raised in price to them, without a corresponding increase on the price charged to the public. I think this would tend to stop this alarming rise, and that producers would find out what good friends they have had in the great body of the trade, who stand between them and the public.

Wm. Barron.

Cheltenham, April 29th, 1873.

Pharmacy in Ireland.

Sir,—I would not again have troubled you with any opinions of mine on pharmacy in Ireland, had not your correspondent Mr. Holmes accused me of being incorrect in many of my statements. I did not refer to the social position of the chemists and druggists of Ireland when I compared them with those of the same name in England and Scotland, but to their position as pharmacists. If the Irish chemists are so fully competent, as Mr. Holmes asserts they are, why does he not say how, where, and when they have gained that experience so necessary in the correct and efficient dispensing of physician's prescriptions? I have yet to learn how any one can be competent to dispense physician's prescriptions who has never dispensed one in the whole course of his experience. If an Irish chemist were asked if he could dispense physician's prescriptions, I am afraid he could give no better answer than that given by the Scotchman who, on being asked if he could play the violin, replied, "I dinna ken; I ne'er tried." I should be very happy to think that my experience of Irish chemists was exceptional; but mere assertions can never convince any one.

There are apothecaries to be found in Ireland, who devote themselves strictly to pharmacy, and abjure prescribing as rigidly as any first-class pharmacist in London. I could mention one of the most flourishing towns in Ireland where the dispensing is entirely done by such men, and I think Mr. Holmes could find many such in Dublin.

I might for Mr. Holmes' benefit (I hope no one else requires the information) mention, that the Modified examination was never considered qualification enough for membership of the Pharmaceutical Society; it was merely instituted as a compromise with those who had been long enough in the business to give them a vested interest.

Can the Irish chemist claim any such vested interest? Were the proposed Act as it at present stands to become law, he would be no better—no worse.

Alex. Anderson.

277, *Oxford Street, W., April 24th*, 1873.

Pharmaceutical Curiosities.

Sir,—Although the above is rather a hackneyed subject for a letter, I cannot forbear sending you a few specimens collected in this neighbourhood. The chemist here must be viewed as a superior being by the common folks, or they would never so severely task his sense of gravity, and if one should unfortunately express surprise at anything they ask for, they would probably say you had not "passed your diploma" (the expression of a native in reference to my examinations).

What would our examiners think of "oil of lily," "oil of Exeter," or "oil of cabbage?"

A day or two ago I got an inquiry for "black oil of snails."

Scarcely able to maintain my gravity I inquired what it was to be used for, but my customer was too wide awake to let me know *that*.

I asked if it was not the green oil she wanted, meaning to give her ol. virid., but she persisted in saying that it was black, and left the shop observing that she did not expect she should be able to get it about here! Can ignorance go further?

Well, lately I have been looking over an old recipe-book of a *registered chemist*, and under the head of "definitions" I find the following:—

"Cort. Granatur—Pome Granate bark."

"Os. Sepiæ—Scuttle bone."

"Lignum—Chips."

Further on iron filings and ferri carb. are given as synonymous terms, and then we are told that "pioloygneous acid" is another name of acetic acid!

On another page "amaris" is defined as meaning "bitter," and on another I catch sight of "syrup of madenhare."

But, really, it is too bad to pull a brother in the craft to pieces so; and as I fear I am occupying too much of your space, these "specimens" must suffice for the present, but I promise to send you more ere long.

J. Bower Williams, A.P.S.

Kingswinford, April 2nd, 1873.

P.S.—The person referred to dispenses with B. P. form.

J. Farmer.—Pyroacetic spirit is acetone, and pyroxylic spirit is wood naphtha.

A. Kinninmont is thanked for his letter and inclosure.

G. S. T.—Apply at Apothecaries' Hall.

M. A. M. (Yeovil).—We agree with you thinking that such a practice as that you refer to would be very objectionable, and we are disposed to think that the instance you refer to must have been accidental. However, we have made inquiries respecting it, and will communicate further with you when we have the result.

J. H. T.—The Act 29 & 30 Vict., c. lxiv., specifically prohibits the use of methylated spirit, or any derivative thereof, in the manufacture, composition, or preparation of any article whatsoever, capable of being used either wholly or partially as a beverage, or *internally as a medicine*. On this ground we should not consider the use of methylated spirit in the case you refer to would be legally an adulteration, although the preparation would not be strictly in accordance with the directions of the Pharmacopœia.

Mr. T. Collice.—Your letter has been forwarded to our correspondent.

The following journals have been received:—The 'British Medical Journal,' April 26; the 'Medical Times and Gazette,' April 26; the 'Lancet,' April 26; the 'London Medical Record,' April 23; 'Medical Press and Circular,' April 25; 'Nature,' April 26; 'Chemical News,' April 26; 'Gardener's Chronicle,' April 26; the 'Grocer,' April 26; 'Journal of the Society of Arts,' April 26; 'Grocery News,' April 26; 'Produce Markets Review,' April 26; 'Practitioner' for May; 'Journal of the Women's Educational Union' for April; 'Doctor' for May; 'Journal of Applied Science' for May; 'Practical Magazine,' Parts I.—IV.; 'American Chemist' for April; 'Mineral Water Trade Review' for April; 'Sanitarian' (New York) for April; 'Canadian Pharmaceutical Journal' for April.

Communications, Letters, etc., have been received from Mr. Jenkins, Dr. Collins, Mr. Barron, Liebig's Meat Company, Mr. Lowe, Mr. Walker, Mr. Ekin, Cacoethes Scribendi.

CINCHONAS.*

BY JOHN ELIOT HOWARD, ESQ.

At a recent meeting of the Linnean Society the author referred to a former treatise in the Report of the Botanical Congress in London in 1866, in which he expressed the opinion "that every well-defined region of the Andes has its own prevalent and characteristic cinchonæ, generally found in varied aspects, and incapable of being reduced to any one typical form." Mr. Howard thinks that the number of so-called species is already far too great, and that if every well-defined kind be held to be a species, the number of these might soon amount to *hundreds* at the very least. Moreover, it appears that these species produce great variety of forms from the same seed. This was illustrated by a number of specimens of cinchonæ from Mr. Howard's stores. Amongst these two totally diverse forms were shown, which had originated from the seed obtained from the capsules of one botanical specimen from the East Indies. One of these was the *C. Bonplandiana*, var. *angustifolia*, the celebrated kind which yields about 10 per cent. of sulphate of quinine; the other was a different sort of *C. Bonplandiana*. This could not well be the result of cross-fertilization, but rather of accidental variety. Mr. Howard showed another specimen (sent from the East Indies) of a supposed hybrid between the *C. succirubra* and the *C. officinalis*.

Arranged in the room were more than a dozen luxuriant plants grown from one small parcel of seed of *C. calisaya* sent from Mr. Broughton, in April of last year, exhibiting an average growth of perhaps two feet, and in some cases a great divergence from the usual form of the leaf of this species, which, however, from Dr. Weddell's account,† seems also to be the case in different forms of the *C. calisaya* in Bolivia. Is this the result of cross fertilization? or of an innate tendency to vary within certain limits? Mr. Howard thinks that the present is a favourable opportunity to ascertain these points. He would admit, as different species, only those forms in which there is a manifest incompatibility in the organs of reproduction, shown by sterility, or else by the production of true hybrids marked as such by instability, and a tendency to revert to one or other of the parents. Where there exists perfect facility of union, and fruitfulness in the progeny, he would regard the varying forms as simply different races: and consequently the distinctions drawn from the shape of the leaf (*cordifolia*, *ovata*, and so forth) are unsatisfactory and misleading when made the basis of *species*. Mr. Howard reviewed two works recently published in France, one by Dr. Weddell called 'Notes sur les Quinquinas,' the other 'Nouvelles Etudes sur les Quinquinas,' by J. Triana, both of which he considered had advanced greatly our knowledge of the genus, and remarked, in the first of these, points of gradual approximation to his own views.

In the course of his observations on the red bark, Mr. H. drew attention to some information which had reached him in regard to the management of this tree in India, and the different modes of cultivation by mossing, etc., none of which seemed able to change the habit of this species to produce more cinchonidine than quinine. A discussion arose in reference to the best method of propagation and cultivation of these plants in India, in which some gentlemen interested in the plantations took part, and the President made some concluding remarks, in which he alluded to the like variability of form exhibited in some other trees.

* Abstract of a paper read at a meeting of the Linnean Society, May 1, 1873.

† "If we compare the leaves, the typical form of which is a very obtuse obovate-oblong, we shall find that some are oblong-lanceolate and pointed, or even oval or elliptical, and of varying consistency and colours."

NOTES ON INDIAN SIMARUBEÆ.

BY ALFRED W. BENNETT, M.A., B.SC., F.L.S.

Lecturer on Botany, St. Thomas's Hospital.

(*Concluded from p.* 843.)

3. PICRASMA, *Blume*.

Trees or shrubs with very bitter properties. Leaves unequally pinnate. Flowers small, unisexual or polygamous, in axillary panicles. Calyx very small, 4–5-toothed. Petals 4–5, valvate, very often persistent and enlarged after flowering. Disc thick. Stamens 4–5, not scaly, hairy. Ovary 3–5-partite, free; styles free at the base and apex, but united in the middle; stigmas simple; ovules solitary, erect. Fruit of 1–3 fleshy coriaceous drupes. Seed erect, albuminous.

About six species, distributed over tropical continental Asia, the Eastern Archipelago, Japan, the West Indies, and Brazil.

1. *P. quassioides*, Benn. Plant. Jav. Rar. 198; Planch. in Hook. Jl. Bot. v. 573; *Nima quassioides*, Ham. *Simaba quassioides*, Ham. in Don Fl. Nepal, 245. A large scrambling shrub, with stout, often spotted, branches, and very bitter bark. Leaves a foot or more long, unequally pinnate; leaflets 9–15, obovate, acuminate, serrate, the lowest pair much smaller and stipulæform. Flowers small, green, polygamous, in axillary branching, pubescent panicles. Calyx-segments 5, small, imbricate. Petals 5, ovate or obovate, valvate, persistent, and much larger in fruit. Stamens 5; filaments strap-shaped, as long as the petals, villose. Fruit of 3–5 rather membranous drupes, about the size of a pea, each containing one erect seed.

North-Western India; Eastern Himalayas; Nepal; South China. The bark is very bitter, and is used in native medicines as a tonic and stomachic. It is imported into Bengal from the hills, and is sold under the name of "Bharangi." The root is, according to Royle, as bitter as the Quassia of the West Indies.

2. *P. javanica*, Blume Bijdr. Fl. Nederl. Ind. 247; Benn., Plant. Jav. Rar. 197, t. 41; Planch. in Hook. Jl. Bot. v. 573. A moderate-sized tree. Leaves of 3–7 leaflets, much thicker and often larger than in *P. quassioides*; leaflets ovate or obovate, quite entire, with a thickened margin, ending abruptly in a blunt point. Flowers in axillary often rather dense panicles. Calyx-segments, petals, and stamens 4; the petals persistent, much enlarged, and greatly thickened in fruit. Drupes strongly reticulated.

Eastern Bengal; Khasia Mountains; Malaya; Java. The form from the Khasia Mountains has smaller leaves, and approaches more nearly to *P. quassioides* in habit. Bennett's *P. nepalensis* (Pl. Jav. Rar. 201), "Brucea arbor," Wall. Cat. 7499, from Nepal, is undistinguishable. This tree is everywhere known to the Javanese as an intense bitter; in the western parts of the island its name is "Ki-pait," literally "bitter wood;" in the eastern parts "Patty-lallar" or "fly bane." It is used as a remedy against worms, and in cutaneous eruptions.

3. *P. andamanica*, Kurz. Enum. And. iv. A tree with very smooth branches, closely resembling *P. javanica.* Leaves unequally pinnate; leaflets 5 inches long by 2½ inches broad, oval, rounded, and often unequilateral at the base, acuminate, entire, scarcely thickened at the margin, thinner than in the last species. Panicles axillary, rather lax. Calyx-segments, petals, and stamens 4; one or more of the petals of the male flowers with two large glandular dots. Fruit unknown.

South Andaman Islands. Properties unknown.

4. Brucea, *Mill.*

Bitter trees or shrubs. Leaves very large, unequally pinnate. Flowers very small, in a large number of very small cymes arranged in axillary panicles. Calyx minute, 4-partite, imbricate. Petals 4, minute, linear, imbricate. Disc 4-lobed. Stamens 4, inserted beneath the disc; filaments naked. Ovary deeply 4-lobed, or carpels 4, entirely free; styles nearly or quite distinct. Drupes 4, entirely free, ovoid, somewhat fleshy. Seed solitary, exalbuminous.

This genus includes six species, distributed over Tropical Asia, Africa, and Australia. Although partaking of the bitter properties of the order, I am unaware of any species being used officinally, except the African *B. antidysenterica*, already alluded to.

1. *B. sumatrana*, Roxb. Fl. Ind. i. 449; DC. Prodr. ii. 88. A shrub with bitter and somewhat fetid properties. Leaves often more than a foot long, covered with a dense yellow pubescence, especially in the veins and beneath; leaflets numerous, very coarsely dentate, the lowermost pair sometimes again pinnate. Panicles axillary; rachis very long, yellow-pubescent, the minute flowers collected into rather distant small cymes, usually hermaphrodite. Calyx very minute. Petals longer than the calyx-segments, linear-obovate. Stamens 4, inserted beneath the disc; filaments short, not exceeding the petals in length. Ovary 4-lobed. Drupes 4, 1-seeded; 2 lines long by 1½ lines broad, black.

Eastern Peninsula; Assam; South China; Ceylon; Eastern Archipelago; Philippines; Tropical Australia.

2. *B. mollis*, Wall. Cat. 8483. A bitter shrub. Leaflets larger than in *B. sumatrana*, 3 inches long by 2 inches broad, lanceolate, acute, entire, pubescent or nearly glabrous. Panicles axillary; rachis pubescent or nearly glabrous; secondary cymes often many-flowered. Petals linear, longer than the stamens. Drupes 4, much larger than in *B. sumatrana*, 4 lines long by 3 lines broad, ovoid, brown.

Sikkim; Bhotan; Khasia Mountains; Silhet.

5. Eurycoma, *Jack.*

Small trees with bitter bark. Leaves very large, coriaceous, pinnate, with entire leaflets. Flowers polygamous, in much branched sub-terminal hairy panicles. Calyx minute, 5-toothed, valvate. Petals 5, induplicate-valvate. Disc absent. Stamens in male and hermaphrodite flowers 5, smaller in the latter; filaments attached to the base of the petals. Ovary 5-partite, free; styles 5, connate; stigmas distinct. Drupes 3–5, stipitate. Seed solitary, pendulous, exalbuminous.

Two or three species, confined to the Eastern Peninsula, Eastern Archipelago, and the Philippine Islands. Like the last, the species of this genus do not appear to have been used medicinally, although possessing the properties of the order.

1. *E. longifolia*, Jack. in Roxb. Fl. Ind. (ed. Wall.) ii. 307. DC. Prodr. ii. 86; Planch. in Hook. Jl. Bot. v. 584. *E. merguensis*, Planch. l. c. *E. tavoyana*, Wall. M.S. A tree with very large leaves, a foot or more long, having a large number of coriaceous elliptical acute leaflets, much lighter beneath. Panicles large, spreading, and much-branched, the rachis and pedicels covered with a rufous glandular pubescence. Calyx-segments minute, elliptical, glandular-ciliated. Petals four times as long as calyx-segments, lanceolate-ovate, 2 lines long, ½ line broad, very finely pubescent within and without. Filaments broad, half as long as petals, glabrous, with a ligulate ciliated appendage at base. Drupes hard, ovate, ½-inch long by ⅓-inch broad. I am unable to distinguish Planchon's *E. merguensis*, from the specimen in the Hookerian herbarium, by the alleged character of the filaments; and in other respects it precisely resembles the typical form.

Eastern Peninsula; Andaman Islands; Eastern Archipelago; Philippine Islands.

2. *E. apiculata*, nov. sp.—Leaves very long; leaflets elliptical, ending in an abrupt apiculus, dotted on the lateral veins beneath. Panicles compound, denser than in *E. longifolia*, the rachis and pedicels slightly hairy. Calyx-segments small, ovate, acute, hairy without, but not glandular. Petals ligulate, very narrow, 3 lines long by ½ line broad, glabrous. Filaments very short, ¼–⅓ as long as petals, glabrous, not appendiculate. Fruit unknown.

Penang.

6. Suriana, *Lin.*

Leaves simple, entire. Flowers hermaphrodite. Calyx 5-partite, imbricate, persistent. Petals 5, imbricate. Disc inconspicuous. Stamens 10, of two unequal lengths, 5 sometimes barren. Ovary of 5 free carpels; styles basilar, filiform; ovules 2 in each carpel, lateral. Fruit of 5 or fewer carpels, covered by the persistent calyx, indehiscent, each 1-seeded. Seed ascending, exalbuminous.

1. *S. maritima*, Lin. gen. no. 581; DC. Prodr. ii. 91; W. and A. Prodr. 361. Branches thick, covered with a velvety pubescence. Leaves linear-spathulate, obtuse, velvety. Flowers rather large, terminal, buried in the leaves. Petals yellow, equalling the calyx in length.

The only species, found on all tropical shores. An insipid shrub, with no known useful properties.

7. Harrisonia, *Brown.*

Glabrous spiny shrubs, with compound unequally pinnate or unifoliolate leaves. Flowers arranged in cymes, bracteate, hermaphrodite. Calyx small, 4–5-fid. Petals 4–5, longer than the calyx. Disc hemispherical. Stamens 8–10; filaments with small scales at the base. Ovary globose or 4–5-lobed, 4–5-locular; styles connate or distinct at the base; ovules solitary, pendulous. Fruit consisting of from 2–5 small globose berries. Seed solitary; albumen sparse.

Three to four species, distributed over the Eastern peninsula, China, the Archipelago, Tropical Australia, and Tropical Africa. Of no known useful properties.

1. *H. paucijuga*, Benn. Plant. Jav. Rar. 202, t. 42. *Lasiolepis paucijuga*, Benn. l.c. *L. Bennetii*, Planch. in Hook. Jl. Bot. v. 570. A woody shrub, with

sharp, short, recurved spines (apparently metamorphosed stipules) especially on the lower part of the branches. Leaves unequally pinnate; leaflets 5–9, ovate, entire or crenate, glabrous; rachis broadened between the leaflets. Cymes terminal, of from 8–20 flowers. Calyx persistent; segments very small. Petals lanceolate, glabrous. Filaments longer than the petals, five rather shorter than the other five, all glabrous, with a hairy scale at the base. Styles completely united, hairy. Fruit surrounded by the persistent calyx, of from 2–5 pyrenes. A specimen in the Hookerian Herbarium, from Madura, "Herb. Hort. Bot. Cal. no. 1794," with the leaves trifoliolate, appears distinct, but is too imperfect for determination.

Eastern Peninsula, South China, Java, Philippines.

Tribe II.—Picramneæ.

Ovary entire; 2–5-celled.

8. Balanites, *Delile.*

Spiny small trees or shrubs. Leaves bifoliolate, coriaceous; leaflets entire. Flowers green, in small axillary cymes. Calyx-segments 5, imbricate, deciduous. Petals 5, imbricate. Disc thick, conical. Stamens 10; filaments naked, not appendiculate. Ovary globose, 5-locular; ovules solitary in each loculus, pendulous. Fruit a large, fleshy, oily, 1-seeded drupe. Seed pendulous, exalbuminous.

Two species, one a native of Tropical Asia, the other of Tropical and Northern Africa and Syria.

1. *B. Roxburghii*, Planch. in Ann. Sci. Nat. Ser. iv. t. ii. p. 258. *Ximenia ægyptiaca*, Roxb. Fl. Ind. ii. 257; Wight, Ic. 274. A small tree, 20 feet high, with glabrous or puberulous branches, ending in very strong, sharp, ascending spines. Leaves of two elliptical or obovate, puberulous, entire, coriaceous leaflets. Cymes 4–10-flowered. Sepals and petals ovate, velvety, pubescent. Filaments filiform-subulate. Fruit large, woody, angular, more than an inch long, 1-celled, 1-seeded.

Bombay, Deccan, Sikkim, Eastern Peninsula. Closely allied, if not identical with, *B. ægyptiaca* of North Africa. The flowers are very fragrant. We learn from Col. Drury that the nut is covered with a soft, pulpy substance like soap, bitter to the taste, and with an offensive, greasy smell. The nut itself is very hard, and is used in fireworks. For this purpose a hole is drilled in it, the kernel extracted, and the shell filled with powder; when fired, it bursts with a loud report. In Africa, the wood, which is very hard and of a yellow colour, is used for making furniture, also for firewood. An oil is extracted from the seeds. The unripe drupes are bitter and violently purgative, but when ripe are eaten without any unpleasant consequences. The ryots use the bark medicinally for their cattle. This is one of the few trees which flourish on black soil. Royle, in his 'Himalayan Botany,' remarks that it is interesting to find this plant in the country about Delhi, and in the Dowab as far as Allahabad, especially on the banks of the Jumna, as it serves, with other plants, to show an analogy in the Flora of this part of India with that of Egypt. This was first discovered by Dr. Roxburgh as belonging to the Indian Flora, when he suggested that it should be formed into a new genus rather than be referred to *Ximenia*, and described it as common on the driest and most barren parts of the Circars. It is found only in similar situations in the north of India, and is one of those plants which show the great uniformity of vegetation over a great extent of the plains of India, where he has no doubt [illegible] indigenous. M. Delile supposes that the fruit of this shrub is the "Persea" of the ancients, the "lebakh" of Arabian authors.

A NEW VARIETY OF OPIUM.*

BY P. CARLES.

The author reports that he was requested to determine the value of a specimen of a new variety of opium which has been met with in commerce for some time, and which was said to be obtained from Persia. This opium occurs in the form of conical cakes weighing about a pound avoirdupois, partially covered by the remains of poppy leaves. It is free from seeds of Rumex; its odour differs from that of Smyrna opium, being rather comparable to that of green coffee, and when it is heated an odour of chocolate is exhaled. It is soft like ordinary fresh opium, the softness being due to 5·6 per cent. of moisture. When well dried it is easily powdered, but it is slightly deliquescent. The paste is of a fawn colour, and does not darken upon exposure to the air; and when examined by the naked eye or with the aid of a glass appears fine and very homogeneous. It mixes freely with cold water, without requiring to be much worked up in the liquid, which it only slightly colours.

Whilst Smyrna opium usually yields 49 per cent. of aqueous extract, this variety yields 52 per cent. In this operation it always presents a remarkable peculiarity: when two-thirds of the water has been evaporated in a water-bath, successive crystalline crusts are formed in such a manner that if the liquor be left to cool, a nearly solid mass results, in consequence of the interlacing of the crystals. By treating such a product with water M. Carles separated 1·10 per cent. of pure narcotine.

An analysis of the crude opium, according to the method of Fordos, gave as the mean of two operations —morphine, 8·40 per cent., narcotine, 3·60 per cent., that is to say, a smaller proportion of morphine than that indicated in the Codex as the yield of Smyrna opium.

The facility with which this opium dissolves in water, its deliquescence in air, etc., led M. Carles to suspect its adulteration with honey or glucose. This was rather difficult to decide, as Magnes-Lahens has stated that such a body is present in normal opium, or at least in that from Smyrna. Experiment showed that both varieties evidently reduced the cupric solution, but it was a question whether this reduction was due exclusively to glucose. Fermentation alone would appear to the author capable of accounting for it, considering the multiplicity of products that are contained in opium, a certain number of which belong to the glucose family, and reduce the blue liquor. Parallel experiments were made with the cupric solution and with fermentation. Smyrna opium gave off few bubbles of carbonic acid, and the so-called Persian several cubic centimetres; but there was no concordance between these results and those furnished by the Fehling test, which tends to corroborate the author's suspicion. In any case, M. Carles considers this variety of opium to differ notably from that which was described by Guibourt under the name of Persian opium.

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* 'Bull. de Trav. de la Soc. de Pharm. de Bordeaux,' March, 1873.

… OF PROPYLAMINE.

In *L'Union Médicale*, March 22, M. E. Perret gives a method of preparing propylamine "always pure and good," a good deal of what has been sold under that name being apparently nothing more than stinking ammoniacal compounds of different kinds. The proceeding consists in setting in fermentation the digestive apparatus of cows, calves, sheep or oxen (after having cut it up and washed it) with four or at most six times its weight of water, and one-fifteenth of carbonate of potash or dry soda, at a temperature of 59° to 64·5° F. during thirty-two to thirty-six hours. The magma is passed through an open wire sieve, and to the liquid obtained is added half its volume of caustic soda (soap-makers' lees at 40°). The mixture is then put into a retort and distilled very slowly. The methylic gas escapes first in great abundance, and the mass swells up considerably; the heat is moderated, and, this reaction ended, propylamine mixed, very slightly however, with methylic and ammoniacal gases, passes over. It is wholly contained in the first eighth part; that is to say, if there be eight parts of the solution, all the base will be in the first part. It is now saturated with hydrochloric acid and the filtered solution is evaporated to dryness. The dry hydrochlorate is pounded with three times its weight of caustic soda (lees at 40°), then distilled in a retort provided with a tube which reaches the surface of distilled water placed in the recipient. The propylamine dissolves in this, and saturates the water; and, when the bubbles pass off at the surface of the water without being dissolved in it, the recipient is changed and fresh water is employed. This solution is clear, limpid, and has an ammoniacal odour, accompanied by a smell of brackish water, which is extremely unpleasant, but passes off quickly. It furnishes all the reactions described by Wertheim, who in 1850 made a research on this base; it crystallizes well with acids, forming definite salts with four equivalents of water. The salts—sulphates, hydrochlorates, and gallates—crystallize with the greatest facility in prisms of four flattened planes, and in brilliant needles. They have no odour, and a fresh flavour which is not disagreeable.

SULPHOMOLYBDATE OF AMMONIA AS A TEST FOR SOME ORGANIC COMPOUNDS.†

BY J. H. BUCKINGHAM.

Among the latest tests for the detection of morphia, a solution of sulphomolybdate of ammonia will be found the most delicate. The beautiful blue colour which it gives when dropped upon that alkaloid, is indeed a striking reaction. It will give, however, a characteristic colour, not only with morphia, but also with many other organic principles.

One of the peculiarities which I noticed while making my experiments was, that when allowed to stand for any length of time in contact with the compound, the solution always became blue. This colour was light or dark, according to whether or not the solution, when first applied, gave a characteristic colour. This change is due to the oxidation of the solution, as all salts of molybdic acid or its compounds, when heated in contact with air, will finally turn blue. This, however, is hastened by the contact of some organic matter or any deoxidising agent.

This test may be prepared by mixing eight grains of molybdate of ammonia with two drachms of sulphuric acid (chemically pure). The milky solution is then heated until it becomes clear, care being taken not to raise the heat too high, or a change will take place.

This solution should be made fresh every time it is wanted for use. Small quantities should be used, as different results may be obtained by increasing the quantities. The following are the reactions with some of the most important alkaloids and other principles.

1. Those which at first produce no colour, but afterwards change to a light blue.

Alkaloids, etc.	First Colour.	Second Colour.	Final Change.
Quinia	Colourless	. . . .	Light blue.
Quinidia	Do.	. . . .	Do.
Cinchonia	Do.	. . . .	Do.
Asparagin	Do.	. . . .	Do.
Strychnia	Do.	. . . .	Do.
Atropia	Do.	. . . .	Do.
Caffeia	Do.	. . . .	Do.

2. Those which at first produce a characteristic colour, and afterwards, with exception of meconin, change to a dark blue.

Alkaloids, etc.	First Colour.	Second Colour.	Final Change.
Santonin	Light purple	. . . .	Dark blue.
Menispermia	Light yellow	. . . .	Do.
Solonia	Yellow	. . . .	Do.
Veratria	Yellow green	Dark brown	Do.
Meconin	Light green	. . . .	Light blue.
Codeia	Green	. . . .	Dark blue.
Narcotina	Yellow green	. . . .	Do.
Phloridzin	Dark blue	. . . .	Permanent.
Salicin	Purple	Blue, then brown red	Dark blue.
Morphia	Dark red	Purple	Do.
Digitalin	Crimson	Purple	Do.
Brucia	Brick red	. . . .	Do.
Aconitia	Light yellow brown	Brown	Do.
Piperina	Brown red	. . . .	Do.
Berberina	Purple	. . . .	Do.
Cubebin	Crimson.	. . . .	Do.

This test gives an easy and delicate method of distinguishing between strychnia and brucia, and also for detecting the adulteration of quinia with either salicin or phloridzin. The first colour produced may be regarded as the real reaction, as the final change is due to deoxidation.

SYNTHESIS OF MARSH-GAS AND FORMIC ACID, AND THE ELECTRIC DECOMPOSITION OF CARBONIC OXIDE.*

BY SIR B. C. BRODIE, BART., D.C.L., F.R.S.,

Late Waynflete Professor of Chemistry in the University of Oxford.

In connection with the investigation on the electric decomposition of carbonic acid gas referred to in a previous communication to the Society, I was led to submit a mixture of hydrogen and carbonic oxide gas to the action of electricity in the induction-tube, the mixed gases being circulated through the tube by means of an apparatus which I will not now describe. A contraction was soon observed to have taken place, which at the end of an hour amounted to 10 cubic centimetres. The rate of contraction steadily diminished, and during the fifth hour of the duration of the experiment amounted to only 2 cubic centimetres. The experiment was stopped, and the gas analysed with the following results in two several analyses:—

I.		II.	
Carbonic oxide	61·65	Carbonic oxide	61·35
Hydrogen	32·16	Hydrogen	32·34
Marsh-gas	6·14	Marsh-gas	6·31
	100·00		100·00

* From the *Medical Record.*

† From the *American Journal of Pharmacy.*

* From the Proceedings of the Royal Society.

A small quantity (about 2 per cent.) of nitrogen was also contained in the gas, together with a trace of oxygen, which have been omitted from the calculation.

The result of this reaction is expressed in the following equation :—

$$CO + 3H_2 = CH_4 + H_2O.$$

This fundamental experiment, which constitutes the basis of a new method of chemical synthesis, susceptible of the most varied applications, and of peculiar interest in reference to the explication of natural phenomena, was commenced by me on the 10th of January last at Oxford, in the laboratory of my friend and successor in the Chair of Chemistry, Professor Odling; and two analyses of the gas were completed, and the results attained in the course of a week from that date.

In a similar experiment made with a mixture of hydrogen and carbonic acid gas, a contraction also occurred, attended with the formation of water. The gas which resulted from the experiment was found to consist (after the absorption of carbonic acid) of hydrogen and carbonic oxide, together with a little marsh-gas. Traces of oxygen and nitrogen were also present. Minute drops, too, of an oily liquid appeared in the tube. This liquid, after the conclusion of the experiment, was dissolved in a small quantity of water. The solution was strongly acid and had a pungent taste. It reduced an alkaline solution of terchloride of gold and an ammoniacal solution of nitrate of silver.

These reactions are the characteristic properties of formic acid, of which we may infer the synthesis to have been effected according to the equation

$$H_2 + CO_2 = H_2CO_2.$$

I may avail myself of the present opportunity to place on record the following important facts in reference to the action of electricity on carbonic oxide gas.

When pure and dry carbonic oxide is circulated through the induction-tube, and there submitted to the action of electricity, a decomposition of the gas occurs, attended with a gradual and regular contraction, which, in the form assumed in my experiments, occurred at the regular rate of about 5 cubic centimetres in an hour. Carbonic acid is formed, and simultaneously with its formation a solid deposit may be observed in the induction-tube. This deposit appears as a transparent film of a red-brown colour, lining the walls of the tube. It is perfectly soluble in water, which is strongly coloured by it. The solution has an intensely acid reaction.

The solid deposit in the tube, in the dry condition before it has been in contact with water, is an oxide of carbon. Samples, however, made in different experiments do not present precisely the same composition; but nevertheless they appear to belong to a certain limited number of forms which repeatedly occur, and may invariably be referred to the same general order or system. This system is, or appears to be, what I may term an homologous series of "oxycarbons," of which the unit of carbon with the weight 12 may be regarded as the first term, and of which the adjacent terms differ by an increment of carbonic oxide (CO) weighing 28, precisely as homologous series of hydrocarbons differ by the increment CH_2 with the weight 14.

I have succeeded in identifying by analysis two at least of these substances, namely, the adjacent terms C_4O_3 and C_5O_4. From this point of view these peculiar bodies are members of a series of oxycarbons analogous in the oxycarbon system to the series of hydrocarbons of which the unit of carbon is the first and the unit of acetylene C_2H_2 is the second term, the oxycarbon C_4O_3 being represented in that series by the hydrocarbon crotonylene C_4H_6, and the oxycarbon C_5O_4 by the hydrocarbon valerylene C_5H_8.

STEARATES OF SODA, AND THEIR EMPLOYMENT IN PHARMACY.*

BY ÉMILE REEB.

As many practitioners disapprove of the liniments which have fatty bodies for their basis, it has been proposed to substitute them by soaps and recently by glyceroles. The former, however, require too much time in their preparation by the pharmacist, and the latter have the inconvenience of containing an organic body (starch) subject to alteration, causing a change in the glycerole itself. The author has, therefore, sought to obtain a substance combining the qualities of the soaps and the glyceroles. This he believes he has found in the stearates of soda; that is to say, in definite compounds of the fatty acid, deprived of the other products of saponification, such as the oleate and other fatty salts of soda. It has also the advantage of allowing exact measurement in its use.

For several years past pharmacists at Strasbourg have with advantage employed stearate of soda in the preparation of opodeldoc. While investigating the subject more fully, M. Reeb's attention has been turned to the neutral stearate hitherto used, and also to the bistearate of soda which has not yet been employed.

These two compounds have the property of dissolving in boiling alcohol of 95°, and forming upon cooling a transparent jelly of the appearance and consistence usually sought for in opodeldoc. But to obtain this result it is necessary that certain proportions should be maintained, for if the quantity of stearate be too great, the jelly, instead of being transparent, becomes milky, full of crystallizations, or even opaque.

The following table shows the maximum proportions necessary to obtain a firm transparent jelly, melting easily at the temperature of the hand. It will be seen that a smaller proportion of the bistearate is required than of the neutral stearate.

	Stearate.	Bistearate.	Caustic Soda.	Alcohol 95°.	Glycerine.
Opodeldoc . . .	2·50	1·50	—	1·00	—
Iodized Soap .	2·00	—	2·00	1·00	—
	—	1·50	2·50	1·00	—
Stearated Glycerine	4·00	3·00	—	—	1·00
Iodized Glycerine	6·00	5·00	—	—	1·00

The preparation of the bistearate requires less caustic soda; 50 grams of caustic soda are sufficient to convert 500 grams of stearic acid into bistearate of soda, but at least 180 to 200 grams are required to produce the same quantity of the neutral stearate. Moreover, being less soluble in the cold than the neutral stearate it is better suited for this class of preparations.

The stearate of soda alone is not sufficient for the preparation of iodized soap; an addition of caustic soda is required, or else the jelly is not formed, and the stearate of soda is deposited from the alcoholic solution in a pulverulent form. The cause of this has not yet been ascertained, but the author thinks it to be attributable to a physical cause rather than to a chemical reaction.

The property which glycerine possesses of being easily absorbed by the skin, induced M. Reeb to attempt the preparation of a gelatinous mass with stearate of soda and glycerine in the place of alcohol. Using the proportions given in the preceding table, he obtained a compound having similar properties to glycerine, and of the consistence of opodeldoc. Increased proportions of the stearate gave products more and more firm up to the consistency of ordinary soap without diminishing their transparency.

In the preparation the powdered stearate is mixed in a mortar with the glycerine. It is then heated to the melting point, the active principle added as a concentrated solution, and the whole strained through cambric and left to cool. The author claims for it the advantage over

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* From *L'Union Pharmaceutique*, vol. xiv., p 68

soap or glycerine of starch of melting at the heat of the hand; that it is free from an organic body liable to decompose like starch; and that it does not irritate the skin like the alcoholic preparations.

PROFESSOR TYNDALL ON LIGHT.*

(*Continued from p.* 847.)

We have employed as our source of light in these lectures the ends of two rods of coke rendered incandescent by electricity. Coke is particularly suitable for this purpose because it can bear intense heat without fusion or vaporization. It is also black, which helps the light; for other circumstances being equal, as shown by Balfour Stewart, the blacker the body the brighter will be its light when incandescent. Still refractory as carbon is, if we closely examined our voltaic arc, or stream of light between the carbon points, we should find there incandescent carbon vapour. We might also detach the light of this vapour from the more dazzling light of the solid points and obtain its spectrum. This would be not only less brilliant but of a character totally different from the spectra that we have already seen. Instead of being an unbroken succession of colours from red to violet, the carbon vapour would yield a few bands of colour with spaces of darkness between.

What is true of the carbon is true in a still more striking degree of the metals, the most refractory of which can be fused, boiled, and reduced to vapour by the electric current. From the incandescent vapour the light, as a general rule, flashes in groups of rays of definite degrees of refrangibility, spaces existing between group and group which are unfilled by rays of any kind; but the contemplation of the facts will render this subject more intelligible than words can make it. Within the camera is now placed a cylinder of carbon hollowed out at the top to receive a bit of metal; in the hollow I put a fragment of the metal thallium, and now you see the arc of incandescent thallium vapour upon the screen. It is of a beautiful green colour. What is the meaning of that green? We answer the question by subjecting the light to prismatic analysis; here you have its spectrum, and it consists, as you see, of a single refracted band. Light of one degree of refrangibility, and that corresponding to green is emitted by the thallium vapour.

We will now remove the thallium and put a bit of silver in its place. First observe the arc of silver; it is not to be distinguished from that of thallium; it is not only green, like the thallium vapour, but the same shade of green. Are they then alike? Prismatic analysis enables us to answer the question. It is perfectly impossible to confound the spectrum of incandescent silver vapour with that of thallium. Here are two green bands instead of one. Adding to the silver in our camera a bit of thallium we obtain the light of both metals, and you see that the green of the thallium lies midway between the two greens of the silver. Hence this similarity of colour. But you observe another interesting fact. The thallium band is far brighter than the silver bands; indeed, the latter have wonderfully degenerated since the bit of thallium has been put in. They are not at all so bright as they were at first, and for a reason worth knowing. It is the resistance offered to the passage of the electric current from carbon to carbon that calls forth the power of the current to produce heat. If the resistance were materially lessened the heat would be materially lessened, and if all resistance were abolished, there would be no heat at all. Now thallium is a much more fusible and vaporizable a metal than the silver; and its vapour facilitates the passage of the current to such a degree as to render it almost incompetent to vaporize silver. But the thallium is gradually consumed; its vapour becomes less and less; the resistance rises, until finally you see the two silver bands as brilliant as they were at first. The three bands of the two metals are now of the same sensible brightness.

We have in these bands a perfectly unalterable characteristic of these two metals. You never get other bands than these two green ones from the silver, never other than the single green band from the thallium, never other than the three green bands that you have just seen from the mixture of both metals. Every known metal has its bands, and in no known case are the bands of two different metals alike. Hence these spectra may be made a test as to the presence or absence of any particular metal. If we pass from the metals to their alloys we find no confusion. Copper gives us green bands, zinc gives us blue and red bands; brass, an alloy of copper and zinc, gives us the bands of both metals, perfectly unaltered in position or character. But we are not confined to the metals; the salts of these metals yield the bands of the metals. Chemical union is ruptured by a sufficiently high heat, the vapour of the metal is set free and yields its characteristic bands.

The chlorides of the metals are particularly suitable for experiments of this character. Common salt, for example, is a compound of chlorine and sodium; in the electric lamp it yields the spectrum of the metal sodium. The chlorides of lithium and of strontium yield in like manner the bands of those metals. When, therefore, Bunsen and Kirchhoff, after having established by an exhaustive examination the spectra of all known substances, discovered a spectrum whose bands did not correspond to any known bands they immediately inferred the existence of a new metal. They were operating at the time upon a residue obtained by evaporating one of the mineral waters of Germany. In that water they knew the new metal was concealed, but vast quantities of it had to be evaporated before a residue could be obtained sufficient to enable ordinary chemistry to grapple with the metal. But they hunted it down, and it now stands among chemical substances as the metal rubidium. They subsequently discovered a second metal, which they called cæsium. Thus, having first placed spectrum analysis on a safe foundation, they demonstrated its capacity as an agent of discovery. Soon afterward Mr. Crookes, pursuing this same method, added to the list of metals the thallium which yielded that bright monochromatic green band.

This relates to chemical discovery upon the earth, where the materials are in our own hands. But Kirchhoff showed how spectrum analysis might be applied to the investigation of the sun and stars, and on his way to this result he solved a problem which had been long an enigma to natural philosophers. A spectrum is pure in which the colours do not overlap each other. We purify the spectrum by making our slits narrow and by augmenting the number of our prisms. When a pure spectrum of the sun has been obtained in this way it is found furrowed by innumerable dark lines. Four of them were first seen by Dr. Wollaston, but they were afterward multiplied and measured by Fraunhofer with such masterly skill that they are now universally known as Fraunhofer's lines. To give an explanation of these lines was, as I have said, a problem which long challenged the attention of philosophers.

Now, Kirchhoff had made thoroughly clear to his mind the principles which linked together the emission of light and the absorption of light; he had proved their inseparability for each particular kind of light and heat. He had proved for every specific ray of the spectrum, the doctrine that the body emitting a ray absorbed with special energy a ray of the same refrangibility. Consider then the effect of knowledge such as you now possess upon a mind prepared like that of Kirchhoff. We have seen the incandescent vapours of metals emitting definite

* Abstract of a series of lectures delivered in the Cooper Institute, New York, and reported in the *New York Tribune*.

groups of rays; according to Kirchhoff's principle those vapours if crossed by solar light ought to absorb rays of the same refrangibility as those which they emit. He proved this to be the case; he was able by the interposition of a vapour to cut out of the solar spectrum the band corresponding in colour to that vapour. Now, the sun possesses a photosphere, or vaporous envelope; doubtless mixed with violently agitated clouds; and Kirchhoff saw that the powerful rays coming from the solid or the molten nucleus of the sun must be intercepted by this vapour. One dark band of Fraunhofer, for example, occurs in the yellow of the spectrum. Sodium vapour is demonstrably competent to produce that dark band; hence Kirchhoff inferred the existence of sodium vapour in the atmosphere of the sun. In the case of metals which emit a large number of bands, the absolute coincidence of every bright band of the metal with a dark Fraunhofer line raises to the highest degree of certainty the inference that the metal is present in the atmosphere of the sun. In this way solar chemistry was founded on spectrum analysis.

I have now to make plain to you if I can, through the analogy of sound, the physical meaning of emission and absorption. I draw a fiddle-bow across this tuning-fork and it immediately fills the room with a musical sound; this is the radiation or emission of sound from the fork. A few days ago, on sounding this fork, I noticed that when its vibrations were quenched, the sound seemed to be continued, though more feebly; the sound appeared to come from under the table, where stood a number of tuning-forks of different sizes and rates of vibration. One of these, and one only, had been started by the fork, and it was one whose rate of vibration was the same as that of the fork which started it. This is an instance of the absorption of the sound of one fork by the other. Placing two forks thus near each other, sweeping the bow over one of them and then quenching the agitated fork, the other continues to sound. Placing a cent piece on each prong of one of the forks we destroy its perfect synchronism with the other, and then no communication of sound from the one to the other is possible. I will now do with light what has been here done with sound. Placing a tin spoon containing sodium in a Bunsen's flame, we obtain this intensely yellow light, which corresponds in refrangibility with the yellow band of the spectrum. I will send the white light from our lamp through that flame, and prove before you that the yellow flame intercepts the yellow of the spectrum, producing to all intents and purposes a dark Fraunhofer's band in the place of the yellow.

Mentally as well as physically every age of the world is the outgrowth and offspring of all preceding ages. Science proves itself to be a genuine product of nature by growing according to this law. We have no solution of continuity here. Every great discovery has been duly prepared for in two ways; first, by other discoveries which form its prelude, and secondly, through the sharpening by exercise of the intellectual instrument itself. Thus Ptolemy grew out of Hipparchus, Copernicus out of both, Kepler out of all three, and Newton out of all the four. Newton did not rise suddenly from the sea level of the intellect to his amazing elevation. At the time that he appeared the table land of knowledge was already high. He juts, it is true, above the table land as a massive peak; still he is supported by it, and a great part of his absolute height was the height of humanity in his time. It is thus with the discovery of Kirchhoff. Much had been previously accomplished; this he mastered, and then by the force of individual genius went beyond it. He replaced uncertainty by certainty, vagueness by definiteness, confusion by order; and I do not think that Newton has a surer claim to the discoveries that have made his name immortal than Kirchhoff has to the credit of gathering up the fragmentary knowledge of his time, of vastly extending it, and of infusing into it the life of great principles. Splendid results have since been obtained, in relation to which both England and America have played an honourable part; but, splendid as they are, they are but the sequel and application of the principles established in his Heidelberg laboratory by the German investigator.

I have now come almost to the end of my task in this city, and, indeed, in America. My desire has been to show you, with as little break of continuity as possible, the past growth and present aspect of a department of science, in which have laboured some of the greatest intellects the world has ever seen. My friend, Professor Henry, in introducing me at Washington, spoke of me as an apostle; but the only apostolate that I intended to fulfil was to place, in plain words, my subject before you, and to permit its own intrinsic attractions to act upon your minds. In the way of experiment, I have tried to place before you the best which, under the circumstances, could be provided; but I trust that each experiment has had a distinct intellectual value, for experiments ought to be the representatives and expositors of thought—a language addressed to the eye as spoken words are to the ear. In association with its context, nothing is more impressive or instructive than a fit experiment; but, apart from its context, it rather suits the conjurer's purpose of surprise than that purpose of education which ought to be the ruling motive of the scientific mind.

And now a brief summary of our work will not be out of place. Our present mastery over the laws and phenomena of light has its origin in the desire of man to know. We have seen the ancients busy with this problem, but, like a child who uses his arms aimlessly for want of the necessary muscular exercise, so these early men speculated vaguely and confusedly regarding light, not having as yet the discipline needed to give clearness to their insight, and firmness to their group of principles. They assured themselves of the rectilineal propagation of light, and that the angle of incidence was equal to the angle of reflection. For more than a thousand years—I might say, indeed, for more than fifteen hundred years subsequently—the scientific intellect appears as if smitten with paralysis, the fact being that, during this time, the mental force, which might have run in the direction of science, was diverted into other directions.

The course of investigation as regards light was resumed in 1100 by an Arabian philosopher named Alhazan. Then it was taken up in succession by Roger Bacon, Vitellio, and Kepler. These men, though failing to detect the principle which ruled the facts, kept the fire of investigation constantly burning. Then came the fundamental discovery of Snell, that corner-stone of optics, as I have already called it, and immediately afterward we have the application by Descartes of Snell's discovery to the explanation of the rainbow. Then came Newton's crowning experiments on the analysis and synthesis of white light by which it was proved to be compounded of various kinds of light of different degrees of refrangibility.

In 1676 an impulse was given to optics by astronomy. In that year Olaf Roemer, a learned Dane, was engaged at the Observatory of Paris in observing the eclipses of Jupiter's moons. He converted them into so many signal-lamps, quenched when they plunged into the shadow of the planet, and relighted when they emerged from the shadow. They enabled him to prove that light requires time to pass through space, and to assign to it the astounding velocity of 190,000 miles a second. Then came the English astronomer, Bradley, who noticed that the fixed stars did not really appear to be fixed, but described in the heavens every year a little orbit resembling the earth's orbit. The result perplexed him, but Bradley had a mind open to suggestion, and capable of seeing, in the smallest fact, a picture of the largest. He was one day upon the Thames in a boat, and noticed that as long as his course remained unchanged the vane upon his masthead showed the wind to be blowing constantly in the same direction, but that the wind appeared to vary with every change in the direction of his boat. "Here,' as Whewell says, "was the image of his case. The boat was the earth, moving in its orbit, and the wind was the light of a star."

You will immediately understand the meaning of Bradley's discovery. Imagine yourself in a motionless railway train with a shower of rain descending vertically downward. The moment the train begins to move the rain-drops begin to slant, and the quicker the train the greater is the obliquity. In a precisely similar manner the rays from a star vertically overhead are caused to slant by the motion of the earth through space. Knowing the speed of the train, and the obliquity of the falling drops, the velocity of the drops may be calculated; and knowing the speed of the earth in her orbit, and the obliquity of the rays due to this cause, we can calculate just as easily the velocity of light. Bradley did this, and the "aberration of light," as his discovery is called, enabled him to assign to it a velocity almost identical with that deduced by Roemer from a totally different method of observation.

Up to his demonstration of the composition of white light, Newton had been everywhere triumphant—triumphant in the heavens, triumphant on the earth, and his subsequent experimental work is, for the most part, of immortal value. But infallibility is not the gift of man, and, soon after his discovery of the nature of white light, Newton proved himself human. He supposed that refraction and dispersion went hand in hand, and that you could not abolish the one without at the same time abolishing the other. He maintained this opinion to the end of his life, and thus retarded the progress of subsequent discovery. Dolland at length proved that, by combining together two different kinds of glass, you might abolish the colour and still leave a residue of refraction; and he applied this residue to the construction of achromatic lenses—lenses which yield no colour, which Newton thought an impossibility.

But Newton committed a graver error than this. Science, as I sought to make clear to you in our second lecture, is only in part a thing of the senses. The roots of phenomena are imbedded in a region beyond the reach of the senses, and less than the root of the matter will never satisfy the scientific mind. We find, accordingly, in this career of optics the greatest minds constantly yearning to pass from the phenomena to their causes—to explore them to their hidden roots. They thus entered the region of theory, and here Newton, though drawn from time to time toward the truth, was drawn still more strongly toward the error, and made it his substantial choice. His experiments are imperishable, but his theory is dead. For a century it stood like a dam across the course of discovery; but, like all barriers that rest upon authority and not upon truth, the pressure from behind increased, and eventually swept the barrier away. This, as you know, was done mainly through the labours of Thomas Young and his illustrious French fellow-worker, Fresnel.

In 1808 Malus, looking through Iceland spar at the sun reflected from the window of the Luxembourg Palace in Paris, discovered the polarization of light by reflection. In 1811 Arago discovered the splendid chromatic phenomena which we have had illustrated by plates of gypsum in polarized light; he also discovered the rotation of the plane of polarization by quartz-crystals. In 1813 Seebeck discovered the polarization of light by tourmaline. The same year Brewster discovered those magnificent bands of colours that surround the axes of biaxial crystals. In 1814 Wollaston discovered the ring of Iceland spar.

All these effects, which, without a theoretic clue, would leave the mind in a hopeless jungle of phenomena without harmony or relation, were organically connected by the theory of undulation. The theory was applied and verified in all directions, Airy being especially conspicuous for the severity and conclusiveness of his proofs.

The most remarkable verification fell to the lot of the late Sir William Hamilton of Dublin, a profound mathematician, who, taking up the theory where Fresnel had left it, arrived at the conclusion that at four special points at the surface of the ether-wave in double-refracting crystals the ray was divided not into two parts, but into an infinite number of parts; forming at these points a continuous conical envelope instead of two images. No human eye had ever seen this envelope when Sir William Hamilton inferred its existence. Turning to his friend, Dr. Lloyd, he asked him to test experimentally the truth of his theoretic conclusion. Lloyd, taking a crystal of arragonite, and following with the most scrupulous exactness the indications of theory, cutting the crystal where theory said it ought to be cut, observing it where theory said it ought to be observed, found the luminous envelope which had previously been a mere idea in the mind of the mathematician.

But while I have thus endeavoured in these lectures to illustrate before you the power of the undulatory theory as a solver of all the difficulties of optics, do I therefore wish you to close your eyes against any evidence that may arise against it? By no means; we leave it to others to shrink from the contemplation of truth because it may be for the moment disagreeable. You may urge, and justly urge, that a hundred years ago another theory was held by the most eminent men, and that, as the theory then held had to yield, the undulatory theory may have to yield also. This is perfectly logical, but let us understand the precise value of the argument. In similar language a person in the time of Newton, or even in our time, might reason thus: "Hipparchus and Ptolemy, and numbers of great men after them, believed that the earth was the centre of the solar system. But this deep-set theoretic notion had to give way, and the theory of gravitation may in its turn have to give way also." This is just as logical as the first argument. Wherein consists the strength of the theory of gravitation? Solely in its competence to account for all the phenomena of the solar system. Wherein consists the strength of the theory of undulation? Solely in its competence to disentangle and explain phenomena a hundred fold more complex than those of the solar system. Be as sceptical, if you like, regarding the undulatory theory; if your scepticism be philosophical, it will wrap the theory of gravitation in the same great doubt.

Nevertheless this great theory of undulation, like many another truth, which in the long run has proved a blessing to humanity, had to establish, by hot conflict, its right to existence. Great names were arrayed against it. It had been enunciated by Hooke, it had been applied by Huyghens, it had been defended by Euler. But they made no impression. And, indeed, the theory in their hands was more an analogy than a demonstration. It first took the form of a demonstrated verity in the hands of Thomas Young. He brought the waves of light to bear upon each other, causing them to support each other, and to extinguish each other at will. From their mutual actions he determined their lengths, and applied his determinations in all directions. He showed that the standing difficulty of polarization might be embraced by the theory.

After him came Fresnel, whose transcendent mathematical abilities enabled him to give the theory a generality unattained by Young. He grasped the theory in its entirety; followed the ether into its eddies and estuaries in the hearts of crystals of the most complicated structure, and into bodies subjected to strains and pressures. He showed that the facts discovered by Malus, Arago, Brewster, and Bort were so many ganglia, so to speak, of his theoretic organism, deriving from it sustenance and explanation. With a mind too strong for the body with which it was associated, that body became a wreck long before it had become old, and Fresnel died, leaving behind him a name immortal in the annals of science.

(*To be continued.*)

The Pharmaceutical Journal.

SATURDAY, MAY 10, 1873.

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

THE COUNCIL REPORT.

PROBABLY before, or at least as soon as, the present number of the Journal is in the hands of our readers, a copy of the Council's Annual Report will have been sent to all members of the Society, and consequently although the official publication of this document will not take place until the Anniversary Meeting on the 21st inst., it will not be out of place for us to refer to its more prominent features now that the trade in general is more directly affected by the proceedings of the Society than was formerly the case.

In the first place we may state that though the Report of this year is remarkable for its brevity, it is by no means wanting in matter of deep interest and importance. Moreover it may be inferred that the conclusions arrived at as the result of the Council's labours have been such as to command general approval, since the Report opens with a declaration of the advantage ensured by full representation in the governing body of different shades of opinion. We believe that with the exception of those whose occupation would be gone if they did not, under the semblance of criticism, carp and cavil at all that is, there will be few who will fail to appreciate the soundness of the principle involved in the declaration just referred to—few who will not regard its practical recognition as amply compensating for that retardation of results inseparable from the ordeal of discussion which measures must pass through more slowly, when different shades of opinion are represented, than when the governing body is of a more paternal form.

Passing from generalities to particular points in the Report, it must be noticed that there is no decrease in the financial well-being of the Society, while there has been a considerable increase in the numbers of Members, Associates, and Apprentices.

In regard to legislative measures, the Council has the satisfaction of reporting that the Government proposes to act upon its representations as to the desirability of relieving dispensers of medicine from that interference with their daily avocations which results from liability to serve on juries. In like manner, its remonstrances in reference to the wording of a portion of the Adulteration Act resulted in an amendment of the clauses complained of. Lastly, the appointment of several Pharmaceutical Chemists as analysts under this Act may be regarded as the most effectual recognition of the views submitted to the Local Government Board by the deputation from the Council last year. In all these cases it will be evident that the Council has been zealous in furtherance of the interests of the trade in general, and that its action in this direction has been no less successful than its vigilance has been constant.

Passing over the references made in the Report to prosecutions under the Pharmacy Act, and to the late revision of the Registers, as well as to the subject of Provincial Education, which has been found too vague to admit of any organized system being adopted at present, we may mention that the account given of the steady increase in the number of subscribers and amount of subscriptions to the Benevolent Fund, as well as of the mode in which the Fund has been applied, will be calculated, together with the recent discussion on this subject, to augment still more the ranks of its supporters.

Last, though not least, we must refer to the action taken by the Council in regard to the Examinations. The nature of the revised regulations will be fresh in the memory of our readers, and it would be superfluous to dwell either on their importance or on the propriety of seconding the endeavours of the examiners by such regulations, as that requiring candidates for the qualification to carry on the business of a Pharmacist to be of the full age of twenty-one years, and to produce certificates of having been employed for three years by a Pharmaceutical Chemist or Chemist and Druggist, and in dispensing and compounding prescriptions.

JOHN STUART MILL.

THE scientific world will hear with profound regret that Mr. JOHN STUART MILL died of erysipelas on Thursday at Avignon. The blow is all the more poignant because unexpected. Three weeks ago Mr. MILL was in London, and, to the eye of his most intimate friends, seemed in the enjoyment of his wonted good health. The full significance of the loss which his death entails upon science it will take long to realize. His mind, sensitive as it was to so many points of scientific and social interest, was active and prolific to the close. Thirty years have elapsed since his "System of Logic: Ratiocinative and Inductive," marked an epoch in the history of research, and it has now assumed a permanent place in the library of the *savant* and on the bookshelves of the student. Mr. MILL was much more than an abstract reasoner, or an analyst of mental processes. He had made solid acquisitions in science; and while still a lad—he was never at either public school or university—he had earned a high reputation as a botanist, adding not a few varieties and even species to the existing classifications of the British Flora. His controversies with WHEWELL, DE MORGAN, and SPENCER gave evidence of his intimate familiarity with the latest inductions in physics, mathematics, and physiology; while he was an ardent and effective advocate of the addition of scientific subjects to the traditional *curricula* of school and college.

Perhaps the most perfect academic oration ever pronounced was his address to the students of St. Andrew's University on the occasion of his becoming their Lord Rector in 1867. He surveyed the whole realm of culture; and while speaking respectfully of the old subjects of university education, he insisted on the claims of chemistry, physics, and social science to a place in the academic programme. His writings have done more to form the intellectual habits of the rising generation of professional men than those of any other philosopher; and his influence, beautifully catholic and enlightened in all its phases, will be remembered as operative for good at a time when the tendency to "division of labour" was encouraging a narrow specialism in every department of professional life. His many-sided accomplishment and his dispassionate spirit of inquiry were at once a rebuke and a lesson to the self-satisfied expert and "the giant with one idea;" while his large tolerance of every variety of belief—so long as the belief was honest and intelligent—was the characteristic feature of a mind that took nothing on trust and gave a candid and patient hearing to every well-accredited arrival from the fields of scientific research. His loss is of more than national concern. Not only in the country in which he died, but in Germany, Italy, and on the other side of the Atlantic, it will be felt as that of an intellectual guide and pioneer in all that affects the advancement of sound philosophy and the progress of civilization.

THE DINNER AT THE CRYSTAL PALACE.

As the time fixed for ascertaining the exact number of those who will be present at this gathering is next Thursday, the 15th inst., and this is the last opportunity we shall have for reminding our readers of the fact, it may be useful to mention that each Steward is requested to report on that day to the Honorary Secretaries the number of tickets disposed of. Those desirous of obtaining tickets should therefore make application for them as early as convenient before that time. We may add, that there is every reason to believe the Dinner will in no respect fall short of the success attained last year.

THE APOTHECARIES' COMPANY, DUBLIN, AND THE ASSOCIATION OF CHEMISTS AND DRUGGISTS OF IRELAND.

We are informed by the Governor of the Apothecaries' Hall, Dublin, that he has received a communication from the Secretary of the Association of Chemists and Druggists of Ireland, disclaiming on behalf of the members of the Society any responsibility for a letter which appeared in our "Correspondence" columns on the 19th ult., and repudiating the interpretation in that letter of words attributed to Dr. Collins. As there appears now to be a general disposition to cooperate in securing for qualified pharmacists in Ireland a more satisfactory status than they have hitherto occupied, it is to be hoped that nothing will arise to mar the good feeling at present existing between the Apothecaries' Company of Ireland and the druggists of that country.

POPPY CULTURE IN CHINA.

The cultivation of the poppy and the manufacture of opium in China continue to increase, and the quality to improve, judging from the reports of the British Consuls. At the same time it is considered highly improbable that the Chinese product will ever interfere to any extent with the Indian. We read that "the extension of poppy cultivation in Sechuen, Yunnan, and other provinces, cannot but indicate a corresponding increase in the consumption of native opium; but it is improbable that the native growth will ever seriously affect the consumption of the Indian import. Once accustomed to the superior flavour and potency of the latter, no opium-smoker would dream of preferring the native variety, which, in fact, is employed almost exclusively for purposes of adulteration, or consumed by the poorer classes, and relinquished even by them the moment they can afford the higher price of the Indian drug."

The collection of the opium is effected in a very similar manner to what it is in India, the incisions in the poppy-heads, however, instead of being made longitudinally, are transverse, being cut round the entire circumference. "After the collection of the opium, the heads are gathered, and from the seeds they contain, an oil is extracted, which is used in lamps, and is sold for about 3*d.* per lb. An English acre of ground will, in a good year, produce 110 lbs. of seed, which will yield about 50 lbs. of oil."

It is said that the poppy was introduced into the Niuguta district about ten years ago, from the north, the quality now grown being superior to any other of native production.

PHARMACY IN BAVARIA.

The total number of Bavarian pharmaceutical students at the three universities during the recent winter session was—at Munich, 54; Erlangen, 17; Würzburg 34: total, 105. Besides these there were 26 students belonging to other countries. The population of Bavaria is under five millions. If these numbers be compared with those of pharmaceutical students in this country, it will be evident that much remains to be done before England will be on a level with Continental countries in the matter of pharmaceutical education.

It will be seen by an advertisement in another part of this Journal that the office of Dispenser at University College Hospital will shortly be vacant, through the resignation of Mr. William Martindale.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

May 7th, 1873.

MR. A. F. HASELDEN, F.L.S., PRESIDENT, IN THE CHAIR.

MR. W. SCOTT BROWN, VICE-PRESIDENT.

Present—Messrs. Atherton, Baynes, Betty, Bottle, Frazer, Greenish, Hampson, Hills, Owen, Radley, Sandford, Savage, Schacht, Shaw, Stoddart, Sutton, Urwick, and Williams.

The minutes of the previous meeting were read and confirmed.

Finance Committee.

The report of this Committee was received, and sundry accounts were ordered to be paid. The sum of £2500 new 3 per cents. was ordered to be purchased on the General Fund account. The Auditors' report was read, and the accounts presented were accepted. The audited financial statement was ordered to be published in the usual way.

Mr. Urwick moved that the statement of accounts marked B, prepared by the Finance Committee, and accepted by the Council, be also published. He saw no reason why these accounts should be withheld from the members at large, the Council being only the representatives of the members, and the fullest information being due to their constituents. These details showed what each department was doing, and how its operations affected the position of the Society, and when the question had been mooted of getting rid of some of these departments, it was very desirable that the fullest information should be afforded. The Journal had been valued at £5000 for some years past, and yet, by the accounts published, there appeared to be a considerable loss upon it each year, which was absurd. In the detailed accounts, however, credit being given in the Journal account for the cost of Journals supplied to the members, and postage charged to general account, a very different result is brought out.

Mr. Betty seconded the motion. He said that it was an acknowledged principle that the position of any society, and more especially an important one, must ever be strengthened or weakened by the state of its finances; and he trusted that the accounts which the Council had already accepted, as prepared by the Finance Committee with the aid of a professional accountant, would be published for the information of the members of the Society. Unless very strong reasons were shown to the contrary, they should hesitate before passing a resolution which would put the seal of secrecy upon the real financial position of the Society. The reason why the Committee had in the first instance proposed that the accounts should be presented in another form was this:—it was apparent that in their present form they did not represent the true financial position of the Society at any given time, inasmuch as they merely recorded payments and receipts of money. This is especially illustrated in the Journal department, from the figures relating to which no member of the Council had ever been able to gather the true financial position of the Journal. These more extended accounts, however, give a statement of assets and liabilities, showing the actual loss or profit. It was unfair to charge the Journal account not only with £990, the cost of the Journals supplied in return for subscriptions to the Society, but also with £528 annually for the postage of the same. The Council really adopted this principle at its last sitting by requesting the Finance Committee to credit the Laboratory account with the cost of the education of Bell Scholars; because, although no actual cash passed, there was value received. The question then was whether the old method should be still followed of only giving the receipts and expenditure, or whether the full details apportioned in the manner referred to should be given. He had heard it said that these accounts were confusing, and possibly in this instance they might require explanation; but he might say that there was not a figure which could not be substantiated at the annual meeting either by the Finance Committee, or by the professional accountant whose services had been obtained. Of course, taking five quarters of one account and six quarters in another, the statement must appear somewhat involved on the first occasion, but that would not occur again. There was always a little difficulty during a state of transition, but on the whole he believed it would be a wise act to vote for the publication of the whole details. The cashier was now engaged in going through the books to show the exact amount on which interest had been charged under various heads, and to verify the statements made by the Secretary, on which the amounts charged had been calculated.

Mr. Savage thought it would look very strange to publish two financial statements, one signed by the Auditors and the other not, and showing different results.

Mr. Urwick said the difference was caused by the different principle on which the accounts were made out. For instance, the Auditors gave no credit for the cost of supplying the Journal, but the Committee had done so, and thus produced a different result.

Mr. Savage said he did not in the least object to the fullest details of the accounts being given, but such accounts ought to be presented in so clear a form that everyone could understand them, and in the proposed statement there were many items which he believed would be very difficult of explanation. He proposed, therefore, that the accounts should be published as before on the present occasion, and that, with present experience to aid them, the accounts should be presented next year in an amended and more detailed form. He was not opposed to any amount of details, but he did object to the publication of an imperfect statement.

Mr. Schacht agreed very much with what had fallen from Mr. Savage, and advised the postponement of the fuller statement for another year.

Mr. Betty said the Auditors would never sign a statement of accounts containing estimated amounts, and therefore they would be in the same position next year.

Mr. Williams did not think some of the items, such as rent, interest, etc., apportioned to different departments, were based on such exact calculations as they should be before publication, and feared they would create confusion.

Mr. Schacht proposed the insertion of the word "estimated" in the title of the accounts, and after a considerable amount of discussion, it was decided to put the motion in the following form:—

> "That the statement marked B, with the addition of the word 'estimated' before the words 'Financial statement' be published."

A ballot was demanded, the result being that ten votes were given for and ten against the motion.

The President was thereupon called to give a casting vote, which he did against the motion, saying he believed the detailed accounts as presented would only cause some misunderstandings and difficulty of explanation.

The Amended Bye-Laws.

The Solicitor attended at two o'clock, when the amended bye-laws were put and confirmed in legal form, and a resolution was passed for holding a special meeting of the Members at the conclusion of the Annual Meeting on the 21st inst., to submit them for approval and confirmation by the Society.

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

Adams, Frank ....Bodiam.
Crisp, Frederick Arthur ....Clapham.

David, John ....Newport, Mon.
Hyne, Harry ....Bristol.
Lincoln, John Thomas...........King's Lynn.
Roberts, William Henry ....Bath.
Stansby, Charles John ....Derby.
Watmore, James ....Wokingham.

Several members, associates, and apprentices who had paid their subscriptions since April 30th, were ordered to be restored to their original status in the Society on payment in each case of a nominal fine. The same course was taken with a former member on paying his arrears of subscriptions and a nominal fine.

ELECTIONS.

HONORARY MEMBER.

Henry Watts, Esq., B.A., F.R.S., was elected an "Honorary and Corresponding Member of the Society."

MEMBERS.

Pharmaceutical Chemists.

The following Pharmaceutical Chemists were elected Members of the Society :—

Adams, Frank ....Bodiam.
Butterfield, Edward ....Brighton.
Candy, John William Gilbert...London.
Crisp, Frederick Arthur ... .Clapham.
Diaper, Albert ....Upper Norwood.
Furmston, Samuel C., jun. ......London.
Hills, Walter........................London.
Hyne, Harry........................London.
Jones, Moses.......................Swansea.
Kendall, Edward Basnipp ......Lincoln.
Lincoln, John Thomas...........King's Lynn.
Parker, John Samuel .. ..Horbling, Folkingham.
Pretty, Charles.....................London.
Roberts, William Henry ....Abergele.
Stiles, Matthew Henry ....Doncaster.
Taylor, John William ....Lincoln.
Thorn, John James ....London.
Watmore, James ....Wokingham.

Chemists and Druggists.

Atkinson, John.....................Wilmslow.
Atkinson, William ....Skipton.
Heward, William ....Beverley.
Kennedy, Alexander ....Tillicoultry.
Rees, John James ....London.
Richards, Samuel ....Tavistock.
Strawson, Vincent ....Liverpool.

ASSOCIATES.

The following, having passed their respective examinations, and being in business, were elected "Associates in Business of the Society:"—

Minor.

Askew, John........................Carnforth.
Bannerman, Charles Alexander. Lytham.
Bell, Richard Edward .. ..Walworth.
Bonnett, Frederick ....Swansea.
Brown, George Matthew.........Southsea.
Burn, Henry ....London.
Carr, George ....Sheffield.
Cartwright, William Bryan......Stratford.
Cordley, William Bains ....Colchester.
Earee, Edwin Thomas ....South Croydon.
Francis, Charles Ernest ....Hulme.
Freestone, Robert Henry ......Bristol.
Greatrex, Thomas James.........Liverpool.
Little, Henry ....London.
Marshall, Austen ....Waltham Abbey.
Sandy, Frederick William ......Walworth.
Saunders, Ernest Clement ......Detroit, U.S.A.
Stubbs, Tyson ....Deal.
Walton, William Henry ....Hull.
West, William .... Bradford.
Whitelaw, James ....Glasgow.

Modified.

Barrow, Francis Clark...........Barrow-in-Furness.
Bates, John Freer..................Didsbury.
Biggleston, Edwin Radford......Canterbury.
Bond, Edward .... Reading.
Burdon, Thomas Austin ....Spennymoor.
Clayton, Daniel Thomas ....Grimsby.
Collett, Charles B. ....Exeter.
Lorimer, John ....London.
Moule, William.....................Redditch.
Murphy, John ....London.
Orme, Alfred John ....Birmingham.
Smith, John Charles..............London.
Turton, Randolph Culwick ......South Lambeth.

The following, having passed their respective examinations, were elected "Associates of the Society:"—

Minor.

Baines, Arthur ....Alsager.
Balkwill, Joseph ....Kingsbridge.
Baxter, William, jun. ....Wisbeach.
Bradshaw, John ....Runcorn.
Branson, Frederick Woodward .Northampton.
Clifford, Thomas Andrews ......London.
Davis, Benjamin ....Leamington.
Edward, William Wales ....Aberdeen.
Fox, Charles Edward ....London.
Graham, William Woodrow ...Dalbeattie.
Herbert, Samuel ....Bristol.
Hodges, Edwin Goodall ....Bristol.
Jenkins, Thomas Morgan ......Merthyr Tydvil.
Kitchen, William...................Kendal.
Laverack, William Henry ......Bradford.
Luke, Tom...........................Penryn.
Lucas, Joseph Michael Mark...Gravesend.
McCullum, Hugh... ....Berwick.
McCormick, Frank Henry ......Cheltenham.
Miller, Kenneth ....Wick.
Neale, John ....Woodbridge.
Paterson, Stephen.................Edinburgh.
Richardson, Thomas Plowman. .Blackburn.
Robertson, John ....Plymouth.
Scott, Thomas Alexander ......London.
Sheriff, George ....South Norwood.
Smith, James William ....Cambridge.
Smithard, Herbert Henry ......Guernsey.
Teebay, John........................Preston.
Wallis, Owen........................Hastings.
Waring, Albert Wynne ....Bedford.
Watson, Horace, jun. ....Laceby, Grimsby.

Modified.

Coates, Richard ....Croydon.
Colledge, William Robert......Newbiggin-by-the-Sea.
James, Henry ....Ross.
Speight, Robert.....................Lincoln.

APPRENTICES OR STUDENTS.

The following, having passed their Preliminary examination, were elected "Apprentices of the Society:"—

Albright, Alfred ....Bootle.
Allison, Edward Arthur ....Hull.
Beach, William Henry...........Penkridge.
Beeby, John ....Falkirk.
Chadwick, John ....Accrington.
Collinson, Frederick William ...Alnwick.
Crowden, Francis ....Keswick.
Eardley, James Furnival.........Hulme.
Gibson, Robert James ....Glasgow.
Harrison, James ....Sunderland.
Howard, Robert ....Clitheroe.
Husband, John Cecil ....Berwick-on-Tweed.
Ingham, Thomas Whittaker ...Rawtenstall.

Jones, David William ....Llandilo.
Law, William Thorburn ....Falkirk.
Miller, Alexander Kenneth......London.
Morgan, Augustus Kinsey ......Newport, Mon.
Naylor, William Arthur H. ...Manchester.
Newbould, John Benson ....Liverpool.
Pasmore, Walter Frank .. ..London.
Pittuck, Frederick W............Helburn-on-Tyne.
Ronca, Alfred ....Upper Norwood.
Savage, John Welch ....Wells.
Sanderson, Thomas Eastwood...Darlington.
Weighill, Thomas Armstrong ...Sunderland.
Will, William Watson .. ..Montrose.

Library, Museum, and Laboratory Committee.

The Report of this Committee was read, including a draft of the Annual Report to be presented at the ensuing Annual Meeting, which, with certain amendments, was received and adopted.

The following books were ordered to be purchased:— Valentine's 'Qualitative Chemical Analysis,' Tome's 'Dental Surgery,' 'Throat Hospital Pharmacopœia,' and 'Skin Diseases Hospital Pharmacopœia.'

A chemical balance was also ordered to be purchased.

Report of Examinations.

April, 1873.

ENGLAND AND WALES.

Examinations.	Candidates. Examined.	Passed.	Failed.
Major	11	7	4
Minor	69	38	31
Preliminary	361	187	174
	441	232	209

Certificates received in lieu of the Preliminary examination:—

Incorporated Law Society of the United Kingdom	1
University of Cambridge	1
„ „ Oxford	1
	3

SCOTLAND.

Examinations.	Candidates. Examined.	Passed.	Failed.
Major	4	1	3
Minor	21	9	12
Modified	9	8	1
Preliminary	62	36	26
	96	54	42

The North British Branch.

The President read the report of the deputation which recently visited Edinburgh, expressing generally their satisfaction with the new premises and arrangements, and making certain suggestions for the conduct of the Society's affairs and business in that city. The report was ordered to be entered on the minutes.

The Board of Examiners.

The Secretary reported the death of Mr. John Garle, lately one of the Board of Examiners, and the President also reported the resignation of Mr. Ince in accordance with the advice of his medical attendant.

A resolution was passed accepting the resignation of Mr. Ince, and expressing the thanks of the Council for his many years' services on the Board of Examiners.

Benevolent Fund.

The Report of the Committee was read, recommending the grant of £10 to a Registered Chemist and Druggist in distressed circumstances, and also a similar grant of £10 to the widow of a deceased member. The Report was received and adopted.

The Conversazione.

The minutes of the Committee appointed to make arrangements for the forthcoming Conversazione at the South Kensington Museum, were read and approved.

The Secretary reported that he had received a communication from the Royal Botanical Society granting admission to Professor Bentley's class during the ensuing season.

Certificate of Cambridge University accepted by the Board of Examiners in Scotland in lieu of the Preliminary examination of

Adams, Joseph ....Edinburgh.

Errata.

Page 866, col. i. *for* "three hundred and sixty-one" *read* "three hundred and sixty-two."

For "one hundred and eighty-seven" *read* "one hundred and eighty-eight."

In the result of the Preliminary examination, p. 867, "Raynor, Charles Thomas, of Leicester," omitted, should be equal with "Barlow" and "Corden," lines 24 and 25.

Page 867, of towns at which examinations were held, Leicester should read "5 | 2 | 3."

Page 869, *for* "Salisbury, Madge, James C., 10/6," *read* "Lymington, Madge, James C., 10/6."

Provincial Transactions.

THE NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

A Special Meeting of this Association was held on Monday, May 5th.

The President, Mr. Hester, said the purpose of their Association was the education of its members in pharmaceutical knowledge, and their preparation for the various examinations they had to pass. That they had not failed in their purpose was conclusively shown by the fact that last month two of their members passed the Minor in such a creditable manner, one passing in honours and the other close upon the stars. Both those gentlemen he warmly congratulated, reflecting, as they did, such credit upon the Association. Last week, too, he also noticed with great pleasure the name of one of their number very high up on the Preliminary list; and he had no doubt many others, stimulated by these examples, would go on working till they had also become successful. Nor must they forget that the simple passing of an examination was not their destination, but only a resting-place upon the road. After the Secretary had read the minutes, etc., he should call their attention to a subject which doubtless was present in their minds,—that of a botanical ramble.

Mr. Druce then read the minutes of the previous meeting and a list of donations, including a very interesting and useful series of prescriptions, which contained some specimens of foreign prescribing, through Mr. Evans, from Mr. Babb, of Taunton. Messrs. Sandall and Maxwell, who had kindly acted as examiners, had sent in the result of the late examination:—

Assistants' Examination—Botany.

The President's Prize ....Mr. Owen Wallis.

Apprentices' Examination—Materia Medica, Pharmacy, and Botany.

The Secretary's First Prize ......Jno. Cross.
„ Second Prize......Lewis J. Bird.

The prize offered by Mr. Sutton was postponed.

It was then arranged to have a Botanical Ramble to Olney and Turvey on May 27, 1873.

UNITED CHEMISTS AND DRUGGISTS' SOCIETY OF IRELAND.

The monthly meeting of this Society was held on Monday evening, at 12, Grafton Street.

Mr. J. A. Ray was moved to the chair.

The minutes of the last meeting were read and confirmed, after which the honorary secretary (Mr. W. Hayes) read communications from members of the trade in Cork, Belfast, Armagh, Athy, Warrenpoint, etc., approving the objects of the Society and offering their cooperation.

Mr. C. R. C. Tichborne, Ph.D., F.C.S.L., M.R.I.A., was elected Honorary Member of the Society.

The following gentlemen were elected Members:—Messrs. H. N. Draper (Bewley and Draper) and W. Dobbyn, Belfast.'

The following were elected Associates:—Messrs. Cottingham Walters, J. Beggs, and T. C. Kelly.

After some discussion on certain letters which have appeared in the PHARMACEUTICAL JOURNAL, and other business, the meeting adjourned

BRIGHTON ASSOCIATION OF PHARMACY.

At a meeting of the Brighton Association of Pharmacy, on Friday, May 2nd, at the Hanover Lecture Hall; Mr. W. D. Savage, President, in the chair, the subject of Civil Service Trading was introduced for discussion by Mr. T. Higham.

Having given Professor Rogers's idea of cooperation, he endeavoured to show that trading, as carried on by the Civil Service servants at the present time, is not cooperation at all, as any friend can borrow a ticket and avail himself of its privileges. For many reasons he considered the practice unjust to the ordinary retail trader, and he believed that similar principles of injustice applied to themselves would be stoutly resisted by them, but he hoped the time was not far distant when the very enviable salaries of the officers of the Civil Service would revert to the National Exchequer, and so be shared by the public at large. He then argued that the present system of introducing proprietary articles was not desirable, as it tends to lower the standard of skilled labour by employing porters and errand boys in their production instead of properly qualified assistants. He regretted that the efforts of retailers to cope with these evils had not met with the success they deserved on account of a want of proper organization amongst themselves, and he proposed several remedies to meet the difficulty.

In the discussion which followed Messrs. Savage, Barton, Armitage, Ettles, W. H. Smith, and others took part. Civil Service trading was decidedly objected to because civil servants had many advantages over ordinary retailers, on account of their positions as servants of the State, so that retailers were very heavily handicapped in competition with them. An opinion was also decidedly expressed that all cooperative stores ought to pay property and other taxes, so as to be placed on an equality with other trading bodies, and not on a level with charitable societies. The question was also raised as to who would be responsible for cases of poisoning, etc., that might be expected to arise from the fact of their mixing up groceries, wine, and other trades with the very responsible duties of pharmacy.

A hearty vote of thanks having been given to Mr. Higham, the Chairman called on Mr. W. H. Smith to exhibit a new Laboratory Gas Burner (Wallace's Patent) which was shown to be capable of melting copper wire in the open flame, and by a small arrangement at the tap would produce a luminous, a Bunsen, or a kind of blowpipe-flame at pleasure.

The meeting then concluded by passing a vote of thanks to the Exhibitor.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, 1st May, 1873; Dr. Odling, F.R.S., President, in the chair.

After the usual business of the Society had been transacted, three memoirs were read. The first, by Dr. H. Sprengel, "On a new class of Explosives," gave an account of some new explosives, consisting of two liquids inexplosive by themselves, but which when mixed and fired with a detonating charge, are as effective as nitroglycerine. In the discussion which ensued Professor Abel, of the Royal Arsenal, Woolwich, drew attention to the great difference produced by variations in the mechanical state of the explosive. The other papers were "On Zirconia," by Mr. J. B. Hannay, and "A Note on Pyrogallate of Lead and on Lead Salts," by Mr. W. H. Dewing.

The meeting was finally adjourned until Thursday, the 15th May, when a lecture "On Isomerism" will be delivered by Dr. H. E. Armstrong.

PARIS SOCIÉTÉ DE PHARMACIE.

HYDROCHLORATE OF TRIMETHYLAMINE.

At the meeting of this Society on the 2nd April, M. Petit said that in operating upon twenty-five litres of herring-brine he had obtained 30 grams of hydrochlorate of trimethylamine and 45 grams of chloride of ammonium. An estimation of the chlorine had given 37 per cent., a quantity agreeing with that required by theory; whilst the chlorhydrate obtained by M. Wurtz in decomposing iodide of tetramethylammonium by lime gave 53 per cent., a figure corresponding with the formula of hydrochlorate of monomethylamine.

M. Wurtz said that in the reaction of lime upon tetra methylammonium the three compound ammonias are pro duced, and certainly trimethylamine.

M. Guichard exhibited some large crystals of benzoic acid produced by the slow action of sulphide of carbon upon benzoin, and suggested that sulphide of carbon might present some advantages in the purification of resins.

Dr. de Vry remarked that there were some resins which were not dissolved by sulphide of carbon, instancing that of *Podocarpus cupressina*.

ESTIMATION OF CINCHONAS.

Dr. de Vry communicated some new results obtained by M. Oudemans, Professor at the École polytechnique of the Netherlands, respecting the variations in the rotatory power of an active substance being dependent upon the vehicle in which it is dissolved. Thus cinchonidine, which rotates a beam of polarized light to the left, manifests a very varying degree of energy, according to whether it is dissolved in absolute or dilute alcohol. The same is the case with cinchonine, the dextrogyrous power of which varies between rather wide limits, according as it is dissolved in alcohol or chloroform. In making comparative experiments upon the same body, therefore, it would be necessary always to employ the same solvent. Dr. de Vry also alluded to some unsatisfactory results he had obtained with various cinchonas, in the estimation of sulphate of quinine by the process recently published by M. Carles,—a cinchona which by the usual process yielded 8 per cent. of alkaloid, only yielding him 3·8 per cent. by M. Carles's process.

M. Vigier said that he had frequently adopted the process of M. Carles, and always with good results, and attributed Dr. de Vry's want of success to some defect in the mode of operating.

Dr. de Vry said that to determine the value of a cinchona the rotatory power of the total alkaloids it contained should be determined. If the rotatory power be to the left and with great intensity, the cinchona is good for the manufacture of sulphate of quinine. If the deviation be but slightly to the left, or more particularly if it be to the right, it is unsuitable.

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

Public Health Bill.

A Bill with the above title was introduced into the House of Commons on the 21st March by Sir Charles Adderley, read a first time, and ordered to be printed. It has now been issued, and among its provisions are the following :—

Clause 3 extends the provisions of the Nuisances Removal Act, 1863, to unwholesome tea and to all milk of any animal suffering from any contagious or infectious disease, as defined by the Contagious Diseases (Animals) Act, 1869, or from any tubercular disease, the person selling the same is, on conviction before a justice, to be liable to a penalty not exceeding *twenty pounds*, and the refunding of the purchase-money.

Clause 5 provides that on complaint made by a medical officer of health, or by any inspector or other officer of a sanitary authority, a justice may grant a warrant to enter any building or part of a building, or other place in which there is reasonable ground for believing that any diseased, unsound, or unwholesome food is kept or concealed, and to search for, seize, and carry it away.

Clause 6 adds to previous definitions of "nuisances," any inhabited house or building without an adequate supply, or access to an adequate supply, of wholesome water ; any inhabited house or building admitting rain or other water so as to be injurious to health ; any well or pump, public or private, likely to be used by human beings for drinking purposes, or for the preparation of human food, the supply of water from which is unwholesome and injurious to health ; any pool, ditch, gutter, watercourse, privy, urinal, cesspool, drain, or ashpit, injurious to health, and any drain inlet not properly trapped ; and any animal kept in such a situation as to be injurious to health.

Clause 13 relates to returns from medical officers of health and poor law medical officers respecting sickness within their respective districts, and as to sickness under treatment in or in connection with any institutions within their respective districts established for the treatment of the sick, and maintained wholly or partly by voluntary subscriptions, or by endowments, or grants from the Consolidated Fund, or by local rates.

Clause 26 provides that "Every sanitary authority shall cause the water supplied for drinking or domestic purposes within its district, whether by itself or by any waterworks company or by any other person, to be analysed at such times and by such person as the Local Government Board may direct. For the purpose of obtaining samples of the water so supplied, any analyst or duly authorized officer of the sanitary authority may enter upon any lands occupied by such waterworks company or person so supplying water and may take and carry away samples of the water so supplied, and any person refusing admission to or obstructing any such analyst or duly authorized officer as aforesaid in the performance of his duties under this section shall, in addition to any other punishment to which he may be subject, be liable to a penalty not exceeding *forty shillings*."

On Thursday, May 8, Sir Charles Adderley moved the second reading of the Bill, and it was intimated that the Government were favourable to the measure, but it was opposed on the ground that it was inexpedient until the laws relating to public health were consolidated, and the discussion was eventually adjourned.

Trade Marks Registration Bill.

A Bill providing for and regulating the Registration of Trade Marks,—a subject concerning which we continually receive requests for information,—was brought in on the 21st of April, when it was read a first time and ordered to be printed. It has been drawn up by Mr. Arthur Peel and Mr. Chichester Fortescue.

The Bill provides that any person who is entitled to the exclusive use of any lawful trade mark, and any person who intends to adopt and use any trade mark which can be adopted for exclusive use by him as a lawful trade mark, may (subject to certain exceptions), whether he is a British subject or not, and whether he is resident or carrying on business or using such trade mark in the United Kingdom or elsewhere, register such trade mark under its provisions. Upon the registry of a trade mark, and so long as such registry remains in force, the registered owner of such trade mark is to be deemed entitled to the exclusive use of such trade mark so far as regards the description of goods to which it is appropriated in the register. No person, however, is to be entitled to have any trade mark registered which in the opinion of the Board of Trade is not or cannot become a lawful trade mark ; or is the name of a person or style of a firm only, unaccompanied by a mark sufficient to distinguish it from the same name or style when used by another person or firm ; or is identical with a trade mark appropriated to the same class of merchandize and belonging to a different owner, and already registered or received by the registrar for registry ; or so nearly resembles such trade mark as to be likely to deceive.

Application for registry is to be made in a prescribed form, and facsimiles of the proposed trade mark are to be deposited with the registrar, who, after examination and publication, is to register the applicant as owner of that particular trade mark. Such registration, however, is to be dependent upon the payment of a fee (five pounds), and only to be in force so long as an annual payment (one pound) is made. If the owner of any registered trade mark fails to pay the annual fee within one month after it is duly demanded by the registrar, the registrar is empowered to strike it out of the register. If within three months after such demand the owner pays the annual fee to the registrar, together with a prescribed additional fee, the registrar may restore such trade mark to the register. If after the lapse of three months and not more than twelve months the Board of Trade be satisfied by the owner that the nonpayment of the fee arose accidentally, or from circumstances beyond the control of the owner, it may make an order restoring such trade mark to the register ; but at the expiration of twelve months from such demand, if the trade mark is not meanwhile restored to the register, the registered owner of such trade mark shall be deemed to have abandoned and to have lost his right to the exclusive use of such trade mark for the description of goods to which it is appropriated in the register.

The registrar of trade marks, on the original registry of a trade mark, and at any time while the registry of such trade mark remains in force, is, on application, to give to the registered owner a certificate, certifying that the trade mark therein specified is at the date of the certificate duly registered.

A person is not to be entitled to have registered more than one trade mark appropriated to the same description of goods ; and various provisions are made for joint proprietorship, transfer, changes of address, additions to trade mark, etc. Falsification of the register, obtaining registry by false representation, and forgery of certificates, are misdemeanours under the Act, punishable by fine and imprisonment, and the necessary proceedings may be conducted in the manner prescribed in the Summary Jurisdiction Acts.

PROSECUTION FOR THE SALE OF ADULTERATED VINEGAR.

At the Blackburn Borough Police Court, on Wednesday, April 30, Mr. John Thomas Hall, chemist and druggist, was summoned on three charges—firstly, for selling on the 25th January last, to Mary McGrath, a cough mixture composed of opium and adulterated with hydrochloric acid; secondly, for selling on the 10th February last, to Superintendent Robert Eastwood, a cough mixture adulterated with hydrochloric acid; and thirdly, for selling to Superintendent Robert Eastwood, on the 10th February last, half a pint of vinegar, the same being adulterated with hydrochloric acid.

Mr. Potts, chief constable, conducted the case for the prosecution; Mr. Clough appeared for the Cambrian Vinegar Company, of Leeds.

The case had its origin in a prosecution, at the Liverpool Spring Assizes, for manslaughter of a child (reported at p. 798), in which the grand jury failed to return a true bill, but called the attention of Mr. Baron Pollock to evidence that tended to show that the vinegar used in a cough mixture which was given to the deceased was adulterated with hydrochloric acid. The judge concurred in the remarks of the jury, and expressed a hope that they would lead to an investigation. Mr. Potts, the chief constable, stated that he had therefore caused to be purchased from the defendant a quantity of vinegar and a quantity of the cough mixture. Both were analysed, and both were found to contain hydrochloric acid. The defendant had declared that he had received the vinegar used in the cough mixture from the Cambrian Vinegar Company, Leeds, and through the chief constable of Leeds, before the case was reported in the newspapers, samples of vinegar were obtained from that company, as for an intending purchaser, consisting of the highest and lowest standards of vinegar. These were analysed at Leeds and Blackburn and found to be unadulterated. Samples of vinegar were also obtained from other customers of the Company, which had been in stock prior to the death of the child, and found to be pure. Mr. Potts then went to the defendant's shop to get a sample of the original vinegar with which defendant said he had prepared the cough mixture. Defendant said that he had finished all the vinegar used in the preparation of the cough mixture. Ascertaining that the defendant had received six casks out of one of which he said he had obtained the vinegar used in the preparation of the cough mixture, he went with Superintendent Eastwood into the defendant's cellar, and there saw a cask marked with the initials of the Company. They saw a quantity of vinegar drawn from that cask. It was analysed, and found to be perfectly free from hydrochloric acid or any deleterious ingredients. He could not tell whether the cask had been previously opened. The defendant accounted for the absence of the casks that he had received from the Company by saying that he had sent them back. That statement was not true, as on the 18th January six casks were sent to him by the Brewery Company, and only one of these casks had been sent back. Mr. Potts said that the difference between the vinegar obtained from the Company's cask, and that alleged by the defendant to have been taken out of the Company's cask, and which was poisonous, could be detected even in the taste. The defendant had stated distinctly that the vinegar he gave to Superintendent Eastwood first, was taken from the same cask as that mixed with the cough mixture was taken from. Notwithstanding the fact that defendant discovered at the inquest that the vinegar, which he alleged was obtained from the Company, was adulterated, he had since that given three successive orders to the Company for the same quality of vinegar.

Some medical evidence was given as to the state of the stomach of the deceased child; and the mother deposed to the purchase of the cough mixture at the defendant's shop.

Professor Railton, analytical chemist, said, on Saturday, the 8th of February, he received from Dr. Martland a jar containing the stomach and other parts of the intestines of a child. The stomach was inflamed. He found an ounce and three-quarters of liquid matter, and on analysing the contents of the stomach he found 26 grains or 3·4 per cent. of hydrochloric acid. He also found thirty-eight hundreds per cent. of morphia, equal to about four grains of opium, in the whole contents of the stomach. He also found a quantity of acetic acid, saccharine matter, and gum. Hydrochloric acid would inflame the stomach. The stomach would not have been found in an inflamed state if the tincture of opium had alone been there. The presence of the acid would be excessively injurious. The mixture ought to have been entirely free from hydrochloric acid.

The Mayor—Would the hydrochloric acid be put in separately?—Witness said hydrochloric acid would be put into the mixture in order to obtain a solution of the morphia of the opium, and to get the most out of the latter. Manufacturers of vinegar would not use hydrochloric acid unless they were great rogues.

By the Mayor—A certain quantity of sulphuric acid was put into vinegar, but that was allowed by law. But no hydrochloric acid was allowed to be put in. The latter acid was put in to represent acetic acid. There was hydrochloric acid in this case to represent 50 per cent. of acetic acid.

The Mayor—Is there not a great deal of vinegar made out of acetic acid?—Witness—Yes; vinegar is dilute acetic acid.

Mr. Potts—But acetic acid has no relation to hydrochloric acid?—Witness—Not the slightest.

The Mayor—There must be no hydrochloric acid?—Witness—Not the slightest.

By the Mayor—There must be no hydrochloric acid in vinegar.

By Mr. Potts—Every bottle of it must be free from that acid. Out of threepence worth of hydrochloric acid 50 gallons of the stuff called vinegar could be prepared. No manufacturer in his senses would use that quantity. He received from Superintendent Eastwood on the 10th February, a bottle of cough mixture. He analysed a portion of that, and found 4·20 per cent. of hydrochloric acid in it. That was substantially an equal proportion to the liquid found in the stomach of the child, with the addition of a little water. On the 10th February he received from Superintendent Eastwood a bottle of vinegar, which he had carefully analysed. He found in the vinegar 4·6 per cent. of hydrochloric acid, 94·9 per cent. of dilute acetic acid, and 0·5 per cent. of sulphuric acid. The 4·6 per cent. of hydrochloric acid ought not to have been there at all. He had analysed samples received from Leeds, from the Company's brewery, and from tradesmen, and found them all free from adulteration. He had also analysed the sample obtained at Mr. Hall's shop, and it was free from adulteration, and was pure vinegar.

By Defendant—Could not say what was the quality of the vinegar obtained from Leeds. He knew nothing about where the samples came from when he analysed them, or what quality they were, or what the analysis was for. He merely returned the analysis as he found it.

Mr. Potts said the vinegar obtained from Leeds was of the highest and lowest brands.

Superintendent Eastwood said he was present at the coroner's inquest on the 10th of February, and the defendant gave evidence. He then stated that the cough mixture was composed of vinegar, treacle, sugar, oxymel of squills, and tincture of opium flavoured with mint, and that he made it himself in quantities of two gallons at a time. He said he put an ounce and a half of laudanum to the two gallons, and that these were all the ingredients he put in. Subsequently witness obtained some of the cough mixture from the defendant, and took it to Mr. Railton, and also a quantity of vinegar, which Mr. Railton had stated contained hydrochloric acid. On the 2nd April he went with Mr. Potts to the defendant's shop, and asked him if he had any of the vinegar out of which the cough mixture had been prepared left. He said he had not. Witness said that he wanted a pint of vinegar, and accompanied the defendant down the cellar when he went to draw it. He saw the defendant draw the vinegar from a cask that was branded with the initials C.V.C. (Cambrian Vinegar Company.) Mr. Railton had sworn that that vinegar was pure. Defendant said the vinegar of which he had made the cough mixture was not drawn from that particular cask, but from one of six that he had got from the Company since the inquest was held. Defendant, when asked to account for the other casks, said he had sent them back. He at the same time showed the invoices, showing that the Company had sent him six casks on the 18th January. According to those invoices, defendant's statement as to his making the cough mixture out of the casks sent on the 18th of January could not be true.

Mr. James Brodie said he was manager for the Cambrian Vinegar Company, at their branch establishment, Leeds. He had done business with the defendant in several cases. The copy (produced) was a correct copy of the invoice sent to the defendant on the 18th January last. The six casks would be sent to the defendant on the 18th January, the same day as the invoice. The Company had got one of the casks back. The others had not been sent back. They always acknowledged the receipt of casks. The Company brewed five qualities of vinegar. They did not use any hydrochloric acid in the manufacture of their vinegar. If they did use that acid, he would know, as it would be his business as manager to direct that it should be put in. On most days he superintended the making of the vinegar and the general work. They had no hydrochloric acid on the premises. They had never had. Richard Milford, the brewer at the works, would know what was put into the vinegar. There was no adulteration whatever in the vinegar sent to the defendant on the 18th of January. He was quite certain of that. The company had never at any time—either on the 18th of January or any other date—supplied to any one vinegar adulterated with hydrochloric acid. Defendant's statement that he had made the cough mixture out of vinegar supplied by them had considerably damaged the company's trade.

Richard Milford said he was the brewer at the Cambrian Company's Vinegar Works, Water Lane, Leeds. It was his duty to attend to the process of making the vinegar. He had never at any time put hydrochloric acid into the vinegar. They had no hydrochloric acid on the premises. He saw the vinegar made, and it was pure brewed malt vinegar, and was not at all adulterated with hydrochloric acid.

By the Mayor—The vinegar was diluted, and different ingredients were used, such as sugar and raisins. Nothing that was deleterious was used.

By Mr. Potts—Nothing that was poisonous or corrosive was ever used in the preparation of vinegar at the Company's works.

The Mayor asked Mr. Railton whether in such a mixture as that described, any chemical action might take place that would produce hydrochloric acid.

Mr. Railton—Certainly not; the chlorine is wanted.

Mr. Clough addressed the Bench in behalf of the Cambrian Vinegar Company, and contended that the evidence adduced proved that the vinegar which had been procured by the defendant from the Company did not contain any deleterious ingredients.

The defendant did not offer any defence, and after a few minutes' consultation,

The Mayor said the Company was entirely exonerated from any blame in the matter. (Addressing defendant): We are very sorry that such a case has been brought against you. I was very much struck with the ignorance you have shown with respect to the nature of medicines. You must know that it is necessary for you to understand what you are dealing with as medicine. My advice to you would be, never to make another cough mixture until you thoroughly understand the constituent parts of it. I should also recommend you to pass an examination before the Chemical Society. We have decided to fine you £5 and the costs in one case, and the other cases are dismissed.

Mr. Potts asked for costs of three analyses, being 10*s.* 6*d.* an analysis.

The Bench granted the application.

Mr. Hall, who had stepped from the box, got up again, and asked the Bench to grant him a case for a superior court.

The Mayor—The best thing you can do is to let the matter drop.

Mr. Hall—I am entirely innocent of it.

The Mayor—It will be the cheapest and the best to let the thing drop.

Mr. Hall then left the box.—*From the Blackburn Times.*

Adulteration of Quinine with Quinidine.

At the Liverpool Police Court, on Wednesday, April 30, William Henry Rowlands, chemist, 195, Vauxhall Road, was summoned for selling a quantity of quinine which was adulterated. The Deputy Borough Solicitor, Mr. Atkinson, prosecuted.

A Corporation officer, named Robinson, said that on the 28th March last he visited the defendant's shop and asked for twenty grains of the purest quinine. The defendant said he did not keep any but the best quality, and gave the witness a packet labelled "quinine sulphate," for which he paid him one shilling. The witness then told the defendant that he was going to take it to the public analyst, and the defendant said he could not get a living by selling genuine drugs; and that the article he had sold was "quinidine," the second extract from the red Peruvian bark.

Dr. Brown, the borough analyst, who was called, said that the article in question contained a considerable amount of an alkaloid of bark, which was not quinine at all. "Quinidine" was not injurious to health, but it would increase the bulk and materially decrease the value.

The defendant pleaded that what he had sold was a mild tonic, and was not detrimental to health.

Mr. Aspinall (magistrate) asked how it was that only one druggist had been summoned? He thought it would have been better to have sent inspectors to half-a-dozen shops in various parts of the town, when they would probably have found matters much the same in each case.

Mr. Atkinson replied that the course suggested had been adopted, and the defendant's was the only case in which any adulteration had been detected.

A fine of 10*s.* and 9*s.* 6*d.* costs was imposed, Mr. Aspinall remarking that it was very gratifying to find that this was the only case.—*Liverpool Daily Post.*

Prosecution under the Adulteration Act.—Important Decision.

On Friday, May 2, at the Clerkenwell Police Court, Mr. William Rance, a dairyman and cowkeeper, Islington, was summoned before Mr. Barker, by an inspector appointed by the Vestry of St. Mary, Islington, under the provisions of the Act to amend the law for the prevention of adulteration of food and drink and of drugs, to answer complaints "for that he, being a dairyman and milk seller, did, on the 31st March, unlawfully sell a certain article of food and drink (to wit, milk), knowing the same to have been mixed with another substance, with intent fraudulently to increase its bulk, and without declaring such admixture to the purchaser thereof before delivering the same to the purchaser, contrary to the Act," etc. Mr. John Layton, vestry clerk, of Islington, attended for the prosecution; Mr. Ricketts defended Rance.

The inspector stated that he had purchased the milk at Mr. Rance's shop, and paid 3*d.* for a quart. Dr. Tidy analysed it with the following result :—Specific gravity of milk, 1024; cream, 3·8; total solid per 1000, 84·0; fat (butter), 14·6; casein (cheese), 23 = 37·6; sugar, 39·2; salts, 7·2 = 46·4.

Mr. Ricketts, in both cases, submitted that the milk was known as skim milk, and that, though the cream was removed, that was not an adulteration. He further contended that the defendant had not fraudulently increased the bulk of the milk for the purpose of defrauding the purchaser.

Mr. Barker asked if this case was not similar to one he dismissed, in which the Vestry of St. Luke's were the prosecutors.

Mr. Ricketts said it was, for then it was shown that the milk sold was known as skim milk.

Mr. Barker said that since the case was first before him he had paid particular attention to it, and he came to the conclusion that he could not convict. What the intention of the legislature was it was not for him to say, but he must deal with the case as it stood. By the 3rd section he found that any person who should sell any article of food or drink, or any drug, knowing the same to have been mixed with any other substance with intent fraudulently to increase its weight or bulk, and who shall not declare such admixture to any purchaser thereof before delivering, to be the same and no other, shall be deemed to have sold an adulterated article of food, or drink, or drug, as the case may be, under this Act. Construing these words literally and strictly, as he was bound to do, he did not think he should do right in convicting the defendant. He then dismissed the summons.

Mr. Layton said that after that judgment he should have to ask for a case for the decision of the judges in the superior courts.

Mr. Barker said that for the present he should not grant a case, but Mr. Layton could, if he pleased, apply in writing, as the Act laid down.

On Saturday, Mr. Layton again appeared before Mr. Barker, and said that he had to ask for a case, and he now formally put in his reasons for so doing. The case was applied for in consequence of a resolution of the Vestry, passed on Friday night, the Vestry having determined, should the decision of Mr. Barker be upheld by the court above, to consider the Adulteration of Food Act a dead letter, and at once to discharge their analyst and inspectors and refuse to put the Act in force. At the meeting of the Vestry on Friday night it was stated that the Adulteration Act had been passed on the ground that the vestries had failed to use the permissive laws previously in existence, and now the legislature had given them an Act which, should Mr. Barker's decision be upheld, would be perfectly useless to them. If the law as laid down by his worship was to be carried out the Vestry felt that they should be acting in the dark. If the Act was not to be carried out, or if it had not given the court power enough, then it was not worth the paper it was written upon.

Mr. Barker remarked that this was not the first Act that was not worth the paper it was written upon.

Mr. Layton referred to the first Act of Parliament, in which the word "pure" was used, and he contended that both Acts of Parliament bore on the case. The court had held with Mr. Ricketts that because the cream was taken away from the milk that it was milk still, and that it was not adulterated; but his contention was that reducing the strength of any article was an adulteration within the meaning of the Act.

Mr. Barker said he had decided the case on the facts as submitted to him in the evidence, and had decided that there had been no ingredient added fraudulently to increase the weight or the bulk of the article sold.

Mr. Layton said he might refer the magistrate to the case of cinnamon. There was a process in existence by which all the good of the spice might be extracted, and then the remainder was sold as chips, there being no goodness left in it. He further contended that the presumption of the Act was that if any person went into a shop to purchase an article, he was bound to get what he asked for, and that in a pure, unadulterated state.

Mr. Barker said he would not discuss the matter further then, nor would he then grant the case. He would look through the evidence, and give his decision next week.—*From the Echo and Standard.*

Reviews.

JOURNAL OF THE CHEMICAL SOCIETY: with Abstracts of Chemical Papers published in other Journals. Van Voorst. 1872.

The bulky volume now before us is something more than the journal of a learned society. It contains, indeed, the transactions of the Chemical Society, with all the papers and lectures read before it, but it also presents us with a tolerably adequate account of a year's progress in chemistry in the world at large. It is now rather more than two years since the Chemical Society commenced the task of publishing abstracts of all the original papers bearing on chemical science which appeared in English or foreign periodicals. Dr. Williamson, then the president of the society, was, we believe, the leader of the movement. It appeared to him, and to many other English chemists, that it would conduce much to the advancement of science if those engaged in scientific work could be supplied as early as possible with a condensed account of the original papers published in our own and foreign journals. Every branch of science now-a-days progresses with such rapid strides, and results are so voluminous, and they appear in so many languages, that it is only with the greatest difficulty that either the teacher, the investigator, or the manufacturer can keep abreast of modern discoveries and improvements. This difficulty presses especially on Englishmen. It is no use being blind to the fact that the greater part of scientific work is done on the Continent. For one original investigation published in England probably ten appear in Germany and France, and these foreign papers are quite inaccessible to most English readers. In Germany the necessity of collating the scattered publications of scientific work has long been recognized; their painstaking 'Jahresbericht,' giving short abstracts of the papers of each year, is a work well known. But the volumes necessarily appear so long after the date of the papers which they report, that they furnish rather a past than a contemporaneous history. We may feel proud, then, that our own Chemical Society, by its issue of monthly abstracts, is at the present time supplying more complete and useful reports of chemical science than have hitherto been produced.

The volume before us is made up of the bound monthly numbers of the past year, and is furnished with a copious index both to authors and subjects. The papers and lectures read at the meetings of the Society are many of them of great interest; in addition to these we have in this volume about eleven hundred abstracts of papers which have appeared in other journals. We have examined the volume somewhat carefully, and find that nearly forty periodicals are regularly abstracted, and as some of these, from the second references given, evidently republish papers from other periodicals, the extent of literary surface which comes under contribution is even more extended than at first appears. The periodicals drawn from are German, French, Italian, American, and English; the first two largely predominating. The matter is very methodically arranged. First comes the section of physical chemistry, then inorganic, mineralogical, organic, animal physiology, vegetable physiology and agriculture, analytical, and technical. The titles of the sections sufficiently indicate the wide range of subjects included. The journal is under the editorship of Mr. Watts, a name well known in the literary departments of science. The task of preparing the abstracts is performed by a body of gentlemen whose names are given, and whose initials are appended to their respective work. There is also a large and influential publishing committee which exercises a general superintendence of the journal.

So vast an undertaking as this could not be carried on without great expense. We understand that the British Association has made a grant of £100 to the journal, and that a special subscription has been raised among the fellows of the Society and other friends of science to ensure a trial of the scheme. We hope that as the monthly numbers of the journal get better known the appreciation of the public will relieve the Society of any further financial anxiety. For ourselves we cannot think the library furniture of any active student of science can be complete without the journal and abstracts published by the Chemical Society.

The West Riding Lunatic Asylum Medical Reports. Edited by J. Crichton Browne, M.D., F.R.S.E. Vol. II. London: J. and A. Churchill. 1872.

This is the second annual instalment of a series which promises to be of much value to the practitioner in general and the medico-psychologist in particular.

In no department of the healing art has more progress been made than in the diagnosis and treatment of lunacy. The old system of torture and physical restraint—a relic of those early Christian times when the lunatic was regarded as the victim of demoniacal possession, out of whom the devil had to be scourged—would, if repeated now-a-days, draw down upon the practitioner the vengeance of the law. The cruel apparatus, without which no asylum was held to be complete,—the hobbles which prevented locomotion; the bath of surprise into which the maniac suddenly found himself descending through the treacherous floor, and thereafter immersed to the chin; the travelling of strong-kneed keepers over the chest of the recumbent patient till his ribs were fractured without any external sign,—all these devices are now things of the past, and replaced by a system at once rational, humane, and often efficacious.

Yorkshire, under the auspices of the shrewd and genial Tuke, led the way in this philanthropic revolution, and his traditions are being worthily sustained and developed by the able and energetic physician who presides over the West Riding Asylum. Among other services to the cause of medico-psychology, in theory and in practice, Dr. Crichton Browne, for the last three years, has incited his staff to the observation of such phenomena in his patients,—their special diseases, the treatment by which they seem to benefit, the therapeutic agents which experience has shown to be most efficacious,—as, when clearly recorded, would be of use to the profession at large. These records have been fasciculated in two successive volumes, and constitute a substantial and enduring addition to medical literature. On the principle of *vires acquirit eundo*, the second volume is a distinct improvement on its meritorious predecessor, and, if the ratio of progress be, as we have every right to expect, maintained, the series will be looked for from year to year with progressive curiosity and interest.

In the present volume the articles which will have most attraction for the pharmacist are, Dr. Wilkie Burman's on 'Conia, and its use in Subcutaneous Injection;' Dr. S. Mitchell's on the 'Effects of Ether and Nitrous Oxide combined;' and Dr. Maziere Courtenay's on 'The Use of Opium in the treatment of Melancholia.' All these contain fresh and thought-inspiring matter, and should be studied in view of the approaching revision of the 'British Pharmacopœia.'

Other papers in the volume, of more than average ability, are the editor's on 'Cranial Injuries and Mental Diseases,' which ought to bring its author into court as a medical witness on all occasions when damages are sought from railway companies for obscure injuries to the brain; the 'Mental Symptoms of Ordinary Disease,' by Dr. Patrick Nicol; the 'Electric Treatment of the Insane,' by Dr. Clifford Allbutt; and 'Impairment of Language as the result of Cerebral Disease,' by the editor's father, Dr. W. A. F. Browne, late Commissioner in Lunacy for Scotland. This last is an exceptionally able paper, reasoned and written with much freshness, force, and effect. Throughout the volume, indeed, the literary features are unusually commendable, and reflect the highest credit on its accomplished editor and his trusty *entourage.*

BOOKS RECEIVED.

Report on the New or Fifth Decennial Revision of the United States' Pharmacopœia to the Medical Society of New York. By Edward R. Squibb. New York: Appleton and Co. 1873.

Manual for Medical Officers of Health. By Edward Smith, M.D., LL.B. (Lond.), F.R.S. London: Knight and Co. 1873.

Obituary.

Notice has been received of the death of the following:—

On the 23rd of April, 1873, Mr. William Judd, Pharmaceutical Chemist, of Bath Street, Leamington. Mr. Judd had been a Member of the Pharmaceutical Society since 1859.

On the 2nd of May, 1873, Mr. John Handcock, Chemist and Druggist, of Ossett, near Wakefield. Mr. Handcock had been a Member of the Pharmaceutical Society since 1870.

On the 1st May, 1873, Mr. William Taylor, Chemist and Druggist, 120, Oldham Road, Manchester.

On the 5th May, 1873, Mr. James Bell, Chemist and Druggist, of Broadgate, Grasmere, Westmoreland.

On the 5th of March, 1873, Mr. Thomas Sherlock, Chemist and Druggist, of St. Helen's.

Notes and Queries.

ADHESIVE PLASTER.—M. Eng gives the following formula for the preparation of an adhesive plaster in *L'Union Pharmaceutique*:—

Powdered Gum Dammar	560 parts.
Oil of Sweet Almonds	140 „
Castor Oil	70 „
Glycerine	30 „
Aniline Red	q. s.
Spirit of Ether (equal quantities of ether and spirit	225 to 240 „

The first four ingredients are to be heated in a copper vessel until the resin is fused, the aniline red then added, and when the mixture has half cooled, the spirit of ether is to be poured in. An emulsive liquid is thus formed of the consistence of syrup. A layer is then spread on a material previously coated with mucilage of starch, flour, or isinglass. The court plaster so made is said to be strongly adhesive, bright and shining, and to be free from any irritating effect on the skin. It does not dry up like ordinary court plaster, contains no lead, and may be spread upon calico, silk, gutta percha, or paper. It also allows of the introduction of any substance soluble in alcohol or ether.

Correspondence.

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

The Benevolent Fund.

Sir,—A letter in to-day's Journal seems to warrant me in again troubling you. Although not gifted with the power of writing in the sensational style of a "Subscriber to the Benevolent Fund," I will endeavour to be as concise as possible in my reply.

Since my explanation of my two trifling donations does not seem to have been credited, I will state more plainly the fact, that up to the time of sending my last five shillings, I was ignorant of the amount that was taken yearly from subscriptions and donations and added to the already large fund. My knowledge increasing, my sympathy with the appropriation of donations was not great. I have already stated that the words "long since," in my letter of March 29th, were used to denote that my opinions had not been formed by the writings recently found in the Journal.

I fancy "Subscriber" is a little hasty in calling my scheme a pet one, for if he will again trouble himself to refer to p. 800 of the Journal, he will find that I have another which I advocate, viz., the present system, minus any further accumulation of subscriptions; which improvement is already being, to some extent, adopted. If only carried out to the full, I am pleased to confess that, in my opinion, there would not be many wishing for the novel one.

But just a word in defence of the pet scheme. Can "Subscriber" not see that if Leicester has received more than she has subscribed under the present system, other towns must have received less, and therefore that it is manifestly unfair to judge of the pet scheme as a whole, by a case which is balanced by the surplus which would be in hand in other districts?

"Subscriber's" energy in defence of the Fund has led him into error, for he charges me with having *railed against annuities*. If your readers will kindly peruse my two former notes, I think they will agree with me that I only contended for the *immediate distribution of subscriptions*, caring little what form it took, being equally pleased in seeing either temporary relief granted, or regular annuities conferred.

In regard to Mr. K., should the Council still see fit to grant him £35 per year until elected an annuitant, my case in regard to him will fall to the ground. I fail to find, though, that they took the same course in regard to Messrs. Wilson and Watkins until elected.

Finally, I am sorry that my convictions in regard to the best use of benevolent subscriptions do not allow me to agree with the gentleman I have alluded to.

Walter B. Clark.

Leicester, May 3rd, 1873.

A Trade Grievance.

Sir,—*Apropos* with Mr. Barron's letter in last Saturday's Journal, I, in common with other chemists, have this morning received an elaborate counter-bill from a well-known firm, with an intimation that a supply would be forwarded on receipt of address. Imagining, in my innocence, that the increase of wholesale price of this firm's goods was to be followed by a corresponding advance in their retail prices, which they desired thus to advertise through their agents, I at once cast my eye towards that part of the bill, when, to my surprise, I found no such advance hinted at.

The conclusion to which I at once came was that the advance had been made, not on account of increase of value of ingredients, but in order to cover the expense of their advertising goods, to the serious detriment of the retailer; and that the wiser plan for us to adopt, in self-defence, will be, instead of clamouring for a supply of pretty pictures, to prepare and recommend our own toilet requisites to the total exclusion of others. That such must be the effect of the present rage for advancing the wholesale prices of various proprietary articles, while the retail are advertised as before, is self-evident, unless we are prepared to sacrifice a considerable portion of our returns to the exclusive benefit of the makers.

Query.—Why cannot we agree to act on the same principle as the wholesale dealers, and refuse to sell proprietary articles except at advanced prices in the same ratio?

May 6th, 1873. Equity.

In reference to Mr. Barron's letter on this subject, the representative of Mr. Henry Bond writes to say that he has not advanced the price of his marking ink.

Pharmaceutical Curiosities.

Sir,—If the subject is of any interest, allow me to add one or two of my experiences on the above subject. I have a sort of album of the original orders, and transcribe a few. Amongst the oils I find, in addition to those mentioned by Mr. Williams, oils of fhagone, St. John, beaver, and peacock, all of which are synonyms of ol. viride. I have also oils of Nero, hay, oakem, and Agmai, and by a note I see ol. amygd. dulc. is (or was) the article sold for each. "Purple plum spirit" (*i.e.*, archill) is another oddity I fancy, and the following are (to put it mildly) eccentric as to orthography. For instance,—

"Se. lot. za Juice."
"Turnasais" (Turner's Cerate).
"possits of past" [*sic*] (Phosphorus Paste).
"Qubruck Powder."
"Arse and asnel sope."
"Mulbry suryuph."

And finally,—

"Sa. la. monac."

I could give a long list of similar examples of "free and independent" spelling, but doubt if the information is worth the space it will occupy.

Tauro-gallus.

J. J. Anderson.—Apply at the Royal Veterinary College, Camden Town.

W. C. J.—The dose is large, but not excessive, nor so large as to justify the supposition that there was a mistake.

J. Dibbs.—The latest issue of the 'Medical Directory' is for 1873. It is published by Messrs. J. and A. Churchill, 11, Burlington Street, from whom you could obtain further particulars.

E. Ward Jackson.—You are recommended to communicate the facts of your case to one of our medical contemporaries.

Mr. Baildon is thanked for his communication.

"*Cinchona.*"—(1) 1873. (2) Both the works mentioned are good ones, but we should give the preference to the illustrated edition of Bentham. (3) The subject is not specially mentioned in the synopsis of the examination, and it is probable that nothing would be required beyond what is implied in the identification of officinal plants, an intimate acquaintance with the functions and mode of arrangement of the different organs of plants, and a knowledge of the general principles of classification.

"*Arte et Labore.*"—A chemist and druggist, registered by virtue of his having been in business before the passing of the Pharmacy Act, 1868, may become, by election, a Member of the Pharmaceutical Society. For particulars apply to the Secretary, 17, Bloomsbury Square, W.C.

"*Inquirer.*"—We should recommend you to address your inquiry to the authorities of the Inland Revenue Office, Somerset House.

W. H. Burrell.—All advertisements should be forwarded to the publishers, Messrs. J. and A. Churchill, 11, New Burlington Street.

Inquirer (*Chemicus*) is referred to the regulation respecting anonymous communications.

Communications, Letters, etc., have been received from J. Dibbs, J. Abraham, P. Q., L., "Catta-fiord," "Tauro-Gallus."

THE PHARMACY OF THE UNITED STATES' PHARMACOPŒIA.

BY WILLIAM MARTINDALE, F.C.S.,

Dispenser, and Teacher of Pharmacy to the University College Hospital.

(*Continued from page* 863.)

Aceta.—First in the list comes *Acetum Destillatum.* It is directed to be made by taking eight pints of vinegar, and distilling until seven are obtained. It is not stated in the materia medica list from what source the crude vinegar should be prepared, but that used in the United States is generally made from cider. The distillate contains about 4·5 per cent. of monohydrated acetic acid, and is of the same strength as *acidum aceticum dilutum,* for which also, as I have previously stated, it may be substituted in preparing the official vinegars. It seems unfortunate that this should be allowed, because if dilute acetic acid possess any solvent and preserving action in making these preparations, over and above that of pure water, it possesses it *alone* and without the impurities which are contained along with it in distilled vinegar, such as alcohol, aldehyd, acetone, and acetic ether. These impurities may tend to complicate or obscure the action of that class of preparations when given for certain diseases. The additional cost, however, will, I suppose, commercially preclude the use of such a substitute almost entirely.

Acetum Opii, for which the synonym of "Black drop" is given, is prepared by macerating and percolating opium and nutmeg, both in moderately coarse powder, in diluted acetic acid, and adding a certain proportion of sugar. It contains about one grain of dried opium in six minims. How far it resembles its prototype will be difficult now to ascertain. The other *aceta*—those of lobelia, bloodroot, and squills are uniform both in strength (1 in 8) and in the processes of their preparation; they may be made by either process, percolation pure and simple, or maceration and expression. No addition of spirit is made to any of them.

Acida.—Of these, *acidum sulphuricum aromaticum* contains about one-third more acid than B. P., but less aromatics. The strong acid is mixed gradually with half the alcohol ordered, and allowed to cool. A tincture is made by percolation of the aromatics with the other portion of alcohol, and mixed with the acidulated spirit. This process will tend to the formation of much ethyl-sulphuric acid in the product even at first, which is probably an advantage, as I find that on keeping a little while the B. P. preparation contains it also.

Aloe.—Aloe purificata. This is made by melting socotrine aloes in a water bath, adding one-sixth of stronger alcohol, and straining through a fine sieve, which has just been dipped in boiling water; the strained mixture is then evaporated until it becomes solid on cooling. Socotrine aloes only is so treated, the object being to separate the mechanical impurities, but mere powdering and sifting will, I think, answer that purpose quite as well; the continued application of heat must be injurious to the product. I may here state that there are no *extracts* of aloes corresponding to the B. P. preparations.

Aquæ.—The aromatic waters—*aqua anisi, aqua cinnamomi, aqua fœniculi, aqua menthæ piperitæ,* and *aqua menthæ viridis*—are directed to be made by distilling the fruits, barks, or fresh herbs of these

respectively with water, or by the alternative process of triturating their oils with carbonate of magnesia, adding distilled water gradually and filtering through paper. *Aqua amygdalæ amaræ* is made by the latter process only. Orange-flower and rose waters are ordered to be distilled from the fresh flowers or petals, or in the case of rose water, the petals may be used pickled with salt. In the formula for *aqua camphoræ,* 120 grains of camphor are ordered to be rubbed, first with 40 minims of alcohol, then with half a troyounce of carbonate of magnesia, and lastly, with two pints of distilled water added gradually, and filtered through paper. Dr. Wood states* that camphor water thus made contains three grains of camphor in the fluid ounce; if so, it is an active preparation, and very different from that in the British Pharmacopœia, which does not contain above half a grain in the fluid ounce. With us, camphor water is generally used as a mere *placebo;* the United States' preparation would form a dangerous one. *Aqua acidi carbolici* is made by mixing ten fluidrachms of glycerite of carbolic acid with sufficient distilled water to make a pint. It will thus contain one part of carbolic acid in about sixty-four parts fluid. This will make but a weak lotion, if it be intended to be used as such, and as carbolic acid is soluble in about one-fourth the quantity of water, the utility of the glycerine in the preparation, or of the preparation itself even, is doubtful. A formula for hydrated carbolic acid, directing one part of water to be added to sixteen parts of the crystal, only liquefied by means of heat, would be a much more useful preparation than either the glycerite or the water of carbolic acid. Pharmacists will rarely keep the latter preparations made, and as they require their strength to be adjusted by the prescriber to suit the case he requires them for, pharmacopœial formulæ for them appear to be unnecessary. *Aqua creasoti* is prepared by agitating one fluidrachm of creasote with sixteen fluidounces of distilled water, and filtering through paper. Genuine English creasote is not soluble in four times this quantity of water, nor is it dissolved "wholly and readily in an equal volume of acetic acid," as is stated at p. 28. In the preparation of distilled water we are told to "take of water eighty pints. Distil two pints, *using a tin or glass condenser, and throw them away;*† then distil sixty-four pints, and keep them in well-stopped glass bottles." We have also a process given for making *aqua ammoniæ,* sp. gr. 0·960, direct from chloride of ammonium and lime, but none for *aqua ammoniæ fortior,* sp. gr. 0·900, this is found described in the materia medica list only. Why is not the other made from it by mere dilution?

Testa præparata—prepared oyster shell. Under the head of *Calcium* preparations we find this has a place. Crabs' eyes have departed from the realms of pharmacy, but oyster shells still find favour on the other side of the Atlantic, it appears.

Cerata.—For these we have ten formulæ. The *cerates* are still with them a class of preparations firmer in consistency than *ointments,* and all contain wax as an almost necessary ingredient. *Ceratum*—simple cerate, is composed of eight parts of *lard* and four of *white wax. Unguentum*—simple ointment, has two parts of white wax to the same quantity of lard.

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* Wood and Bache's 'United States' Dispensatory,' 12th Edition, p. 1001.

† These italics are mine.

American lard, at least that imported into this country, contains less stearin than English lard, so that they may find the need of a firmer basis than pure lard, else I am of opinion that lard, when carefully prepared, is not surpassed by any factitious mixture of fatty substances as a general basis for ointments. *Ceratum cantharidis* corresponds to our *emplastrum cantharidis*, but it contains no suet. In preparing it, it is directed that on the addition of the cantharides, in very fine powder, to the melted basis, by the heat of a water-bath the mixture is to be kept in a liquid state for half-an-hour, stirring it occasionally while digesting, and afterwards constantly, until cool. This is an undoubted advantage, and will assist in the absorption of the cantharidin by the cerate; but, as cantharidin is a volatile principle, I think the temperature of the water-bath should have been limited. There is also *ceratum extracti cantharidis:* an alcoholic extract of the flies is first made, and mixed with a similar basis to the ordinary cerate—it is slightly weaker than this preparation. For Goulard's cerate we have two processes; we have the old London Pharmacopœia formula and an alternative one, in which, by using liniment of camphor and simple cerate, we get the same product by mere admixture. This is also an advantage, as it is an ointment very prone to become rancid,—it can thus be prepared extemporaneously without any difficulty. There are *cerates*—but not *ointments*—of both spermaceti and resin (synonym for the latter—"Basilicon ointment"), and also a *compound resin cerate*, which contains crude turpentine and flax-seed (linseed) oil. *Ceratum saponis* is a mixture of soap-plaster, yellow wax, and olive oil. *Ceratum sabinæ* is a mixture of the fluid extract of savine and resin cerate, heat being applied to drive off the spirit from the extract after its admixture with the melted cerate. *Ceratum zinci carbonatis* is precipitated carbonate of zinc and simple ointment, mixed thoroughly.

Chartæ.—Charta cantharidis corresponds to our *charta epispastica.* The whole of the ingredients are directed to be *boiled gently,* not *digested* merely, before straining and coating the paper with its layer of the basis. *Charta sinapis* has been referred to by Professor Redwood. Ninety grains of black mustard seed in powder are mixed with a solution of gutta percha in chloroform ($1\frac{1}{2}$ in 17 by weight), and painted on a piece of paper four inches square. It is sufficient for a much larger piece. Dr. Squibb states that it is probably an imitation of Mr. Crew's preparation (and Mr. Crew's most likely of Rigollot's). Benzine is used as a solvent of the gutta percha in the preparation of M. Rigollot's paper, as the odour of it is very evident on opening a new packet.

Collodium.—Simple *collodion* is prepared with stronger alcohol (sp. gr. 817) and stronger ether (sp. gr. 728), and contains about one-third more pyroxylon than the B. P. preparation. My experience with the preparation, when required for surgical purposes, has been that one-third *less* than the B. P., not *more*, should be added of the pyroxylon if this latter be the right kind of nitrocellulin. It is stated that by long standing it deposits a layer of fibrous matter and becomes more transparent, and that this layer should be incorporated by agitation before the collodion is used. *Collodium flexile* has been borrowed from us; it is almost exactly the same as that in the British Pharmacopœia. *Collodium cum cantharide* is made by percolating cantharides with stronger ether and then with stronger alcohol: having reserved the ethereal product, the alcoholic percolate is concentrated to a small bulk by spontaneous evaporation; this is then mixed with the ethereal tincture, and pyroxylon added, with *Canada balsam* and *Castor oil,* to render its film flexible when applied.

Confectiones.—Of these there are five. *Confectio aromatica* is a mixture of *aromatic powder* (cinnamon, ginger, cardamom, and nutmeg) with clarified honey. *Confectio opii* is the same, with the addition of one part of powdered opium in about thirty-six of the product. *Confectio rosæ* is prepared with red rose petals in fine powder, sugar, clarified honey, and rose-water. *Confectio sennæ* is much the same as the British Pharmacopœia preparation without the extract of liquorice, but the figs and prunes are merely *digested* along with the purging cassia and tamarind, not *boiled* previously, as it is directed they should be in our process.

Decocta.—The general process of making these is to take one troy ounce of the bruised drug and boil "in a pint of water for fifteen minutes, strain, and add sufficient water through the strainer to make the decoction measure a pint." In *decoction of logwood* the fluid is boiled down to one-half its bulk, and in the *compound decoction of sarsaparilla* the ingredients are boiled for fifteen minutes, and digested for two hours more at 200° F. *after* ebullition, not *before* as in the British Pharmacopœia.

Emplastra.—Emplastrum plumbi is the basis of eleven out of the seventeen official plasters. This lead plaster contains less oil than ours; more minute directions are given for its manufacture than in B. P., but we are not told how, or when to separate, or what to do with, the glycerine that is formed during the process. *Emplastrum resinæ* is a mixture of lead plaster and resin,—*emplastrum saponis*, of lead plaster and sliced soap, the soap being previously brought to a semi-liquid state with water, then added to the melted lead plaster and boiled to a proper consistence. *Emplastrum aconiti* is prepared by mixing an alcoholic extract of aconite root with resin plaster,—*emplastrum arnicæ*, with an alcoholic extract of the flowers and the same basis,—*emplastrum belladonnæ*, by mixing resin plaster with an alcoholic extract of the dried leaves of belladonna. This latter is made by maceration and percolation, and the subsequent distillation and evaporation of the product thus obtained. *Emplastrum assafœtidæ* is directed to be prepared by dissolving assafœtida and galbanum in alcohol, straining, adding lead plaster and yellow wax, and evaporating to a proper consistence. *Emplastrum galbani* contains galbanum, crude turpentine, Burgundy pitch, and lead plaster. *Emplastrum picis Burgundicæ* and *emplastrum picis Canadensis* are merely these resins with the addition of yellow wax; *emplastrum picis cum cantharide,* a mixture of Burgundy pitch and cerate of cantharides. *Emplastrum opii* is made with the extract of opium, Burgundy pitch, and lead plaster. *Emplastrum ferri* is the same as ours—the so-called subcarbonate of iron being used in its preparation. *Emplastrum hydrargyri* and *emplastrum ammoniaci cum hydrargyro* are also much the same as B. P. A mixture of Burgundy pitch and powdered tartar emetic forms *antimonial plaster*, and ammoniacum dissolved in diluted acetic acid, strained and evaporated to a proper consistence, makes the *ammoniac plaster.*

(To be continued.)

CINCHONA CULTIVATION IN ST. HELENA.

BY OSWALD A. READE.

Having recently had a few idle days in the island of St. Helena, I took the opportunity of making some inquiries respecting the result of the attempt to introduce and cultivate cinchona there.

The experiment was commenced rather more than four years since at the recommendation of Governor Elliot who then had charge of the island. The plants were at first placed under the management of Mr. Chalmers, formerly of Kew Gardens, but he had left the island a few weeks previous to my visit. Everyone I spoke to in Jamestown respecting them informed me that they were a complete failure; but as very few had actually seen them, I resolved to go to Diana's Peak where the attempt had been made.

Diana's Peak is the highest point on the island, being nearly 3000 feet high and six miles distant from the town. The south-east trade-winds laden with moisture condense in almost perpetual clouds about the peak, and people living near the base of it informed me that there had not been a fine day for two months. The roads were in such a wretched condition that I was obliged to give up my first excursion in despair, and renew the attempt two days later, though they were then not much better. Steep clayey paths seldom trodden by anything save cattle, into whose tracks we sank over boot-tops, led the way to the foot of the peak. At some remote period steps have been cut out of the rock to enable people to reach the summit, but many of them have been worn away and those which remain are thickly covered with succulent lichens, which render the climbing tedious and dangerous, especially near the summit, where the path, which is only two or three feet wide, is bounded on either side by precipitous slopes. It is along side paths leading from the one I have described that the cinchonas are planted; everything around them betokens rich and luxurious vegetation; tree ferns and their smaller brethren rise everywhere, interspersed with cabbage trees and wild fuchsias springing from a thick carpet of mosses, the whole bound together with brambles and some scrophularious creeper. The past generations of these have left a layer of rich peat, kept moist with the continual clouds and rain, which has formed a good natural bed for the cinchonas.

Originally, more than 1000 were planted out from the hothouse where they were raised, but less than 300 now remain. I was informed by the man who at present has charge of them, that when first planted out they made great progress and throve well, especially *C. succirubra*, some of the leaves of which measured 19 inches long by 15 broad, before the plants were twelve months old. After the roots had penetrated through the layer of peat, however, many of them began to sicken and die, the heavy red clay which underlies it apparently not being suitable for them. It is to this I believe that the loss of so many of the plants is attributed.

Several species were tried, of these *C. succirubra* has succeeded much the best, and the trees of this species which are now alive look healthy and promising.

C. Condaminea also looks healthy, but the wood has grown spindly.

C. Calisaya has not done so well.

The average height of the trees is now about 8 feet. The trunks have formerly been protected for 2 or 3 feet from the ground with a thick covering of moss, but it appears to have been allowed to fall away lately.

The bark has been stripped off some of the dead plants and sent to the civil hospital here, where it was tried and pronounced to be equal in quality to that supplied through the wholesale houses.

It certainly seems as though the cultivation of the red cinchona would be a success in St. Helena, were it well looked after.

NITRATE OF ZINC AS A CAUSTIC.*

BY M. LATOUR.

Up to the present time nitrate of zinc has not been used as a therapeutic agent; yet its causticity approaches nearly that of chloride of zinc, which renders such important services in the surgical art. Less soluble than the chloride, it is still soluble enough to allow of the hope that its application as a caustic will give results sufficiently satisfactory to recommend it to the notice of surgeons, with whom it will rest to decide by clinical experience whether it will be of real service.

Preparation of Nitrate of Zinc.—Pure nitrate of zinc is easily prepared by dissolving commercial zinc, with the aid of heat, in nitric acid diluted with an equal volume of water. It is best to maintain an excess of zinc and to concentrate the liquor down to the production of an ochraceous precipitate due to the formation of a certain quantity of basic nitrate, which carries down the iron usually present in commercial zinc. Boiling water is added to dissolve the salt, and after cooling the liquid is filtered, then evaporated at a gentle heat until a slight ebullition takes place. It is now allowed to cool, when the solution forms a mass; finally, the salt is separated, broken into small pieces, and thrown on to a glass funnel to drain. Thus prepared, nitrate of zinc corresponds to a crystalline salt melted in its water of crystallization, part of which is driven off by a moderate heat. It contains three equivalents of water; it is not completely soluble in water in consequence of the formation of a small quantity of basic subnitrate of zinc, of no importance otherwise. It has the advantage over acetate of zinc of being less deliquescent, while its preparation is more easy and less costly. The salt so obtained is the basis of the following preparations:—

Paste of Nitrate of Zinc.—A caustic paste is prepared by dissolving 100 grams of the nitrate in 50 grams of water, and incorporating with the solution 50 grams of wheaten flour. The mixture is kneaded until perfectly homogeneous, and the result is a convenient paste which retains its humidity. It does not adhere to the fingers, moulds perfectly without contraction, and does not spread at the edges through attracting moisture from the air. When made into cylinders it must not be dried in a stove, or it becomes yellowish in colour and friable, through the oxidation of the gluten of the flour by the decomposition of the nitrate of zinc under the combined influence of heat and water. The paste may, however, be preserved in perfectly dry cylinders by placing it in a well-closed tin box, together with some pieces of quick lime, in such a manner as not to come into contact with the lime.

The preparation of this paste may be shortened by employing a saturated solution obtained by stopping the evaporation of the solution above described when it has, while warm, from 1·450° to 1·580° density; after cooling, its density is from 1·630° to 1·650° One hundred cubic centimetres of this solution would contain 113 grams of the zinc nitrate; a litre of saturated solution would contain 1·130 kilos, and require 555 grams of wheaten flour to form a homogeneous paste similar to that before described. Upon adding the flour to the solution, the mixture at first is liquid, but afterwards it gains consistence

* 'Journ. de Pharm. et de Chimie' [4], vol. xvii. p. 385.

through the hydration of the starch and gluten. The proportions given are the result of numerous experiments.

The saturated solution of nitrate of zinc is strongly caustic, and its coagulating property is intense. It is reported to have been successfully used in cauterizations by Dr. Clement, physician of the Hôtel-Dieu, Lyons.

Caustic Mixture of Nitrate and Chloride of Zinc.—Several attempts were made to combine the nitrate and chloride of zinc in a paste that should possess the advantage of suppleness, and of not contracting when spread over a surface, which is characteristic of that prepared from the nitrate. Such a paste was obtained; it remained soft, spread easily, and did not contract; but in consequence of the avidity of the chloride for water, the slough produced by it has not proved so clean as that produced by the nitrate alone. The following is the formula:—

Chloride of Zinc	50 grams.
Nitrate of Zinc	100 „
Water	80 „

Dissolve by the aid of heat the chloride and nitrate of zinc in the water and allow the solution to cool, when it will have a density of about 1·650°. 100 c.c. are then mixed with 75 grams of flour.

PROFESSOR TYNDALL ON LIGHT.*

(*Concluded from p.* 888.)

One word more I should like to say regarding Fresnel. There are things better even than science. There are matters of the character as well as matters of the intellect, and it is always a joy to those who wish to think well of human nature, when high intellect and upright character are combined. They were, I believe, combined in this young Frenchman. In those hot conflicts of the undulatory theory, he stood forth as a man of integrity claiming no more than his right, and ready to concede their right to others. He at once recognized and acknowledged the merits of Thomas Young. Indeed, it was he and his fellow-countryman, Arago, who first startled England into the consciousness of the injustice done to Young in *The Edinburgh Review*. I should like to read you a brief extract from a letter written by Fresnel to Young in 1824, as it throws a pleasant light upon the character of the French philosopher. "For a long time," says Fresnel, "that sensibility, or that vanity, which people call love of glory, has been much blunted in me. I labour much less to catch the suffrages of the public than to obtain that inward approval which has always been the sweetest reward of my efforts. Without doubt, in moments of disgust and discouragement, I have often needed the spur of vanity to excite me to pursue my researches. But all the compliments I have received from Arago, La Place, and Biot, never gave me so much pleasure as the discovery of a theoretic truth, or the confirmation of calculation by experiment."

This is the core of the whole matter as regards science. It must be cultivated for its own sake, for the pure love of truth, rather than for the applause or profit that it brings. And now my occupation is gone. Still I will bespeak your tolerance for a few concluding remarks in reference to the men who have bequeathed to us the vast body of knowledge of which I have sought to give you some faint idea in these lectures. What was the motive that spurred them on? What the prize of their high calling for which they struggled assiduously? What urged them to those battles and those victories over reticent Nature which have become the heritage of the human race? It is never to be forgotten that not one of those great investigators, from Aristotle down to Stokes and Kirchhoff, had any practical end in view, according to the ordinary definition of the word "practical." They did not propose to themselves money as an end, and knowledge as a means of obtaining it. For the most part, they nobly reversed this process, made knowledge their end, and such money as they possessed the means of obtaining it. We may see to-day the issues of their work in a thousand practical forms, and this may be thought sufficient to justify, if not to ennoble their efforts. But they did not work for such issues; their reward was of a totally different kind. In what way different? We love clothes, we love food, we love fine equipages, we love money, and any man who can point to these as the result of his efforts in life justifies those efforts before all the world. In America and England more especially he is a practical man. But I would appeal confidently to this assembly whether such things exhaust the demands of human nature? Given clothes, given food, given carriages, given money—is there no pleasure beyond what these can cover which the possessor of them would still covet? I need not tell such an assembly that there are joys of the intellect as well as joys of the body, or that these pleasures of the spirit constituted the reward of our great investigators. Led on by the whisperings of natural truth, through pain and self-denial, they often pursued their work. With the ruling passion strong in death, some of them, when no longer able to hold a pen, dictated to their friends the results of their labours, and then rested from them for ever.

Could we have seen these men at work without any knowledge of the consequences of their work, what should we have thought of them? To many of their cotemporaries it would have appeared simply ridiculous to see men whose names are now stars in the firmament of science straining their attention to observe an effect of experiment almost too minute for detection. To the uninitiated they might well appear as big children playing with not very amusing toys. It is so to this hour. Could you watch the true investigator—your Henry or your Draper, for example—in his laboratory, unless animated by his spirit, you could hardly understand what keeps him there. Many of the objects which rivet his attention might appear to you utterly trivial; and, if you were to step forward and ask him what is the use of his work, the chances are that you would confound him. He might not be able to assure you that it will put a dollar into the pocket of any human being living or to come. That scientific discovery may put not only dollars into the pockets of individuals, but millions into the exchequers of nations, the history of science amply proves; but the hope of its doing so is not the motive power of the investigator. It never can be his motive power.

I know what De Tocqueville says of you. "The man of the North," he says, "has not only experience, but knowledge. He, however, does not care for science as a pleasure, and only embraces it with avidity when it leads to useful applications." I wonder whether the great historian and analyst of democratic institutions would repeat these words to-day? What are useful applications? Is man's body alone to be the object and arbiter of what is useful? Is there no nakedness of the mind to be clothed as well as nakedness of the body?—no hunger and thirst of the intellect to satisfy? Surely no two terms were ever so much distorted and misapplied with reference to man in his higher relations than these terms useful and practical. Let us expand the definitions of these terms until they embrace all the needs of man, his highest intellectual needs inclusive. It is specially on this ground of its administering to the higher needs of the intellect; it is mainly because I believe it to be wholesome as a source of knowledge, and as a means of discipline, that I urge the claims of science upon your attention.

But with reference to material needs and joys, surely pure science has also a word to say. People sometimes speak as if steam had not been studied before James Watt, or electricity before Wheatstone and Morse, whereas, in point of fact, Watt and Wheatstone and Morse, with all their practicality, were the mere outcome of antecedent

* Abstract of a series of lectures delivered in the Cooper Institute, New York, and reported in the *New York Tribune*.

forces, which acted without reference to practical ends. This also, I think, merits a moment's attention. You are delighted, and with good reason, with your electric telegraphs, proud of your steam-engines and your factories, and charmed with the productions of photography. You see daily, with just elation, the creation of new forms of industry—new powers of adding to the wealth and comfort of society. Industrial England is heaving with forces tending to this end, and the pulse of industry beats still stronger in the United States. And yet, when analysed, what are industrial America and industrial England? If you can tolerate freedom of speech on my part, I will answer this question by an illustration. Strip a strong arm, and regard the knotted muscles when the hand is clenched and the arm bent. Is this exhibition of energy the work of the muscle alone? By no means. The muscle is the channel of an influence, without which it would be as powerless as a lump of plastic dough. It is the delicate unseen nerve that unlocks the power of the muscle. And without those filaments of genius which have been shot like nerves through the body of society by the original discoverer, industrial America and industrial England would, I fear, be very much in the condition of that plastic dough. At the present time there is a cry in England for technical education, and it is the expression of a true national want: but there is no outcry for original investigation. Still without this, as surely as the stream dwindles when the spring dries, so surely will their technical education lose all force of growth, all power of reproduction. Our great investigators have given us sufficient work for a time; but if their spirit die out, we shall find ourselves eventually in the condition of those Chinese mentioned by De Tocqueville, who, having forgotten the scientific origin of what they did, were at length compelled to copy without variation the inventions of an ancestry who, wiser than themselves, had drawn their inspiration direct from Nature.

To keep society as regards science in healthy play, three classes of workers are necessary: Firstly, the investigator of natural truth, whose vocation it is to pursue that truth, and extend the field of discovery for the truth's own sake, and without any reference to practical ends. Secondly, the teacher of natural truth, whose vocation it is to give public diffusion to the knowledge already won by the discoverer. Thirdly, the applier of natural truth, whose vocation it is to make scientific knowledge available for the needs, comforts, and luxuries of life. These three classes ought to coexist, and interact upon each other. Now, the popular notion of science, both in this country and in England, often relates, not to science strictly so called, but to the applications of science.

Take the electric telegraph as an example, which has been repeatedly forced upon my attention of late. I am not here to attenuate in the slightest degree the services of those who, in England and America, have given the telegraph a power so wonderfully fitted up for public use. Assuredly they earned a great reward, and assuredly they have received it. But I should be untrue to you and to myself if I failed to tell you that, however high in particular respects their claims and quality may be, practical men did not discover the electric telegraph. The discovery of the electric telegraph implies the discovery of electricity itself, and the development of its laws and phenomena. Such discoveries are not made by practical men, and they never will be made by them, because their minds are beset by ideas which, though of the highest value from one point of view, are not those which stimulate the original discoverer. The ancients discovered the electricity of amber, and Gilbert, in the year 1600, extended the force to other bodies. Then followed other inquirers, your own Franklin among the number. But this form of electricity, though tried, did not come into use for telegraphic purposes. There appeared the great Italian, Volta, who discovered the source of electricity which bears his name, and applied the most profound insight and the most delicate experimental skill to its development. Then arose the man who added to the powers of his intellect all the graces of the human heart, Michael Faraday, the discoverer of the great domain of magnets, electricity. Oersted discovered the deflection of the magnetic needle, and Arago and Sturgeon the magnetization of iron by the electric current. The voltaic circuit finally found its theoretic Newton in Ohm, while at Princeton, Henry pushed forward the course of experimental inquiry.

Here you have all the materials employed at this hour in all the forms of the electric telegraph. Nay, more; Gruss, the celebrated astronomer, and Weber, the celebrated natural philosopher, both professors in the University of Göttingen, wishing to establish a rapid mode of communication between the observatory and the physical cabinet of the university, did this by means of an electric telegraph. The force, in short, had been discovered, its laws investigated and made sure, the most complete mastery of its phenomena had been attained, nay, its applicability to telegraphic purposes demonstrated by men whose sole reward for their labours was the noble joy of discovery, and before your practical men appeared at all upon the scene.

Are we to ignore all this? We do so at our peril. For I say again, that, behind all your practical applications, there is a region of intellectual action to which practical men have rarely contributed, but from which they draw all their supplies. Cut them off from this region, and they become eventually helpless. In no case is the adage truer, "Other men laboured, but ye are entered into their labours," than in the case of the discoverer and the applier of natural truth. But now a word on the other side. While I say that practical men are not the men to make the necessary antecedent discoveries, the cases are rare in which the discoverer knows how to turn his labours to practical account. Different qualities of mind and different habits of thought are needed in the two cases; and, while I wish to give emphatic utterance to the claims of those whose claims, owing to the single fact of their intellectual elevation, are often misunderstood, I am not here to exalt one class of workers at the expense of the other. They are the necessary complements of each other; but remember that one class is sure to be taken care of. All the material rewards of society are already within their reach; but it is at our peril that we neglect to provide opportunity for those studies and pursuits which have no such rewards, and from which, therefore, the rising genius of the country is incessantly tempted away.

When the Pilgrim Fathers landed at Plymouth Rock, and when Penn made his treaty with the Indians, the newcomers had to build their houses, to chasten the earth into cultivation, and to take care of their souls. In such a community science, in its more abstract forms, was not to be thought of. At the present hour, when your hardy Western pioneers stand face to face with stubborn Nature, the pursuit of science for its own sake, is not to be expected. The first need of man is food and shelter; but a vast portion of this continent is already raised far beyond this need. The gentlemen of New York, Boston, Philadelphia, Baltimore, and Washington, have already reached that precise condition of well-being and independence when a culture as high as humanity has yet reached may be justly demanded at their hands. They have reached that maturity, as possessors of wealth and leisure, when the investigator of natural truth, for the truth's own sake, ought to find among them promoters and protectors. Among the many grave problems before them they have this to solve, whether a republic is able to foster the highest forms of genius.

You are familiar with the writings of De Tocqueville, and must be aware of the intense sympathy which he felt for your institutions; and this sympathy is all the more valuable from the philosophic candour with which he points out, not only your merits, but your danger. If I in no unfriendly spirit—in a spirit, indeed, the reverse of unfriendly—venture to repeat before you what this great historian and analyst of democratic institutions said of America, I am persuaded that you will hear me out. He wrote some twenty-three years ago, and perhaps would not write the same to-day; but it will do nobody any harm to have his words repeated, and, if necessary, laid to heart. In a work published in 1850, he says: "It must be confessed that, among the civilized peoples of our age, there are few in which the highest sciences have made so little progress as in the United States." He declares his conviction that, had you been alone in the universe, you would speedily have discovered that you cannot long make progress in practical science without cultivating theoretic science at the same time. But, according to De Tocqueville, you are not alone. He refuses to separate America from its ancestral home; and it is here, he contends, that you collect the treasures of the intellect, without taking the trouble to create them.

De Tocqueville evidently doubts the capacity of a democracy to foster genius as it was fostered in the ancient aristocracies. "The future," he says, "will prove whether the passion for profound knowledge, so rare and so faithful, can be born and developed so readily in democratic societies as in aristocracies. As for me," he continues, "I can hardly believe it." He speaks of the unquiet feverishness of democratic communities, not in times of great excitement, for such times may give an extraordinary impetus to ideas, but in times of peace. There is then, he says, "A small and uncomfortable agitation, a sort of incessant rubbing of man against man, which troubles and distracts the mind without imparting to it either animation or elevation." It rests with you to prove whether these things are necessarily so, whether the highest scientific genius cannot find in the midst of you a tranquil home. I should be loath to gainsay so keen an observer and so profound a political writer, but, since my arrival in this country, I have been unable to see anything in the constitution of society to prevent any student with the root of the matter in him from bestowing the most steadfast devotion on pure science. If great scientific results are not achieved in America, it is not to the small agitations of society that I should be disposed to ascribe the defect, but to the fact that men among you who possess the genius for scientific inquiry are laden with duties of administration or tuition so heavy as to be utterly incompatible with the continuous or tranquil meditation which original investigation demands. I do not think this state of things likely to last. I have seen in America willingness on the part of individuals to devote their fortunes in the matter of education to the service of the commonwealth, for which I cannot find a parallel elsewhere.

This willingness of private men to devote fortunes to public purposes requires but wise direction to enable you to render null and void the prediction of De Tocqueville. Your most difficult problem will be not to build institutions, but to make men; not to form the body, but to find the spiritual embers which shall kindle within that body a living soul. You have scientific genius among you; not sown broadcast, believe me, but still scattered here and there. Take all unnecessary impediments out of its way. You have asked me to give these lectures, and I cannot turn them to better account than by asking you in turn to remember that the lecturer is usually the distributor of intellectual wealth amassed by better men. It is not as lecturers, but as discoverers, that you ought to employ your highest men. Keep your sympathetic eye upon the originator of knowledge. Give him the freedom necessary for his researches, not overloading him either with the duties of tuition or of administration, not demanding from him so-called practical results—above all things avoiding that question which ignorance so often addresses to genius, "What is the use of your work?" Let him make truth his object, however unpractical for the time being that truth may appear. If you cast your bread thus upon the waters, then be assured it will return to you, though it may be after many days.

WOMEN'S RIGHTS.

The 'Collective Wisdom' has again rejected by a large majority Mr. Jacob Bright's proposal to invest the ladies with political powers and privileges; and for another year at least, the engaging 'Sex' is to be left out of the scheme of the British Constitution. We are bound to state that, in Blackburn at any rate, the female applicants for electoral rights have sustained this cruel rebuff with almost superhuman stoicism and composure. No mass meetings of householding widows and spinsters have, while we write, been advertised to assemble on the Market-place to demonstrate indignation against those brutal M.P.'s who have made the female claim to the franchise a subject of flippant jest, and by their votes have denied the demand. Mr. Beresford Hope, Mr. Bouverie and Mr. Leatham are still intact and unscarified. This exemplary forbearance under such affront is, in our opinion, evidence either that so self-controlled a section of our community is peculiarly qualified to exercise political influence, or—that these fair ones do not care a rap about it. Supreme heroism, or supreme indifference, are the alternative explanations of Woman's silence under the continuance of Woman's electoral disqualifications. We lean to the latter interpretation. There is absolutely no evidence that the housekeeping ladies of Great Britain really long and pine for the questionable gift of the parliamentary vote, or yearn to share with male humanity the onus and the shock of political conflict, the secrets and the sacrifices of party combination, or the frenzied joy and rage of party triumph and defeat. Why should Mr. Jacob Bright insist upon making the ladies this cumbrous present of a 'White Elephant?' But we need not ask why. It is the pressure of a small but masculine female coterie behind them that impels Mr. Jacob Bright and Professor Fawcett on their course. The hands that framed this Bill are ostensibly the hairy hands of Mr. Jacob, but the voice is the voice of Mistress Jacob. Mrs. Jacob Bright and Mrs. Fawcett, and the insurmountable Miss Becker, are the real movers in this agitation. They compose the Board of Directors of this Woman's Suffrage Association (Limited). The Mr. Jacob Brights and the Professor Fawcetts are but the meek instruments of the masterful female characters that rule their destinies. We do not blame them for pursuing with every show of zeal that work of championing female rights which they dare not, as we can conceive, evade. It is, however, testimony to the invincible force of female pertinacity directed to a given object that although the Englishwomen who want to be active politicians are a mere handful, that little group of strong-minded ones, with no countenance from their sex at large, and with nothing to back them but their own courage and fortitude, have so far progressed as to persuade more than a hundred and fifty members of Parliament to vote for woman suffrage. A full fourth-part of the House has already been 'nobbled' by Miss Becker and her sweet sisterhood, to say nothing of the considerable number who have been reduced to such a condition of fear and trembling that they dare not vote against the Bill, much as they inwardly object to its provisions, but stay away from the House in cowardly concealment when the subject is on. In fact, the political ladies are rife with hope that some year before long they will gain an absolute majority of votes in one of these annual divisions, and then, *væ victis*—woe to the members who have withstood their claims when the ladies get upon the electoral rolls! These fair anglers for statesmen boast that they have already got Mr. Disraeli in their baskets, and that Mr. Gladstone is on the point of being hooked, while other big fish are smelling at the bait. We do not profess to rejoice at ladies taking part in politics, unless they are prepared to take the whole tiresome business off the hands of men entirely; but if it must be, it must, and we trust we know how to accept inevitable fate.

The Pharmaceutical Journal.

SATURDAY, MAY 17, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE BYE-LAWS OF THE SOCIETY.

ON the occasion of the Anniversary Meeting next Wednesday, it will devolve upon the members of the Society who attend the Special General Meeting called for that day, to confirm the alterations of and additions to the Bye-laws which have for some months past been under consideration by the Council. The official notice which appeared last week as an advertisement sufficiently sets forth the particular nature of the alterations and additions to be submitted to the Special General Meeting, for the purposes contemplated by the Society's Charter of Incorporation as well as the Pharmacy Acts, 1852 and 1868. It may be as well, however, to recapitulate here more concisely what are the effects of the changes that have been made.

The first alteration is in clause 10 of section 1, and relates to the conditions under which forfeited status in the Society may be at any time restored by the Council; the payment of the current year's subscription, and of a sum ranging from the half of one year's subscription, up to five guineas being substituted in place of payment of all arrears, and a fine not exceeding half a guinea.

The second alteration is in clause 3 of section 3 and consists simply in the substitution of a permissive for a prohibitory form of stating how the Common Seal of the Society is to be used.

In section 4 the term "Regulation" is now coupled with the term "Bye-law" in regard to the "making, altering, and abrogating" provided for by this section, which is also declared to be applicable to regulations to be prescribed by the Society, in accordance with any statute. In clause 1 of this section there is little alteration beyond the insertion of the word 'regulation" in two places.

The alteration of section 9 by introducing the words "or oftener" empowers the Library, Museum, and Laboratory Committee to meet more than once in every month, as may be requisite.

It is in section 10, relating to examiners, examinations and fees, that the chief and probably the most important alterations have been made. In clause 1 of this section the plural number is substituted for the singular, since there is now more than one Board of Examiners; and while this clause also provides for the continuance of these respective Boards in office until the end of the present year, clause 2 provides that, instead of appointing examiners at the first ordinary Council meeting after the general meeting, the Council shall appoint examiners at its first meeting in December next, and every subsequent December, and that the persons so appointed shall, for the year to commence on the then following first day of January, constitute the Board of Examiners for England and Wales. By this alteration the new Council, from year to year, will have an opportunity of judging as to the fitness and efficiency of the examining Board before being called upon to appoint its members.

In clause 3 of this section the election in like manner of Examiners for Scotland, is provided for by alterations of the same nature as those applying to the appointment of Examiners for England and Wales.

The alteration in clause 4 provides for the meetings of the Boards of Examiners being presided over by either the President or the Vice-President of the Society, when they happen to be present, rather than by both.

The alteration of clause 5 consists simply in cancelling the exceptions to the limitations by age of elegibility for the office of Examiner, and consequently no person of the age of 65 can be made an Examiner.

By the alteration of clause 6, the time which must elapse between the appointment of any person as an Examiner and his ceasing to hold office as a Member of Council is now reduced from one year to six months, but in other respects the exceptions in this clause in favour of the President and Vice-President remain the same.

The only alteration in clause 7 is the substitution of the number fourteen for twelve as the maximum for the Board of Examiners for England and Wales. In clauses 8, 9, 10, and 11, there are no changes, and in clause 12, relating to the examination of persons desiring certificates of competent skill and qualification to be engaged or employed as assistants, as well as to the examination of persons desiring certificates of like qualification to exercise the business or calling of pharmaceutical chemists, the only alteration is the introduction of authority for the acceptance, in the Minor examination, of certificates of having been previously examined in the First examination, and for the acceptance, in the Major examination, of similar certificates of having been previously examined in the Minor examination.

The clauses 13, 14, 15—17, 18, and 19, of this section are unchanged, but an important alteration has been made in clause 16 by adding to it the provision that:—

"After the 31st day of December, 1874, no person shall be admitted to the Major or the Minor Examination who shall not have attained the full age of twenty-one years; and after the 31st day of December, 1876, no person shall be allowed to pass the Major or the Minor Examination unless he shall satisfy the Examiners that for three years he has been registered and employed as an Apprentice or

Student, or has otherwise for three years been practically engaged in the translation and dispensing of prescriptions.

"Persons who have passed the Minor Examination at least three months previously may be admitted to the Major Examination, and all other persons desirous of passing the Major Examination may make application to the Board of Examiners for special leave in that behalf."

THE BELL AND HILLS FUND.

Few of our readers in town or country will have forgotten that in 1869 the presentation of fifty guineas to the Pharmaceutical Conference by Mr. T. H. Hills, in his own name, and in memory of Jacob Bell, was accompanied by a suggestion that the sum of ten guineas should be applied for the purchase of books for the chemists' library at Exeter Those who have taken part in, or watched the proceedings of the Conference in subsequent years will know that the Executive Committee has, since that time, sought to give further effect to Mr. Hills' desire to promote pharmaceutical education, by making a present of books of the same value to the chemists' library in each town visited by the Conference. In this way the Fund had, in course of time, been nearly exhausted, when Mr. Hills last year, with characteristic generosity, supplemented his former gift with the sum of £200 (four Russian Bonds of £50 each).

At the Brighton meeting of the Conference it was unanimously decided, after previous consultation between the Executive Committee and Mr. Hills, that the grant of a sum of £10 for books to any local association in towns where the Conference met should be continued out of the interest arising from these bonds; and that the Executive Committee should from time to time, but not oftener than once in three years, decide when one-fourth of the investment should be sold out, and also decide upon the appropriation of such income, from principal and interest, by granting sums in aid of original research or for the cultivation of pharmaceutical science.

In our report of the proceedings of the Executive Committee of the Conference (p. 916) reference is made to a circular that has been issued in reference to the appropriation of this fund and the rules by which it is to be governed. The plan adopted is the same as that of the British Association, which has successfully promoted the accomplishment of much valuable work. The sum available during the next three years will be about £80, and on the 20th of this month the Committee will be prepared to receive applications for grants in aid either of any original research members of the Conference may desire to undertake in connection with pharmacy, or of the repetition of experimental work which might seem to require further corroboration or inquiry.

These applications must be addressed to the Executive Committee through the Secretaries of the Conference. They are to be accompanied by full particulars as to the proposed investigation and estimates of cost. In other respects the general conditions and rules laid down by the British Association in regard to grants have been adopted.

We trust that this scheme will be efficacious in contributing towards the doing away with that lack of original contributions to the progress of pharmacy, which is not only in itself a reproach to the followers of the art in Great Britain, but also tends to place them in a disadvantageous light as compared with the pharmacists of other countries.

TRADE MARKS' REGISTRATION BILL.

Now that the new Adulteration Act makes it especially desirable both for manufacturers, retailers, and for the public that there should be some trustworthy criterion of the genuineness of various commodities of daily use, the utility of trade marks for that purpose must be evident. But unfortunately trade marks have hitherto had no legal status, though the right to use them has always existed; and though by the Merchandize Marks Act the piracy of a trade mark, known in the market, is made an offence, as well as the false application of any genuine or forged mark, it is in any case necessary to show an intent to defraud.

It is only recently, by the decisions of the Courts that any property in a trade mark has been recognized, and even now the exclusive right to its use depends on its notoriety, while in any suit or prosecution it is still necessary to prove, not only the exclusive use of a trade mark, but also the period during which such use has continued, as well as its notoriety in the market. Frequently it is also necessary to prove that a purchaser has been deceived by the wrongful use of a mark.

The registration of trade marks as proposed by the Bill, of which we gave an abstract last week, would give the wanting statutory status, would prove ownership and furnish a record of the period of use, besides being in itself evidence of notoriety.

Such registration would give a trade mark, as such, an immediate legal character from the time of its first employment. The reference which it is intended that each trade mark shall bear to the register, would furnish at once the means of verifying the title of the person using it, and thus furnish direct evidence of the right to use, of the user, the notoriety of use, the exclusiveness of that right, and the priorities of employment by either of the several litigants.

The proposed Bill would also settle several other questions relating to trade marks and to the articles to which they are applied, such as their place of manufacture, the persons responsible for their manufacture, as well as for their genuineness and character.

Moreover, it would facilitate the prevention of piracies of British trade marks abroad; for although registration of trade marks has been adopted in various parts of Europe, in America, and several British colonies, with the best results, a remedy for such infringement has often been refused abroad in consequence of the absence of reciprocity to foreign manufacturers, from the English law not providing a means for registration of foreign marks here.

It appears, therefore, that the Bill now before Parliament is one calculated to be of great benefit to all classes of traders as well as to the public generally, and for these reasons the measure has our most cordial wishes for its success.

WOMEN'S RIGHTS.

Although some who claim to have a just estimate of the prevailing tendency of opinion believe there is no reason to expect the result of the demand for a pharmaceutical franchise for women will be much other than that lately experienced in St. Stephen's, it is not to be supposed that the defeat of those who contended for the electoral privileges of women will at all lessen the vigour of the assault that is now about to be made in the same cause within the British Parliament of Pharmacy. *Apropos* of the coming discussion of the question as to the admission of women into the ranks of the Society—some of our readers will regard with interest the extracted remarks from the *Blackburn Times*. (See page 906.)

Though we do not endorse either the statements or the opinions of our contemporary, we cordially sympathize with the supposed victims of ultra vigorous womenkind, and, as regards the latter part of the extract, we are instinctively reminded of a verse in the 'Nugæ Canoræ Medicæ,' where the Poet Laureate of the Edinburgh New Town Dispensary predicts—

> "An' when the leddies git degrees,
> Depen' upon 't there's nocht 'll please
> Till they hae got oor chairs an' fees,
> An' there's an en' o' you and me.
> For a' that ken the woman craiter
> Maun own it is her foremost faitur
> To tak' to lecturin' by natur';
> An' hoo she'll do 't ye sune' ll see."

THE CHICAGO COLLEGE OF PHARMACY AND PROFESSOR ATTFIELD.

The pleasure which all English pharmacists experienced in the successful result of the effort to show sympathy with the pharmacists of Chicago, while suffering from the effects of their almost unparalleled disaster, was to a great extent owing to the energy of Professor Attfield. This activity on their behalf was speedily recognized by the members of the College, and their appreciation was shown by a request from a few of them to Professor Attfield that he would sit for a portrait for presentation by them in the name of their fellow members to the College. In complying with this request, Professor Attfield stipulated that the cost of the picture should not exceed twenty-five guineas. The picture has now been finished and shipped to its destination. It is an admirable likeness, and represents the Professor sitting by a table, on which are placed some books, and in his hand some papers relating to the Chicago College Fund. It has been painted by Mr. E. N. Downard, a rising artist, several of whose pictures have been exhibited in the Royal Academy. A tablet, having the following words on it, is attached to the frame:—

> "Professor Attfield, F.C.S., Professor of Practical Chemistry to the Pharmaceutical Society of Great Britain. A portrait painted for a few members of the Chicago College of Pharmacy and presented by them to this College in recognition of the generosity of British Pharmacists and the special efforts of Professor Attfield in largely aiding to raise the College from its ashes after the great fire of 1871.—E. N. Downard."

A replica by the artist may be seen for a short time in the Museum at 17, Bloomsbury Square.

THE CONVERSAZIONE.

In order to prevent inconvenience to the visitors to the Conversazione on Wednesday evening next, we are requested to say that the officials at the South Kensington Museum will not be able to take charge of hats on that occasion. Programmes of the music will be provided, and should be obtained by each visitor upon entering the museum.

The appointment of Professor Redwood as Public Analyst, under the provisions of the Adulteration Act, for the Parish of Clerkenwell and the Districts of St. Giles's and Holborn has been confirmed by the Local Government Board.

Professor Bentley will commence the Third Part of his course comprising Practical Demonstrations on Plants and Systematic Botany, at the Royal Botanic Society's Gardens, Regent's Park, on Friday morning, May 23rd, at 8 o'clock. Cards of admission may be obtained from Mr. Bremridge, 17, Bloomsbury Square.

We are informed that the control and analysis formerly exercised by the late Baron Liebig and his delegate, Professor Max von Pettenkofer, in connection with the "Liebig's Extract of Meat Company, Limited," will in future be carried out by the latter gentleman in conjunction with Hermann von Liebig, son of Baron Liebig, who has been accustomed to act as special assistant to his father.

Notice.—In order to include a report of the approaching anniversary proceedings of the Pharmaceutical Society in the number of this Journal for next week, its publication will be delayed until Saturday.

STATEMENT OF ATTENDANCE OF MEMBERS OF COUNCIL ON COMMITTEES FOR THE YEAR 1872-73.

	Committees held Once a Month or Oftener.		Committees held Occasionally.						
	Finance.	Library, Museum, and Laboratory.	House.	Benevolent Fund.	Parliamentary.	Provincial Education.	General Purposes.	Special Committees appointed to Draw up Reports, etc.	Total Number of Attendances.
No. of Committee Meetings held.	18	13	9	13	15	4	4		
Atherton (*Nottingham*)	*	*	*	*	8	3	3	*	14
Baynes (*Hull*)	*	*	*	*	1	2	1	*	4
Betty (*London*)	16	12	8	11	10	4	2	1	64
Bottle (*Dover*)	*	4	1	*	10	*	4	1	20
Brown (*Manchester*)	*	2	*	*	5	3	1	1	12
Frazer (*Glasgow*)	*	*	*	*	2	2	0	*	4
Greenish (*London*)	17	12	9	11	5	4	0	*	58
Hampson (*London*)	17	*	*	13	11	2	3	1	47
Haselden (*London*)	5	12	9	2	10	2	4	3	47
Hills (*London*)	*	10	7	*	5	*	1	*	23
Mackay (*Edinburgh*)	*	*	*	*	1	2	0	1	4
Owen (*London*)	11	*	*	9	2	*	1	*	23
Radley (*Sheffield*)	*	*	*	*	1	4	3	*	8
Sandford (*London*)	*	9	6	*	8	2	2	2	29
Savage (*Brighton*)	*	*	*	*	4	*	2	1	7
Schacht (*Clifton*)	*	1	*	*	*	3	2	*	6
Shaw (*Liverpool*)	*	*	*	*	5	2	2	*	9
Stoddart (*Bristol*)	*	*	*	*	*	1	1	*	2
Sutton (*Norwich*)	*	*	*	*	*	2	0	*	2
Urwick (*London*)	17	*	*	13	6	4	4	1	45
Williams (*London*)	*	11	8	*	10	4	2	2	37

* Not appointed on this Committee.

STATEMENT OF ATTENDANCE OF MEMBERS OF COUNCIL AT COUNCIL MEETINGS FOR THE YEAR 1872-73.

Atherton, John Henry	10
Baynes, James	8
Betty, Samuel Chapman	13
Bottle, Alexander	12
Brown, William Scott	7
Frazer, Daniel	8
Greenish, Thomas	11
Hampson, Robert	13
Haselden, Adolphus Frederick	12
Hills, Thomas Hyde	13
Mackay, John	4
Owen, John	11
Radley, William Valentine	11
Sandford, George Webb	11
Savage, William Dawson	11
Schacht, George Frederick	12
Shaw, John	11
Stoddart, William Walter	10
Sutton, Francis	10
Urwick, William Walker	13
Williams, John	13

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN, NORTH BRITISH BRANCH, EDINBURGH.

The annual meeting of the North British Branch of the Society was held in St. Giles Street, on Monday, 12th May, at 12 o'clock, Mr. Baildon, President, in the chair.

Mr. H. C. Baildon made a few valedictory remarks as President previous to vacating the chair. He said: To the exhaustive report of the past session presently to be read by our Honorary Secretary, little remains for me to add. But I have the pleasing duty to perform of asking you to pass a cordial vote of thanks to those gentlemen who have so kindly contributed lectures at the various scientific meetings during last session, viz. to Professor Crum Brown, to Dr. Stevenson Macadam, to Dr. J. G. M'Kendrick, to Mr. Paton, and to Mr. Mackay. All these lectures have been extremely interesting and instructive, and they have upon the whole been well attended. The recent official visit of the President, Vice-President, and the Secretary of the London Council, accompanied by Mr. Williams, has been most gratifying to the Council and to the Board of Examiners of the North British Branch, and will, I feel satisfied, be attended with very beneficial results. You will, I am sure, be pleased to hear in connection with pharmaceutical education in Scotland, that our indefatigable Secretary has now completed arrangements which will enable our students to obtain tickets through him for each of the subjects required by them upon very moderate terms. During the last session no less than 14 took tickets for Dr. Stevenson Macadam's class, whilst 3 attended his practical, and 1 his analytical chemistry. Eleven tickets have now been issued for Professor Balfour's botanical class, and each succeeding year should add considerably to these numbers. I have now great pleasure in stating that if elected, my friend Mr. Young has consented again to place his valuable services at the command of the Society as President of our North British Branch,—we all know how well he has on two previous occasions filled the chair; and our friend Mr. Gilmour is willing, if elected, to continue in the vice-presidential chair, in preference to taking that of president this year, but we all look forward to his filling the higher office, which indeed nothing but his extreme diffidence has caused him for the present to decline. In retiring for the second time from the honourable position of President of the North British Branch of the Pharmaceutical Society, I wish to return my sincere thanks to the Council for the kindness and support which I have invariably received at their hands during my two years' term of office.

The following report was then read:—

Annual Report.

In this the Annual Report of the proceedings of the North British Branch of the Society, there can be nothing of more importance to the members generally, than the occupation of the new premises, in which have been carried on, since November last, the operations of the Society in Scotland.

The room which was set apart for the museum has been used for all the examinations. Though somewhat small, and scant in accommodation when many candidates were present, it yet has answered the purpose fairly. The same room has also been made available for the ordinary evening scientific meetings, which have, the Committee are glad to say, been on the whole well attended throughout the session now closing. It must be admitted, however, that practical experience, even during the short time the rooms have been in use, points to the necessity ere long of having more space both for examinations and meetings.

The second room, set apart as a library, has also been used as a reading-room. Here a visitors' book is laid on the table, and it is gratifying to know that since November last, when the rooms were opened, 432 names are entered as having, on various occasions, paid visits to the rooms. There have been twenty-two tickets issued for the library, and regularly used; but many of the young men who have gone to St. Giles Street have made use of many of the volumes, by remaining during several hours at a time reading books and examining specimens together.

The Council feel satisfied that the short experiment which has been made proves that it was a step in the right direction to give such opportunities to young men in town and from the country, who were really desirous of spending a portion of their time in reading and study. It is hoped that still greater facilities will be afforded in this respect, as the Council have it in contemplation to fit up a more extensive series of specimens for the special use of students.

It may also be here mentioned that while the rooms have been used for all the requirements of the Society, the Council, on an application from the Young Men's Chemists and Druggists' Association, had much pleasure in granting the free use of the rooms for the purpose of that Association holding their regular meetings for mutual improvement throughout the winter months, and at which meetings papers were read, and interesting discussions followed.

The Board of Examiners have not been idle, and they beg to state that since last report, the following candidates have appeared:—Preliminary, 175; Major, 13; Minor, 54; Modified, 24—in all, 264. Of these failed in Preliminary, 74; Major, 6; Minor, 23; and in Modified, 6—in all 109; giving roughly 41 per cent. of failures. The Council cannot but regret the large percentage of failures which have occurred in all the above departments. The questions, as a rule, which are set for the first examination are really so fair to the candidates, that it appears inexplicable how so many should fail; more especially as the bulk of those who come up for this examination are young and fresh from school, and who ought therefore to be quite conversant with Latin, arithmetic, and English, to the extent, at all events, required by the Board.

Great as has been the extent of failure in the past, it is much feared that a recent change carried out by the Board in London, will very much increase the percentage for the future. It may be frankly stated that the examiners in Scotland do not concur in some of these alterations, and are very desirous that the old condition of things in respect to partial failures should be at once restored. They feel strongly on this point, sharing as they do the fear—if not the conviction—that if the change referred to be continued, it will so militate against parties entering the business, that the supply, both of apprentices and assistants, may yet be seriously interfered with if the new system be adhered to. Some correspondence has already taken place between the two Boards, London and Edinburgh, which the Council hope may result in some satisfactory arrangement being made.

The annual statement of intromissions on the part of the Honorary Secretary and the Branch have been already rendered, accounts vouched, passed, and settled.

By a series of new bye-laws, already passed at the Council-table, and which it is expected will be confirmed by the Annual Meeting in London this month, provision has been made for electing examiners in December of each year, instead of June as heretofore. In accordance with this proposal it is intended that the present Board in England and Scotland will continue as already constituted until the end of the year, when the new appointment for one year, to be confirmed by the Privy Council, will then take place. The gentlemen at present comprising the Board in Scotland will thus retain their position until December, when the Board will be elected anew.

The Council had much gratification in having had the honour of receiving during last month a deputation from London. Ever actuated by a desire to assimilate the Branch here as much as possible to the Society in London, the Council are confident that from what the President, Vice-President, Secretary, and Mr. Williams saw while present at our examination, and the benefit derived from some hints which fell from Mr. Haselden as to the conduct of the examinations in London, much good will accrue; and it will always be a matter of pleasure to the Council here, to receive in future a repetition of such a visit from their friends in the south.

In regard to the election of Council in Edinburgh for this and succeeding years, it is proposed to make the number sixteen, or fourteen members along with President and Vice-President. Of this number ten will be balloted out each year, leaving six of the old members. The ten drawn shall, however, be eligible for re-election, while it will also be competent for any member of the Society at the Annual Meeting to propose, and if need be put to the vote, any new name he may wish to serve on the Council for the ensuing year. This mode of procedure will be more in accordance with the plan adopted in London, without the machinery and expense of voting papers. To give, however, a more general interest to the proceedings at the Annual Meeting, it has been proposed that in future, billets will be circulated in Scotland a fortnight before the date of meeting in Edinburgh, giving the result of the ballot; and in event of any member wishing to propose a member of Council he may do so, by writing to the Secretary, who will intimate the same to meeting. Vote will then be taken as to the new members. Intimation of the meeting will also be made on the cover of the Pharmaceutical Journal.

The Council are thankful that the Society now recognize the position which the Branch here ought to occupy, and are glad to find that as our wants become apparent and known, the London Council are ready to grant supplies as well as to meet our various requirements. The true feeling which has ever existed here, and has prompted from time to time an advocacy of our rights, has arisen from a desire that our affairs should be so conducted that the North British Branch of the parent Society in London, and established in Edinburgh, should occupy a position in the estimation of the medical and general public in all respects worthy of such a powerful organization as that of the Pharmaceutical Society of Great Britain.

The report was unanimously adopted.

Vote of Thanks to Lecturers.

Mr. H. C. Baildon moved a vote of thanks to those gentlemen who had been kind enough to deliver lectures during the past session.

The vote was cordially passed.

Election of President and Vice-President.

Mr. H. C. Baildon said he had great pleasure in moving that Mr. Young fill the presidential chair and Mr. Gilmour continue to occupy the vice-president's chair during the ensuing year. He hoped that Mr. Gilmour's extreme diffidence would not prevent him on a future occasion, though it had on this, from occupying the presidential chair.

Mr. Napier seconded the motion, which was then passed unanimously.

The Election of Council for 1873–74.

Mr. Mackay then reported that at a meeting of a committee of the Council and examiners held on Saturday, the following names were drawn by ballot as those of gentlemen who should retire this year, but be eligible for re-election:—Messrs. Fairgrieve, Noble, Napier, Heron, Davison (Glasgow), H. C. Baildon, J. Aitken, and Fairlie (Glasgow).

The following having been nominated were declared elected, other five who had been also placed in nomination having retired:—Messrs. Kemp (Portobello), Buchanan, W. Tait (of Duncan, Flockhart, and Co.), Fairlie (Glasgow), Davison (Glasgow), J. Aitken, Heron, and Baildon. These, with the President and Vice-President, will fill the ten vacancies on the Council.

Mr. Baildon then moved that their Honorary Secretary, should be re-elected. He knew of no one who could perform the duties of this office in the same efficient manner as Mr. Mackay did, and he hoped that he had many years of health before him, for this, amongst other reasons that he was sure so long as he had health they would have an efficient Secretary.

Mr. Young, the newly elected President, then moved a cordial vote of thanks to Mr. Baildon for his services during the past year. It had been a year of considerable work, and Mr. Baildon had bestowed a great amount of labour upon their concerns. He had given his services most cordially, and he was sure they were all conscious of how much he had adorned the chair.

The vote was cordially passed.

Mr. Baildon having acknowledged the compliment, expressed his satisfaction that he was succeeded by so able a gentleman as the newly elected President.

This closed the meeting.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The Eleventh General Meeting was held at the Royal Institution on Thursday evening, April 24th, the President, Mr. E. Davies, F.C.S., in the chair.

The following donations to the Library were announced:—Current numbers of the 'Pharmaceutical Journal;' the 'Register of Pharmaceutical Chemists and Chemists and Druggists;' and the 'New York Druggists' Circular.' To the Museum—A specimen of "Guaranine," manufactured and presented by Messrs. Hopkins and Williams, of London.

The first paper read was on the

Action of Spirit of Nitric Ether upon Iodide of Potassium.

BY J. ABRAHAM.

Mr. Abraham said that, in consequence of an inquiry, he had made careful experiments on this subject, and found that the spirit of nitric ether made according to the Phamacopœia was, when perfectly fresh, *feebly acid.* If, in that state, it was added to a solution of iodide of potassium, decomposition was instantly apparent, the solution becoming *reddened.* If the iodide of potassium contained ten per cent. of carbonate of potash (perhaps less) this change of colour did not occur; and after the mixture had been kept some days, there was at most a slight yellow colour. He believed that carbonate of potash was often found in commercial iodide of potassium, and when such an article was used, the discolouration to which he referred might not occur. Even if spirit of nitre were made by another process, and were perfectly free from acid at first, it would soon become changed, and the effect on iodide of potassium would be what he had described.

In connection with this subject, Mr. Alfred E. Tanner said that the prevailing practice appeared to be, to add a certain quantity of alkali to the spirit of nitre previously to mixing it with the iodide, under the impression that the spirit of nitre should be neutral, but this was really not sufficient, for unless there was an excess of alkali present the iodide would still be decomposed, and where this discolouration was not present, it was owing to the alkali being added in sufficient excess to take up the iodide liberated. All nitrites decompose iodide of potassium, and the practice of ordering these two articles in combination is to be deprecated, inasmuch as they are quite incompatible.

A paper was afterwards read on

The Decomposition of Animal and Vegetable Substances.

BY GEO. F. CHANTRELL,

Hon. Sec. of the Microscopical Society of Liverpool.

The following is an abstract of the paper:—

To the sanitarian this subject is one of most vital interest, as decomposing animal and vegetable matters enter so largely into the pathology of contagion. One of the earliest developments of life to be noticed in water, in contact with animal and vegetable substances, is that of bacteria. The writer referred to the diverse opinions expressed by Dr. Burdon Sanderson and Professor Hallier as to whether bacteria are plants or animals; it was evident their place in nature was as the universal destroyers of nitrogenous substances, acting as the pioneers, if not the producers of putrifaction. He said, by a little investigation of the remarkable substance "yeast," much light would be thrown on the subject.

He then referred to the results of Dr. Lionel S. Beale's (the well-known microscopist) examinations of *yeast* under the 50th of an inch object-glass = 2800 diameters, who says the yeast-cell will be found to be composed of two kinds of matter, the one smooth, *transparent*, and external, closed at all points, known as the cell wall (formed material); the other soft, diffluent, also transparent, but apparently composed of *semi-fluid* matter (germinal matter or bioplasm). Professor Huxley says of this bioplasm that it is a substance which contains the elements carbon, hydrogen, oxygen, and nitrogen, that it is in all essential respects the substance which forms the chief part of the contents of the yeast-plant, that it is identical with the material which forms the chief part of the white of the egg, that, in fact, although this little organism is a *plant*, and nothing but a *plant*, yet that its active *living* contents contain a substance which is called protein, which is of the same nature as the substance which forms the foundation of every *animal* organism whatever. Mr. Chantrell then referred to an experiment he had made with a thin section of celery, which he had placed in an animalcule cage, with a drop or two of well-boiled distilled water, forming a film of water and celery, about the size of a well-worn threepenny piece; in course of twenty-four hours, he noticed that on the outside of the chlorophyll granules a film or mucus (bioplasm?) had formed, which, after a while came away, and at the same moment active bacteria were to be seen all over the field. He could not resist the conviction that this mucus or bioplasm was the source from which the bacteria arose; as far as the microscope showed, it was evident the material was identical, only that the bacteria had their own characteristic movements and the chlorophyll granules their own slower ones. Later on, the bacteria were in amazing quantities as also were developments of the bacteria into filaments and spirilla.

Fish roe and meat treated in a similar manner to the celery produced almost identical results, animal and vegetable substances alike developing bacteria, torulæ, spirilla, etc., etc.

In course of a number of experiments with *boiled* vegetables it was remarkable how soon ciliated infusoria appeared (treated in a similar way to the celery). In an experiment with a portion of the *Collomia grandiflora* seed, which was kept for some weeks in the animalcule cage, infusorial life was developed in a most remarkable manner, from bacteria up to paramecia; one form of the latter regularly *swarmed* for nearly six weeks, after which some of them began to alter in form, and soon there were no less than six different varieties. Unfortunately by neglect the colony dried up—by the addition of water, in course of a few hours *amœbæ* were observed to be developing from the dead matter. The remarkable results obtained in these and other investigations of vegetable tissues led to the treating of garden soil in a similar way, and in twenty-four hours as a rule, ciliated infusoria, besides other life, were found. There was also another reason that suggested this investigation, and that was the fact of charcoal having been produced from the carbonization of garden, arable, and pasture soils, which has been *patented* as a most efficient purifying material for the treatment of sewage of towns. In the examination of a sample of sewage sludge from Ealing Sewage Works (now being treated under Major-General Scott's Patent Clay and Lime process) in a similar manner to the experiment with celery, in a very few hours active infusoria appeared, and to that extent that the carbonization of this unpromising-looking substance suggested itself—and the result you have before you—a perfectly black charcoal, not a pure charcoal, but probably containing as much carbon as animal charcoal. In sewage under the microscope, infusoria can almost always be found. In the examination of boiled vegetables, under a power of 760 diameters, movement has been found in the chlorophyll granules as they disengaged themselves from the vegetable tissues; besides these granules are very minute germinal spheroids, mere greenish points which have their own characteristic movement; these same spheroids, have been observed in the body of the spirilla, and also in minute fungoid growth. Carefully made infusions of coal, marble, and gypsum show these same spheroids which develop into many strange forms which have been well affirmed by microscopists of note, both English and foreign.

Mr. Chantrell then quoted some extraordinary effects on a fine rose bush by the application of half an inch of coal dust in depth on the surface. A sickly plant in a very short time quite recovered itself, and the effect on the colour of the flowers was something marvellous. This account is given in the *Revue Horticole*. The only exception was, that the flowers of a *yellow* colour alone remained insensible to the influence of the coal. It has been said that vegetable charcoal has a similar effect. Are we to suppose in the case of the coal, that it is due to the presence of these minute organisms before described, and that these are taken up as food by the plant?

The writer then referred to Pouchet's account of the mode of origin of *Paramecium viride* from infusions of hay and Dr. Bastian's difficulty in getting the same results, until he found out that whilst he was making his infusions with hot water Pouchet was making *his* with cold water. Temperature has a marked effect on the character of infusorial life. The "proligerous" pellicle or *scum* which forms on the surface of decomposing infusions of animal and vegetable substances is one of the most interesting objects of study to the microscopist; and he would call especial attention to that strange production of nature, the *spirillum*. It constitutes a large portion of scum; it is a living, moving thread, always on the move, coiling and uncoiling constantly. Examine it under a high power; the small spheroids, of a greenish colour, may be discerned. In old scum these threads have been seen undergoing change, and afterwards these spheroids aggregate, and finally develop into *amœbæ*; these in their turn become *paramecia*, and after a time develop into planarian worms. These worms seem to extract from the water, as it were, the last of the nitrogenous matter—old infusions generally finishing by a deposit of a substance like the lees of yeast, all active infusorial life having disappeared. The formation of scum primarily is thick and viscid, and after a while sinks to the bottom, followed by a weaker one—which in its turn sinks—and a third and fourth one, according to the strength of the decomposition. Each time the smell is reduced; nature by these means purifies the water.

Mr. Abraham said that it was an exceedingly difficult thing to trace the changes which took place in microscopic objects in fluids. That a new object was found in place of one which had been previously there was not a proof that one had been changed into the other. Mr. Chantrell might, however, be perfectly correct, and no doubt objects had been described as distinct animals which were the same in different stages of growth. With respect to the bacteria, it should be remembered that they were exceedingly minute, so minute that he believed no structure had yet been observed in them. He had looked at them with a $\frac{1}{15}$th-in. object-glass, magnifying 2000 diameters, and had seen none. A paper had been read some time ago before the Liverpool Microscopical Society, in which Mr. Metcalfe Johnson, of Lancaster, expressed his opinion that certain minute objects became animals or vegetables according to the circumstances in which they were placed. Some still more advanced authorities resolved vital force into chemical force.

A discussion on the subject of the paper followed, in which the President, Dr. Cook, and Mr. Tanner took part.

A vote of thanks to Mr. Chantrell for his valuable and interesting paper, proposed by Mr. Mason and seconded by Mr. Tanner, was unanimously carried.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The annual business meeting of the Association was held in Anderson's University, on the evening of Wednesday, the 23rd April; Thos. Davison, Esq., President, in the chair.

The minutes of previous meeting having been read and adopted, the Secretary then gave his annual report, after which the Treasurer presented his financial statement.

Secretary's Report.

"In accordance with an old established custom, it becomes my duty, to-night, to lay before you a statement (which shall be brief) of what has been done during the session that is now about to expire.

"I cannot speak definitely as to the number of our members, many of those who were members last session, I believe, have left the city, without, however, notifying your Secretary of the same. If I might be allowed to give a rough guess I should say that the probable number will be between 70 and 80, a number less by about 20 than that of last of session, but this can be accounted for by the formation of the 'Assistants' Association' about that time, which robbed us of several members, and also by the fact of a few of our members getting situations in other parts of the country. While on this point I may be allowed to allude to the loss that the Association has suffered in the departure of Mr. Jas. L. McMillan from Glasgow to fill a situation abroad. It will be remembered that this gentleman gave several valuable papers to the Association during the last two or three sessions.

"Including the present there have been six meetings of the Association this session. Our first meeting, as most of you are aware, was honoured by the presence of Mr. Samuel Chapman Betty, Member of the Pharmaceutical Council, London, who came to Glasgow specially to deliver the inaugural address of your Association.

"We must not forget to express the indebtedness of your Association to Dr. John Clark, Glasgow, who delivered an able and interesting lecture on the 'Oxides of Hydrogen' on the occasion of our second meeting, and to Mr. James Stitt, who kindly favoured us with a lecture on 'Phosphorus;' nor must we forget to record the obligation that we are under to Mr. Weir for his short lecture on 'Health,' and to Mr. Fairlie for his excellent paper on 'Artificial Silicates.'

"The principal features of the past session have been the issuing of a retail price-list, the formation of an 'Assistants' Branch' of the Association, and the complimentary dinner on the occasion of the official visit of the President, Vice-President, and Secretary of the Pharmaceutical Society to Glasgow.

"In regard to the price-list, we have every reason to congratulate ourselves on the success that has attended the labours of the committee appointed to carry out that matter.

"We cannot, of course, say that every chemist and surgeon in the city is closely following the prices contained in the list, but that the majority are endeavouring to adopt it to the utmost of their power we believe to be a fact.

"The demand for the price-list has quite exceeded our expectations. The first issue of 300 copies was very soon exhausted, applications for them being received from different parts of the country, including England; and as inquiries still continued to be made for them, the committee thought it advisable to have a second edition printed. This allowed of certain alterations in, and numerous additions to the list being made.

"As it was thought that most of the towns in the west of Scotland of any importance would most likely before long adopt the Glasgow price-list (as was instanced a short time since by the chemists of Greenock), your Committee have had 400 printed this time, copies of which may be had from Mr. Jos. A. Clarke, convener of Price-List Committee, price 1*s.*

"In connection with this matter I may say that an advertisement has been inserted in the Pharmaceutical Journal, and also in the *Chemist and Druggist.*

"In regard to the Assistants' Branch very little can be said, and your Council regret that that little is not of a very encouraging nature. On the 19th February, 1873, a meeting of assistants was called to consider the advisability of forming a branch association. The attendance was small, but it was moved, seconded, and agreed to, that a branch association should be formed. Office-bearers and committee were then appointed. On the 19th March a second meeting was called, but as there were not more than half a dozen presented themselves, there was no business done. I cannot attempt to account for the want of interest shown by the assistants and apprentices in this matter. One would naturally have supposed that they would have hailed the formation of such an association with delight, and instead of giving it the "cold shoulder," would have given it their hearty support.

"In reference to the complimentary dinner given in honour of the visit to Glasgow of the President, Vice-President, and Secretary of the Pharmaceutical Society, your Council have very much pleasure in being able to report that the occasion came off with very great *éclat.* About forty gentlemen sat down to dinner. Among the number were (besides the deputation from London) Messrs. Ainslie, McKay, Baildon, Young, Gilmour (Edinburgh), Duncanson (Stirling), Stanford (British Seaweed Company), Professors Cowan and Simpson, etc., etc.

"Your Council cannot allow the session to close without expressing in the strongest language their great indebtedness to Mr. John Currie, of Sauchiehall Street, for his generosity in conducting that class for pharmaceutical students; and they feel certain that those students who were regular in attendance at the class will corroborate the statement that Mr. Currie was thoroughly master of the subjects that it was his self-imposed duty to impart to his pupils, and which he did in a most able and agreeable manner; and they trust that they will have the honour of his advice and assistance in connection with classes during the coming session.

"Through the liberality of that very liberal gentleman, Mr. Jas. McDonald, of the Glasgow Apothecaries' Company, and Mr. Rait, of Partick, your Council were enabled to offer two prizes in connection with Mr. Currie's class, and which, as many of you are aware, were carried off by Messrs. Wallace and Cleghorn.

"There is one subject more that I wish to touch upon, and then I have done, and that is, the Annual Festival. Your Committee have much pleasure in being able to state that it has been a success. After paying all expenses, there was a balance of three pounds in the Treasurer's hands. At the first glance it would appear that, this year, the festival had been a great success financially. But in case it should cause you to be less energetic on the occasion of our next festival, I desire to remind you that, with one exception, the services of those who took part in the concert were gratuitous. Had each of those gentlemen who gave their services on that occasion been paid, say, two guineas, I fear that the chancellor of your exchequer would have pulled a very long face to-night when giving you his budget."

Treasurer's Report.—1872–3.

Income.	£	s.	d.
To Balance brought forward ...	0	12	6
,, Donations ...	4	14	0
,, Subscriptions—23 Members at 5s. ...	5	15	0
,, ,, 22 ,, at 2s. 6d. ...	2	15	0
,, ,, 7 ,, at 1s. ...	0	7	0
,, Mr. Currie's Class, 15 Students at 5s. each ...	3	15	0
,, Prize Fund (reserved) ...	0	11	3
,, Surplus Funds of Soirée ...	2	12	8
,, Price-List Cash "in Secretary's hands" ...	7	8	0
	£28	10	5

Expenditure.	£	s.	d.
By Books for Mr. Currie's Class ...	0	13	7
,, 23 Meetings for ,, ...	1	14	6
,, Expenses for ,, ...	0	9	0
,, Printers' and Engravers' Account ...	5	17	6
,, Secretary's Expenses ...	2	11	9½
,, Post-Cards for Assistants' Meetings ...	0	5	11½
,, Rent of Hall, etc. ...	8	1	0
,, Janitor's Fee ...	1	1	0
,, Balance in hand ...	7	16	1
	£28	10	5

The Secretary's and Treasurer's Reports having been adopted, the following motions were brought forward :—

The President, having vacated his chair, moved—"That the following alterations and additions be made in the Rules :—Rule 1, instead of 'and shall have for its object the mutual improvement of its members, the better education of assistants and apprentices, and the general advancement of the interest of the profession and trade ;' to read thus—'And shall have for its object the study of the science of chemistry, and other collateral sciences having a bearing upon pharmacy.'"

The President briefly stated his reasons for making this motion, it being simply to remove the Association from the burden of taxation. This having been seconded and agreed to, he then moved the following as a new rule :—"No part of the Society's funds shall be applied by way of dividend, gift, donation, or bonus to any of the members." This was also agreed to.

Mr. Fairlie then moved—First, "That the Council take steps to procure another place of meeting, in some central part of the city, which could be opened at certain hours as a reading-room, and used as a class-room, and for the meetings of the Association in the evenings." Second, "That the Secretary be instructed to convene a joint-meeting of the Council, and the Committee of the 'Assistants' Branch' early in September, to arrange the business of the session, including Syllabus of Lectures, Essays, Discussions, Classes, etc."

Both the motions were seconded by Mr. Murdoch, and finally adopted. The election of Office-bearers and Council was then proceeded with. The retiring President (Mr. Thos. Davison) declining re-election, Mr. John Currie (Sauchiehall Street) was elected President. Mr. Wm. Whyte, Vice-President, Mr. Jos. A. Clarke, Secretary, Mr. William McKenzie, Treasurer. Council —Messrs. Daniel Fraser, Thos. Davison, Alex. Kinninmont, John Black, John Fenwick, Arch. Paterson, R. T. Dun, Robt. McDonald, Jas. M. Fairlie, W. S. Galbraith, R. Brodie, G. Garry. Auditors—Messrs. J. Hunter and J. Foster.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

Meeting of the Executive Committee.

A meeting of the Executive Committee of the British Pharmaceutical Conference was held on Wednesday, May 7th, at 17, Bloomsbury Square. The chair was taken by Mr. Daniel Hanbury, and there were also present—Messrs. Clayton, Williams, Schacht, Attfield, and Moss. The minutes of the previous meeting were read and confirmed.

Year-Book.—The Secretary (Professor Attfield) reported that upon seeking to make arrangements, directly after the meeting at Brighton, for the issue of the annual volume he found that the printers required an advance on former prices of 7½ per cent. for the greater part of the printing, paper, etc., and 8 per cent. on the binding. Upon inquiry he became convinced that the proposed increase was a reasonable one and ventured to allow it without troubling the members of Committee to assemble and decide the point. In September, Mr. C. H. Wood announced to the Executive that he had completed his portion of the MS. of the volume. Professor Attfield had also prepared by that time a list of the names and addresses of the 2000 members of the Conference, an alphabetical list of the towns with the resident members, and a complete report of the transactions of the Conference at the ninth annual meeting at Brighton. In compiling the latter he had been much assisted by the reports published in the Pharmaceutical Journal, and by the kindness of the authors of papers and speeches. The proof sheets were corrected as they came from the printers, the first part by Mr. Wood, and the second by himself and Assistant-Secretary. The volume was published at the end of December.

Honorary Members.—The Secretary reported that he had officially communicated with the gentlemen who had been elected honorary members of the Conference at the Brighton meeting, and had since received the acknowledgments of those gentlemen.

Bell and Hills Fund.—Professor Attfield reported that he had purchased and had had bound ten guineas' worth of books, selected by himself in accordance with the wishes of the Brighton Chemists' Association, and had presented them to that body in the name of the Committee. The Association had acknowledged their receipt in highly appreciative terms.

Finance.—Professor Attfield reported that in November and December last he issued 1760 circulars requesting members to forward their subscription. About 1100 subscriptions were forwarded in answer. In February, 660 members were again asked for their subscriptions—210 responded ; in April the remaining 450 were a third time requested to remit and to that date about 50 or 60 had done so. Of the 400 defaulters, 57 were three or more years in arrear ; 114 owed for the current and previous and the previous year, and 229 for the current year only. With regard to the members who had not paid subscriptions for three or four years, the Professor said they were mostly gentlemen who resided in towns where the annual meetings were held, and who probably had not intended to subscribe to the Conference for more than the one year of their temporary interest in the association. Many members, however, who had avowedly joined for one year only, and who had not promptly paid the following year's subscription, had been induced to continue membership on being appealed to by the Secretary or after receiving the various circulars issued during two or three years. The 57 members now alluded to had not responded to such appeals, and he proposed that to such members a special letter should be sent drawing attention to the rule respecting defaulters, and stating that if no answer were received within a given period (say ten days) the name of the member applied to would be struck off the roll by the Executive Committee.

Mr. Clayton approved of the efforts of the Secretaries to induce members to retain their interest in the Conference, but thought that when such endeavours met with no response the connection should be severed.

Mr. Williams concurred in this view.

Professor Attfield said that as Secretary he fully appreciated and even fostered temporary interest in the Conference, of course also hoping that it might merge into permanent interest ; but when men answered neither circulars nor letters year after year continued appeals would probably become troublesome to such members themselves and certainly gave useless trouble to the staff.

The course proposed by the Secretary was ordered to be adopted.

Number of Members.—In answer to a question from the Chairman, the Assistant-Secretary said that the total number of names on the books was 2071, including 17 honorary members and about 60 candidates for membership.

Bell and Hills Fund.—Mr. Benger (Secretary) reported that he had written to five or six prominent members of the Conference with the object of obtaining suggestions as to the best method of appropriating the money which Mr. Hills had confided to the Executive Committee for the promotion of pharmaceutical education and the cultivation of original research and pharmaceutical science generally. The following was a summary of the answers he had received:—

Mr. Reynolds thought that the Committee meeting in May might draw up a set of rules, and immediately afterwards invite special attention to the subject by directly laying it before their leading members and by offering a statement to editors for publication in the usual way. There was no reason why a subsequent committee in June should not make grants that might be applied for by individuals; but at all events before the annual meeting took place members should be invited to name special subjects of considerable extent or importance, and if these required combined energies and involved expense, the Committee would aid with their advice, and as in the case of individual workers with grants from the fund. With respect to the ten-guinea grant of books Mr. Reynolds thought that although the Pharmaceutical Society was prepared to contribute to libraries, there was an inherent merit in Mr. Hills' original gift for provincial libraries that should preserve it alive. As to medals, to trust to a medal having no money value was not desirable, and he was against giving medals.

Mr. Groves thought that no other stimulus than desire for distinction was necessary to induce members to undertake absolutely new work, but the equally useful labour of checking and revising the labours of others who, perhaps, had been in haste to be original was not so attractive; the fund, therefore, would be well applied in repeating experimental work whenever experimental corroboration might seem desirable. The French societies nominated commissions to test the conclusion of almost every pharmaceutical writer in France. Some reputations might disappear in the process, but in the interests of truth such consequences should not be regretted.

Mr. Tichborne thought the Fund should be entirely devoted to Pharmaceutical science. He thought (*a*) researches might be undertaken with a view to the expurgation of useless preparations from the British pharmacopœia; (*b*) that a prize should be offered for an essay on the perfecting of official formulæ, for although this was a matter which should be encouraged by the Medical Council, it was also a subject of national importance; (*c*) another prize might be offered for a natural history of the materia medica; (*d*) an essay was wanted on the best disinfectants and the mode of using them; (*e*) also one on the economy of alcohol in tinctures and other pharmacopœial preparations; (*f*) investigations might be made on the application of the spectroscope, microscope, and other physical instruments to pharmacy. The prizes should not be too small, or good men would not compete.

Mr. Brady, Mr. Williams, Mr. Benger, and Professor Attfield concurred in the opinion that the best mode of procedure would be to follow, with modifications, the course pursued by the British Association, which had for many years granted money in aid of researches in science.

Mr. Benger submitted the draft of a circular, including rules relating to the application of the Bell and Hills Fund. After some slight alterations, Mr. Schacht moved and Mr. Williams seconded a resolution which was carried unanimously—"That the statements and rules now read be printed and distributed in the manner suggested."

Annual Meeting, 1873.—Professor Attfield reported that the usual blue list had been revised and a copy forwarded to each member. He had for some time been in correspondence with the officers of the local committee in Bradford, and he anticipated that the meetings in September (Tuesday, the 16th, and Wednesday, the 17th) would be thoroughly successful.

Annual Meeting, 1874.—Professor Attfield said that at the next meeting of the Committee it would be necessary to consider the question of the place of meeting for 1874. The British Association had decided on assembling at Belfast in the autumn of that year. Hitherto the Conference had met in the same town as the Association, on the Tuesday and Wednesday immediately preceding the Association days, a course which benefited both bodies to about the same extent as regarded increased attendances at the respective meetings,—though that extent of benefit was more important to their own gathering than to that of the Association, which mustered twenty times their number—and it was to be hoped that this convenient and favourite course might be possible next year. It was true that Belfast was a long way off, and that ninety-nine hundredths of the members resided in England and Scotland, still distance need not prevent a successful meeting being held if local support were strong. Unfortunately, party feeling in pharmacy was somewhat stirred in Ireland just now by prospective legislation, and might become more so, and it was important that a neutral body like the Conference, which was open to all comers, and which was established not only "for the encouragement of pharmaceutical research," but also "for the promotion of friendly intercourse and union amongst pharmaceutists," should not take any step which might be one of apparent sympathy with a portion only of the followers of pharmacy or its branches. He had during the past six months corresponded on the subject with some of the members of the Conference residing in Ireland, and would state the results at the next meeting of the Committee.

The Committee decided to meet again on Thursday, May 21st.

PHILADELPHIA COLLEGE OF PHARMACY.

The annual meeting was held at the College Building March 31st, 1873. Thirty-five members present. Dillwyn Parrish, President, in the chair. After some routine business had been transacted, Professor Proctor read, on behalf of the committee of deceased members, a memoir of Professor Edward Parrish; and after a number of expressions of the deep and affectionate regard in which he was held, the memoir was directed to be published in the Journal, whence the following abstract is taken:—

Edward Parrish was born in Philadelphia on the 31st of May, 1822, in Arch Street below Fourth, and was the seventh son of the late eminent physician and surgeon, Dr. Joseph Parrish, and Susanna, daughter of John Cox, of Burlington, N.J., both members of the Society of Friends. He was educated in the Friends' School in Philadelphia, where he is said to have been well instructed in elementary studies, and to have acquired a fair knowledge of the higher branches and the classics. He early manifested an aptitude for scientific pursuits, and in the year 1838 entered as an apprentice the pharmaceutical store of his brother Dillwyn. He is reported to have been attentive and faithful in the discharge of his shop duties and responsibilities. Availing himself of the favourable opportunities afforded in the store and at the College of Pharmacy, near by, he acquired an excellent knowledge of his business, for which his taste and inclination were well adapted. His first course was under the instruction of Professors Franklin, Bache, and Joseph Carson, and his last under Professors Carson and William R. Fisher, in the session 1841–42. In the spring of 1842 Edward Parrish took his degree in pharmacy in the Philadelphia College, having written his thesis on "Statice Caroliniana," published in Vol. XIV. *American Journal of Pharmacy.*

In 1843 he purchased a drug store, previously conducted by George W. Ridgway; here he continued business until 1850. During this period he contributed several papers to the Journal, and in 1848, in connection with his assistant, W. W. D. Livermore, a paper on "Collodion," the first notice of that preparation occurring in the Journal, the discoverers at Boston not having published their process. During the same period he married Margaret, daughter of Uriah Hunt, of Philadelphia, who continued his closest friend and companion until her death, a few months before his own.

In the autumn of 1849 he gave his first course of instruction in Practical Pharmacy to 14 students.

Soon after this time he removed and entered into business with his brother Dillwyn, his "Practical School" being better accommodated and gradually increasing in importance, was addressed to pharmaceutists as well as to medical students. In furtherance of his school he determined about this time to take a course of practical instruction in analysis in the laboratory of Professor Booth, and afterwards a medical course in the University of Pennsylvania.

Feeling the need of a text-book for his class, he decided to write a book addressed to medical and pharmaceutical students, and in the year 1855 he published the first edition of his "Introduction to Practical Pharmacy."

In 1857 his lecture on "Summer Medical Teaching in Philadelphia," after speaking of his earlier efforts in establishing his "School," he says: "Twenty-three courses of lectures and practical exercises have since 1849 been given to an aggregate of 299 medical students, drawn from nearly every State in the Union, and from British America. After near eight years' experience as teacher of this speciality, I need offer no apology for giving some general conclusions I have arrived at in regard to its utility as a branch of medical education, and the best means of imparting it." Again he says: "In claiming the position of a pioneer in this sort of teaching [in the U.S.], I do so with the confident belief that the time is approaching when its importance will be fully recognized, and when the education of the physician will be universally regarded as incomplete unless he has enjoyed the advantages of a more or less thoroughly practical teaching in pharmacy."

These extracts will show that Edward Parrish had made considerable advance as a teacher in imparting instruction to medical students before subsequently entering our faculty, and had carried on his school with an enthusiastic belief in its usefulness and efficiency.

The pharmaceutical meetings of the College (an offshoot from the interest awakened by the Pharmacopœia Committee of Revision of 1840) were frequently attended by Edward Parrish after he graduated; and, although his written communications to their proceedings were not numerous, he often gave interest to them by his practical remarks and by the exhibition of attractive objects. Being a ready speaker, he delighted on these occasions to bring forward subjects for discussion, and often without preparation added greatly to their interest. His genial manners, and earnest desire to render these meetings open to all who would come —members, students, or strangers—assisted in prolonging their existence after they decreased in importance, from the cessation in great measure for several years of the experimental essays, which in the beginning had given character and importance to their transactions.

Edward Parrish early determined to pursue a scientific career, aspired to a position in the schools, and was deeply impressed with a belief in his ability to teach. When the chair of Materia Medica was vacated in 1850 by the retirement of Dr. Carson, he was a candidate for the vacancy, but the traditional influence of the idea that that chair was best filled by a physician, led to the election of Dr. R. P. Thomas. In the Spring of 1864, however, on the death of Dr. Thomas, he was elected to fill the vacancy, as Professor of Materia Medica, and continued in that office till 1867, when he exchanged chairs with Professor Maisch, and, assuming the duties of the Professorship o Practical Pharmacy, more in accordance with his inclina tion and habits, continued until his decease to lecture annually to increasingly large classes.

Professor Parrish was always popular with the students; his free and open manner, the interest he took in the class individually and collectively, and, above all, his good delivery as a speaker, rendered him a favourite and gave him influence. For several years prior to his death other engagements had trenched greatly on the time required by his professorial duties, but in 1871 he was relieved from these, and had his life been spared there is no doubt that his career would have been increasingly useful as a teacher of practical pharmacy.

Edward Parrish was elected a member of the Philadelphia College in 1843, became a member of the Board of Trustees in March, 1845, and was elected to the Secretaryship of the College in 1854, and continuing that office until he entered the Faculty, in 1864. In 1847 he was one of a committee of fifteen members to report on the Pharmacopœia previous to the convention of 1850, and in 1859 and 1869 he acted on similar committees previous to the conventions of 1860 and 1870. He was also a delegate to the Pharmacopœia Convention of 1860 for Revising the Pharmacopœia, and in 1869 was one of three delegates appointed by our College to the International Pharmaceutical Congress of Paris, but was not able to to attend. In 1850 he was elected a member of the Publishing Committee of the College, and continued in it until 1870. He contributed frequently to the Journal during this period, and to the *Druggists' Circular, N.Y.*

Professor Parrish became a member of the American Pharmaceutical Association at its first meeting in Philadelphia, in 1852, was elected Recording Secretary at the Boston meeting, in 1853, First Vice-President in 1866, and President of the Association at the meeting of 1868. He acted on many of its committees, assisted in the revisions of the Constitution and other labour, and, when present, always took an active part in the discussions. A number of papers and reports, scattered over the twenty volumes of Proceedings, mark the interest he manifested in this way in the advancement of pharmacy.

His ready pen was always at command to bring together in order the results of reflection and inquiry, whether these related to the ethics of pharmacy, the bye-laws of the Association, or the advantages of education, general or special. Moreover, though not himself possessed of an inventive genius, he delighted in new inventions or improvements in pharmacy, and was always ready to encourage their authors, and to be the means of spreading a knowledge of them by tongue or pen.

In 1858 Professor Parrish made a hurried trip to Europe, but limited his travels to England and Scotland, with a brief tour to Paris, Strasburg, and the Rhine, availing himself of the opportunity to make acquaintance with pharmaceutists and their institutions. In a series of letters published in 1859, in the *American Journal of Pharmacy*, he gave some of the results of this voyage.

About this period he published a little book entitled "The Phantom Bouquet," which treated of the art of skeletonizing leaves and other parts of plants.

In the year 1864 the project of establishing a collegiate institution under the direction of the Society of Friends, which had long been entertained by some of its members, culminated in obtaining the Act of incorporation of Swarthmore College, and the purchase of a farm site of 93 acres in Delaware Co., Pa. Deeply impressed with the importance of more thoroughness in education and with the newer views in regard to the manner and means of educating the youth of both sexes, he gave the subject deep attention, and, entering the field in 1862, became one of the most successful pioneers in the work of advocating the claims of Swarthmore to those who held the means for its completion; serving as Secretary to the Board of Managers from December, 1864, until the completion of the building in 1868, when he was officially declared the first President of Swarthmore College, and continued in office during nearly two years.

On the several occasions when legislative encroachment on the best interests of pharmacy needed resistance, or when legislative aid and protection were to be sought, Professor Parrish took an active and efficient part; and on the passage of the Pharmacy Act of 1872 he was one of the five commissioners appointed by the Mayor of Philadelphia to carry the law into effect. The labour incident to the organization of the Board, and the subsequent service required in the examination of numerous assistants seeking registration under this law, protracted till late in July, doubtless had some influence in undermining his health, not yet recovered from the severe shock it had received by the sudden death of his wife, and probably contributed to his approaching end.

In the following month (August, 1872) the Government of the United States, desiring to settle some difficulties with certain Indian tribes, in the direction of peace, appointed Professor Parrish and Captain Alvord as commissioners. In entering upon this last act of his life he was advised by his family, who believed his health would be benefited by the journey. But the unforeseen exposure incident to a long and rough stage ride through the wilderness proving too heavy a tax on his impaired vitality, and before he could fully accomplish his mission of peace, he fell a victim to the climate, in the 51st year of his age.

Edward Parrish possessed social qualities of a high order: his conversational powers were good, his information on ordinary subjects general, his interest in modern progressive ideas considerable, and he was never happier than when his friends were around him in the family circle interchanging ideas.

His home instincts were strong: his wife and children ever occupied a prominent place in his plans and arrangements; for them no sacrifice was too great, no pleasure too rich, no necessity too expensive; and whether fortune smiled on him or frowned, he was the same kind and liberal husband and father, the same sympathetic brother and friend. There was nothing mean or contracted in his nature, and in business his competition was unmarked by bitterness or personality.

Professor Parrish was by nature ambitious of distinction among his fellows, yet his yearnings after power or place were influenced by a spirit at once mild, benevolent, and lovable. His intellect, which was clear and forcible, he had cultivated by reading and conversation. Had it been steadily concentrated in the line of his profession, it would have led him to honours far higher than those to which he attained; but by directing his attention to too many objects, his efforts lost in power and thoroughness what they gained in variety and popularity.

Although originality was not a prominent trait among his mental characteristics, his mind was active and ready; he was quick to catch ideas when presented, manifested much excellence of judgment in adapting them to his purposes, and it was generally with graceful acknowledgments that he rendered tribute to others when occasion required. It was in his manner of grouping and classifying facts, and of lucidly presenting subjects to his readers, that his personality was most deeply impressed on his literary labours in pharmacy.

Nature had endowed him with a gift of speech well adapted to the platform, and some of his ablest efforts have been introductory and valedictory addresses. As a teacher of pharmacy in the lecture-room, he loved to array the leading facts in generic groupings on the blackboard, using the more prominent individual substances for special comment on the table, often bringing in anecdote to enliven his subject. Less happy as a manipulator than as a speaker, Professor Parrish trusted more to his ability to convey his meaning by figures of speech than to annoying and often troublesome demonstrations by practical experiments; nevertheless he was conscious of the important and valuable aid derived from object-teaching and the exhibition of actual processes; and in his last course introduced several important improvements in his methods of illustration.

As a business man, his mind was too much given to outside matters to push his interests by close personal attention, and they not unfrequently suffered from too much devotion to other objects and interests wholly disconnected with his own personal advantage.

Professor Parrish was known among pharmaceutists abroad, but more especially in England, chiefly through his writings, which are held in much esteem, and the Pharmaceutical Society of Great Britain and the British Pharmaceutical Conference have each shown their appreciation of him by honorary memberships; whilst at home, besides being in membership with various societies, his name is as a household word among the members of the pharmaceutical and medical professions.

Professor Parrish leaves four sons and a daughter to keep green his remembrance and to imitate his virtues.

A letter was read from Mr. Charles Bullock, resigning the office of Secretary, which he had held for many years.

The following were elected as officers for the ensuing year:—

President, Dillwyn Parrish. 1*st Vice-President*, William Procter, jun. 2*nd Vice-President*, Robert Shoemaker. *Treasurer*, Samuel S. Bunting. *Recording Secretary*, William J. Jenks. *Corresponding Secretary*, Alfred B. Taylor. *Publishing Committee*, Thomas S. Wiegand, John M. Maisch, William Procter, jun., James T. Shinn, Charles Bullock. *Editor*, John M. Maisch.

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

Shop Hours' Regulation Bill.

This Bill, which has been introduced by Sir John Lubbock, and has on the back the names also of Mr. Thomas Hughes, Mr. Morley, and Mr. Mundella, contains some provisions of great importance as affecting pharmacists. It proposes to extend the provisions of the Workshops Acts, 1867 to 1871, with certain amendments, to shops kept open for the sale of goods, in the same manner as if such shop were a workshop.

By clause 4 it proposes that no child, young person, or woman shall be employed in any workshop or shop on Good Friday or Christmas Day; and that there shall be allowed to every child, young person, and woman employed in a workshop or shop not less than four whole holidays or eight half-holidays in every year (exclusive of Good Friday and Christmas Day).

The term "young person" is for all the purposes of the said Act to be deemed to include every apprentice, whether male or female, who has attained the age of thirteen years and has not attained the age of twenty-one years.

The term "employed" is defined to mean occupied under a master or parent, whether for wages or not for wages, in any manual labour exercised in or incidentally to the sale of any article in a shop; and the term "shop" is to include any building, room, warehouse, or premises in which any article is sold or exposed or offered for sale, and any buildings or premises, whether open or enclosed, which adjoin a shop or communicate therewith otherwise than by a public highway or thoroughfare, and to or over which the occupier of the shop, or the person by whom any child, young person, or woman employed in the shop is employed, has a right of access or control.

The Workshop Acts, 1867 to 1871, are, in their application to shops as defined in this Act, to be subject to the following modifications:—(1) On some week-day in every week every shop to which this Act applies shall be closed during the whole of said day after the hour of two in the afternoon; and during the time when a shop is closed in accordance with this provision no child, young person, or woman shall be employed therein. If a shop has not been closed as aforesaid on some one of the first five week-days in any week, and it is not so closed on the Saturday in the same week, every child, young person, or woman employed therein during any part of such Saturday shall be deemed to have been employed in manner contrary to the provisions of the Workshop Acts, 1867 to 1871. Subject to the provisions of this modification, children, young persons, and women may be employed in a shop on Saturdays in the same manner as on other days.

(2) A Secretary of State, on proof to his satisfaction that the exigencies of trade require the alteration, may, by order published in such manner as he thinks fit, give permission with respect to any shop or class of shops either generally or in any particular place for the employment of young persons or women for a period not exceeding fifteen hours on any market-day; provided that they are not so employed except between the hours of six in the morning and nine in the evening; that they are not so employed on more than one day in any one week; and that in addition to the time otherwise allowed for meals and rest, they are allowed half an hour for a meal after the hour of five in the afternoon.

Shops of the following kinds are excepted from the provisions of this Bill:—Any premises licensed for the sale of intoxicating liquors under the provisions of the Acts for the time being in force for regulating the sale of intoxicating liquors; any shop in which articles of food are sold for consumption on the premises; any bakehouse as defined by the Bakehouse Regulation Act, 1863.

The Bill is set down for second reading on the 20th May.

Weights and Measures (Metric System) Bill.

The Bill to establish the Metric System of Weights and Measures after a fixed period, which was read a first time at the beginning of March, has now been issued. Substantially, it appears to be the same as that introduced in 1871. It provides that the primary standards of the metre and of the kilogram, verified in relation to the original standards at Paris, and the derived standard unit of capacity, the litre, containing a kilogram weight of distilled water at its maximun density, weighed in a vacuum, together with their several multiples and parts, which are now in the custody of the Warden of the Standards, shall be the standard measures and weights of the metric system. It gives power to judges, etc., to order copies to be supplied, and extends to the metric system all provisions as to inspection of imperial standard weights and measures.

The principal units of the metric system, the "metre" the unit of measures of length, the "are" the unit of the measure of surface, the "litre" the unit of the measure of capacity, as well for liquids as for dry goods, and the "gram" the unit of weight, a thousand of which shall be and is the "kilogram;" with their decimal multiples and decimal parts, as well as the double and the half of the said units, are declared to be units, multiples, and sub multiples of the metric system.

A table is contained in the schedule annexed, in which are set forth, for all commercial purposes, the equivalents of the weights and measures therein expressed of the metric system and of the imperial system respectively; and such table is to be used for computing, determining, and expressing, in imperial weights and measures, weights and measures of the metric system, and in metric weights and measures, weights and measures of the imperial system.

Clause 7 provides that after the expiration of years from the passing of the Act, the imperial and all local or customary weights and measures shall be abolished; and every person who shall sell by any denomination of weights and measures other than those of metric weights and measures, authorized by this Act, is on conviction to be liable to a penalty not exceeding the sum of forty shillings for every such sale, and it also provides that penalties shall be inflicted upon persons using any other denominations of weights and measures in any return, price list, price current, or any journal or other paper containing price list or price current.

From the passing of the Act, and until the use of the metric weights and measures shall be made compulsory, it proposes that the said metric weights and measures are to be deemed and taken to be legal weights and measures, and as such may be used for all purposes whatsoever.

The second reading is set down for the 21st May.

Adulteration of Milk.

At the Liverpool Police Court last week Samuel Worthington was charged with having sold adulterated milk. Evidence was given by the inspector of nuisances that a quantity of milk, which had been purchased on the 28th of April on the premises occupied by the defendant, had been submitted to Dr. Brown, the borough analyst, who certified that it had been diluted by upwards of 16 per cent. of water. In cross-examination the witness who had purchased the milk admitted that he had not been served by the defendant, and it was contended that unless evidence could be given as to the intentional adulteration of the milk by the defendant there was no ground for a conviction. In support of this argument the case of *Core* v. *James* was cited, in which it had been decided at the Bolton Petty Sessions to inflict a penalty of £5 on the defendant for having used alum in the making of bread. The case, however, had been carried to the Court of Queen's Bench, and the conviction was quashed on the ground that no guilty knowledge on the part of the defendant had been proved. Although the action referred to had been taken under a different Act, it was urged that the same objection held good in reference to the present case. Mr. Raffles said that the Act would be useless if the defendant was not held responsible for what his wife or daughter did in a case like the present. The question was simply whether a man whose name appeared above the door of a shop was to be answerable for what was done by anybody who served on the premises. His opinion was that in such a case the occupant of a shop was responsible. Some curious impressions, Mr. Raffles further observed, had got abroad regarding milk cases. He had read a short time ago that water mixed with milk did not constitute adulteration, but how that idea came to be entertained he did not know. In the absence of any further evidence, Mr. Raffles said that he would hold the charge proved. A fine of 20s. and costs was imposed.

William Simpson was summoned on a similar charge. In this case the milk had been purchased by one of the inspectors of nuisances from a shandry belonging to the defendant which was standing in the street. On the milk being analysed by Dr. Brown, it was found to contain 5 per cent. of water. For the defence it was pointed out that the defendant was on his way from the station when the milk was purchased, and as the milk had not been transferred from the railway cans the defendant could not have had any opportunity for adulteration. In consideration of the quantity of water mixed in the milk being so small, Mr. Raffles said he thought it would be sufficient to dismiss the defendant with a caution.—*Liverpool Albion*.

Adulteration of Bread.

At the Wandsworth Police Court a baker, of High Street, Barnes, was summoned for selling bread mixed with alum, which was injurious to the health of the persons eating the same.

The Defendant said he must plead guilty. He was not a baker, but he kept a foreman and trusted him. The flour was rather fresh, and customers had complained. The foreman put a little alum into the bread unknown to him.

Mr. Ingham said, *primâ facie*, he would take it that a baker knew what were the ingredients of his bread. He could not accept the defence unless it were proved. He fined defendant 20*s*. and 23*s*. costs, which included the analyst's fee of one guinea.

James Wilson, a baker, of West Fields, Barnes, was summoned for a similar offence.

For the defence a report in a newspaper was read, in which it was stated that flour was impregnated with alum which came out of the stones used in grinding corn.

Mr. Ingham said some stones might have a certain portion of alum in them, but to yield sufficient to be injurious to health a millstone would be required to be worn away. When a man carried on the business of a baker he must know whether his bread contained alum or not. He held that where a man carried on a trade which required skill he must have a knowledge of it.

The defendant was then fined 20*s.* and 23*s.* costs.

THE SALE OF ANNATTO.—ALLEGED IMITATION OF LABEL.

In the Vice-Chancellor's Court, on Monday, May 5th, the case of Fullwood *v.* Fullwood was heard. It was a motion to restrain the defendant from selling annatto in bottles bearing labels similar to the plaintiff's. The plaintiff, Richard Jackson Fullwood, of 24, Somerset Place, Hoxton, is a manufacturer of annatto. The plaintiff's trade mark was a stag with an olive branch, and his bottles were of different sizes, bearing labels of a light brown or grey colour, having under the trade mark the title—"To Farmers and Dairymen. R. J. Fullwood and Co.'s Highly Approved Fluid Extract of Annatto for Colouring Cheese and Butter." The defendant, Henry Fullwood, is a nephew of the plaintiff, and a manufacturer of annatto under the firm of "Henry Fullwood and Co." The plaintiff alleged that the defendant, who had formerly carried on his business at Kingsland, had recently removed to No. 1, Somerset Place, Hoxton, a few doors from the plaintiff's premises, and had adopted labels and bottles similar to his. The defendant's labels bore at the top the device of the Royal Arms, and the following title:—"For Colouring Cheese and Butter. H. Fullwood and Co.'s Concentrated Liquid Extract of Annatto for Farmers and Dairymen." The plaintiff accordingly now moved for an injunction as above mentioned.

The Vice-Chancellor said that the Fullwood family had, it appeared, been annatto manufacturers since the year 1785. The defendant had in 1870 set up in business in Kingsland. When he began business he called himself "H. Fullwood and Co.," the object of which, if it was a right object, was not altogether clear. When a man starting a business by himself added "and Company" to his name when he intended to trade alone, his so doing was a badge, to say the least, of unfairness. It was not quite a proper thing to do. The defendant's whole conduct showed a desire to become known as connected with the plaintiff's old-established firm of "Fullwood and Co." To complete the matter, in the spring of 1872 the defendant moved into the very street in which the plaintiff carried on his business. There was no shadow of a doubt that his object was to become known as Fullwood and Co., of Somerset Place. The public would not notice the difference between No. 1 and No. 24. His conduct was unfair and fraudulent, and such as the Court could not allow. If the defendant had kept away from Somerset Place, he might have carried on his business with impunity. But his Honour was satisfied that when the defendant removed his business into this street, so close to his uncle, he did so with the hope that the public might be led to confound the two businesses, and to further his object he had adopted bottles of the same shape as those used by his uncle, and labels very similar in appearance. Therefore, under all the circumstances of the case, he was of opinion that the plaintiff was entitled to an injunction.—*Grocery News.*

A DRUGGIST FINED UNDER THE VACCINATION ACT.

At the Preston Police Court, Mr. Edward Foster, chemist and druggist, of Friargate, Preston, was summoned, for the twenty-fifth time, for the non-vaccination of his child. The defendant appeared, by proxy, his representative being Dr. Dupré, of Manchester. Dr. Dupré contended that vaccination was impossible. They punished Mr. Foster now for the twenty-fifth time for refusing to do that which he could not do. The Lyons Society of Medical Sciences had appointed a committee, of which MM. Chanveau and Viennois were prominent members, to experiment upon the transmission of small-pox and cow-pox. From ample data they concluded that these diseases were perfectly distinct, the one from the other, and could never be transmuted the one into the other. The fact was that the vaccination movement was a money-getting swindle, and many persons connected with the Local Government Board made a fine thing out of it.

The Mayor said that the summons required the appearance of the child. It had not been brought, and the case would be adjourned for a week for its production.

HOSPITAL INQUIRY.

In the course of an inquiry by a committee of the Guardians of the Wandsworth and Clapham Union respecting two deaths that had taken place in the workhouse, it was incidentally stated by a nurse that she administered once two tablespoonfuls of ammonia and ether to one of the patients. In their report the committee state their opinion that the "lax and dangerous system of allowing a nurse to administer on her own judgment and responsibility ammonia and ether, or any other drug, cannot be too strongly condemned," and suggest that such a course might have been fatal in the case under inquiry. Ultimately it was decided to bring the facts of the case under the notice of the Local Government Board.—*From the Wandsworth and Battersea District Times.*

Obituary.

On the 8th of May, Mr. David Edwards, Pharmaceutical Chemist, died at his home, Glanmyddyfi, near Llandilo, South Wales. Mr. Edwards was a student in the Pharmaceutical Laboratory during the Session of 1871–2, where he was much esteemed by his tutors and fellow-students. He passed his Minor examination with honours in July, and his Major with honours in December, 1872. It is thought probable that his early death was in a great measure the effect of privations which he suffered in Paris during the siege and the civil war.

Correspondence.

"*Inquirer.*"—We think the assumption of the modified title you mention would be merely an evasion of the Pharmacy Acts, 1852 and 1868. According to section 12 of the former, any person unlawfully styling himself "pharmaceutical chemist" or "pharmaceutist" is liable to a penalty of £5; and the latter, clause 15, still more explicitly provides that any one who shall improperly use the title "pharmaceutical chemist, pharmaceutist, or pharmacist," shall be similarly liable. We think, therefore, you will clearly see that your informant must be grievously mistaken.

"*How to Kill Beetles.*"—Our correspondent is thanked for his communication, but inasmuch as we reprinted a paragraph recommending borax for the destruction of beetles just two years since, and its merits were then discussed by several correspondents (see Vol. I. p. 982, 1001, etc.), we think the proposed remedy is neither a novelty nor yet sufficiently forgotten to be brought forward as one.

"*A Subscriber to the Fund.*"—We have received your letter, but inasmuch as Mr. Clark has now virtually abandoned the ground which he first took in criticizing the administration of the Benevolent Fund, we think it undesirable to prolong this discussion.

*** We are compelled by press of matter to defer the publication of several communications, answers to correspondents, etc.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Pocklington, Sturton, J. Abraham, G. Brown, Wilkinson, Matthias, Learoyd, "A Cumbrian," "An Onlooker," "Boz," "Reader," "Ignoramus," "Live and Let Live," "Olim Juvenis," "Isca," G. C., H. G. R., R. T. C. D.

THE ANNUAL DINNER.

The Second Annual Dinner of the Members and Friends of the Pharmaceutical Society took place on Tuesday evening at the Crystal Palace. The chair was taken by Mr. A. F. Haselden, F.L.S., the President.

The President, in proposing the first toast, said it was one which always was, and he doubted not always would be, responded to most heartily in all assemblies of Englishmen—"The Health of Her Majesty the Queen." Having spoken so freely and fully on a previous occasion of the virtues which adorn Her Most Gracious Majesty, he would not detain his audience by recapitulating them, but would simply ask all present to drink in a bumper, "Health and Happiness to Her Most Gracious Majesty the Queen."

The toast having been drunk in the usual loyal manner,

The President briefly but forcibly proposed "The Health of the Prince and Princess of Wales, and the rest of the Royal Family," with the hope that it would be many years before the Prince was called upon to assume the cares and dignity of royalty.

Mr. W. Scott Brown, Vice-President, in proposing the toast of "The Medical Profession," referred to the attendance, so numerous as to give the assurance of a continuation of the annual gatherings so happily inaugurated twelve months since. At that period a dark cloud which had for a time overshadowed the whole nation was just passing away; and it had served to render more than ordinarily apparent the bright light of medical skill and devotion. Happily, during the past year and now, there was no dark background to give increased lustre; but the lamp of medical science burnt steadily, and needed not to be made apparent to those who were able to appreciate the benefits conferred on the sick and suffering. If, as had been said, gratitude consisted in "a lively expectation of favours to come," in no assembly could the toast which had been entrusted to him meet with a more ready or hearty reception than in that which he was addressing. Years ago a certain William Shakespeare described, in language which probably was familiar to all, a certain very useful body of men, and no doubt his words were appropriate at the time; but certainly, looking around him, he did not think they were quite so apt in the nineteenth century. Their obligations to the medical profession began with the earliest period of their existence, and in after years few, indeed, were so fortunate as not to be in a position to recall circumstances in which some member of the medical profession had interposed between them and the king of terrors a shield which, at any rate for a time, turned aside his darts; and when the last inevitable time arrived, it was one of the solaces of human existence to know that we should then receive all the alleviation of our condition which medical skill and benevolence could bestow. Yes, the medical profession was a truly noble one, and well had it maintained its character in this country. He need not recapitulate the great names which had adorned its annals in the past, and it would be invidious to mention only a few of those who adorned the present era, nor was it necessary to do so, as they were especially familiar to such an audience. During the past year a great deal had been heard about medical charities and their abuses, and this one fact spoke volumes for the medical profession, that, knowing as its members must have done of the abuses connected with the administration of many of these noble charities, which, abuses notwithstanding, were the pride of Englishmen, they still continued to render to them services of a priceless character, for which they could never be compensated except by the knowledge that they received the most cordial good wishes of every member of the community. Efforts were now being made to redress these abuses, and he hoped before long some well-devised scheme would be prepared, which, while preserving those noble foundations, would prevent the misapplications of them which were in reality unfair both to the medical profession and to their own body. Speaking as a country member of the Council, he was proud to be able to say that every year showed that a better and more cordial understanding was springing up between the medical profession and that body to which he had for many years had the honour to belong. He sincerely hoped that such cordiality would continue to increase, and that it would be fostered and encouraged by such meetings as the present. He begged to couple with the toast the name of Dr. Quain.

Dr. Quain, in returning thanks, said he felt it difficult to adequately acknowledge the very cordial welcome which the toast so eloquently proposed by Mr. Brown had secured. He rejoiced to think that the feeling of jealousy that once existed between their bodies was passing away. This he attributed to a better understanding of the functions and duties of the members of those bodies, and to a better and higher education, both of the members of the medical profession and of pharmacists. It was not difficult to remember the time when the practice of medicine consisted of the study of a few symptoms, of feeling the pulse, looking at the tongue, and prescribing a certain quantity of physic, more profitable, perhaps, to the practitioner than to the patient. Now, however, by the aid of physical science, the phenomena of life in health and disease were closely scrutinized. The stethoscope, the ophthalmoscope, the laryngoscope, the test glass, and the crucible were made use of, and thus an accuracy of diagnosis never previously dreamt of was obtained. So, too, with regard to pathology; by the aid of the microscope and its appliances, an immense advance in our knowledge of the nature of diseased processes had been made. There was still one branch in which there was great room for progress, viz., the treatment of disease. We want a better knowledge of therapeutics; and as therapeutical success must depend on the character of the agents used, we must look to pharmacists for help in this respect. This is the return we must ask for the favours to which Mr. Brown had alluded. He rejoiced to see the successful efforts which had been made in the promotion of education by the pharmaceutical body. These efforts may be traced in the character of their Preliminary, their Minor and Major examinations, and the result may be recognized in the published proceedings of their Council, their evening and other meetings, which afforded evidence of rare judgment, intelligence, and scientific knowledge. In wishing prosperity to the Pharmaceutical Society, he begged to connect the toast with the name of their present President, Mr. Haselden, the last of a list of distinguished names. He referred to the names of William Allen, Jacob Bell, John Savory, Peter Squire, Henry Deane, Thomas Morson, George Sandford, and others, who had rendered, each in his own way, valuable service to the Society and to pharmaceutical science,—of these gentlemen the present President was a worthy and successful follower. He saw a great future for the Society, for he saw in so large a body of educated men throughout the country, valuable allies of the medical profession, and he wished them all success.

The President begged to thank Dr. Quain, personally and on behalf of the Society, for the kind manner in which he had proposed the toast, and the company for the way in which they had received it. He was also grateful to the medical profession for the support which had been accorded by it thirty years ago, in the early days of the Society, not only morally but practically, by giving lectures freely and spontaneously, for which the Society had at that time made no settled provision. The advantages of the Society, of the education it bestowed, of the evening meetings, of the conferences, of such social gatherings as the present, and the conversazione, were obvious to all, and did not require to be more especially mentioned. Two years ago, in 1871, the first attempt was made at an annual dinner. There were at the same time two annual dinners going on, a small cloud being present which threatened to burst over us; it did not burst, but was quietly and gradually dispersed. So that in 1872 there was but one annual dinner, and that at the Crystal Palace, which was a success; and again, now, a repetition of the dinner, which, he trusted, had again been a success, and gratifying to them all. Although he took no credit to himself for the establishment of this dinner, yet he felt greatly pleased that it had been established whilst he occupied the presidential chair.

Mr. T. H. HILLS, in proposing the toast of "The North British Branch of the Pharmaceutical Society," said that, as he assumed every one there present was in the habit of reading the PHARMACEUTICAL JOURNAL, it would be unnecessary for him to enter into any particulars as to the labours of their friends in the north, since they would already have read the annual report which appeared in last week's Journal. But he could not propose this toast without making special reference to some of those who had been prominent in their endeavours to promote the objects of the Society in Scotland—Mr. Macfarlan, Mr. Mackay, and Mr. Frazer. Of Mr. Macfarlan, who was gone from them, he need only say, Peace be with his memory. Mr. Frazer also was most active in carrying out the best interests of the Society, and he regretted his absence that night. He also deeply regretted the absence of Mr. Mackay in consequence of domestic affliction, but he would take the opportunity thus afforded him to speak with more freedom of the great services rendered by Mr. Mackay for so many years as Honorary Secretary of the North British Branch. It was no exaggeration to say that John Mackay had done in Scotland what Jacob Bell had done here. However, there was a most worthy representative from Scotland in the room, Mr. Baildon, who had always taken the greatest interest in the Pharmaceutical Society, and therefore he begged to couple with the toast of "The North British Branch of the Pharmaceutical Society" the name of their esteemed friend, Mr. Baildon.

Mr. BAILDON, in responding to Mr. Hills' toast, said that he was very much pleased by the way it had been proposed by Mr. Hills, and for the very kind reception it had met with from the large assembly of pharmacists present. He remarked that the interests and objects of the North British Branch were one and the same with those of the parent Society, and that the Board of Examiners in Scotland were most anxious to conduct their examinations in strict accordance with the suggestions and regulations of the Council in London. Their students had now ample facilities for acquiring a scientific knowledge of pharmacy by attending the classes of the professors in the university, or by attending the lectures in the medical school, and he had pleasure in stating that they were availing themselves of these classes in increasing numbers every year. He regretted very much that owing to a domestic affliction his friend Mr. John Mackay was not present. The North British Branch were greatly indebted to him for the valuable services gratuitously rendered by him for a long period of years.

Mr. BETTY next rose to propose "The British Pharmaceutical Conference," "an association bearing the closest relation to the Pharmaceutical Society, and possessing the machinery to meet increased requirements for organizing and systematizing research." As our individual organisms depend for their healthy development upon conditions materialistic and intellectual, so must the due advancement of pharmaceutical culture ever be essential to pharmaceutical institutions. In speaking of the British Pharmaceutical Conference one of the great results flowing from its free and expansive genius might be referred to. It was not, and never was, an association exclusively of the Pharmaceutical Society, of any division of the United Kingdom, nor even of a continent: it had formed a bond of brotherhood between thinking labourers in science. In its earliest gatherings this catholic feeling found expression in the conviction that the Pharmaceutical Society had a mission, which was to become the representative of the interests and of the unity of their calling, and a mission in which it should brook no rival; and now that the Pharmaceutical Society had received its powers and its privileges, and had accepted together with them the responsibility of maintaining its position as an educated and examining body, it was to such an association as the Pharmaceutical Conference it could point to furnish proof truly of its progress and its influence, but essentially of its vitality. And whilst they might say, Long live the Pharmaceutical Society, they might add, May the Pharmaceutical Conference be coexistent with it,—that Conference which, born of their exigencies, might be said to have stepped forth, like Minerva from the brain of Jove, equipped for its task as the champion to do battle for the intellectual life of present and future pharmacy. The officers of the association included in their number some of the most illustrious names which adorned the ranks of pharmacy; but time only allowed of mentioning Mr. Brady, the present President, who, he regretted to say, was not present that evening. So long as addresses such as he and his predecessors had delivered were continued at the annual meetings, so long would the interest of the Conference be sustained, and of this he had no fear. He begged to couple with the toast the name of one of the officers of the Society, who had so zealously and with such talent laboured to place the Conference in the position it now held—the Secretary, Professor Attfield.

Professor ATTFIELD, on the part of the President and other officers of the Conference, thanked those present for their generous wishes for the success of the Conference, and acknowledged the compliment paid him by the association of his name with the toast. Every one of the present and past officers, he would venture to say, had been actuated by two motives—first to encourage an onward march into the untrodden regions of pharmaceutical research, and next to foster friendly feelings amongst pharmacists, and it was pleasing to know that very great success had resulted. But this state of prosperity was only in part due to the efforts of the officers. They must not forget the twenty pioneers who first cleared the way for the Conference ten years ago on the banks of the Tyne, nor the two hundred who enrolled themselves under its banners at the first annual meeting at Bath, nor yet the six hundred who joined its ranks in the ensuing years, before anything so tangible as the 'Year-Book' could be offered in return for support. Nor must the authors of papers be forgotten, for without them the annual meetings could not be carried on. Much of their success was also due to the labours of the local officers of the Conference in the towns where it held its meetings, and acknowledgement must also be made of the encouragement they had always received from kindred associations, especially from the Council and leading members of the Pharmaceutical Society of Great Britain, and the pharmaceutical press both of Europe and America. To these things as well as to the energies of the executive must be attributed the fact that their numbers had increased from twenty to twenty hundreds. As to the future success of the Conference he did not believe there was a gentleman present who felt the least doubtful on that point. The influences which had brought it to its present position were as vigorous as ever, if not more so. Any difficulties which might be met with by members in carrying out expensive researches were removed by the munificence of a gentleman whose name he need not mention, who had lately given the Association £200 with which to aid original workers. And with regard to the supply of such workers, he felt perfectly sure, that so long as the Pharmaceutical Society continued to promote that high class pharmaceutical education which it had provided for the last twenty-five years, there would be no lack of men who would engage in original investigations. Lastly, with reference to general support, he would say that the officers of the Conference would never rest satisfied until they knew that their annual volume, the 'Year Book,' was to be found on the shelves of every pharmacy in the British Empire.

Dr. RAMSEY proposed the health of the Stewards, which was briefly acknowledged by Mr. Carteighe, and this concluded the list of toasts, the remainder of the evening being devoted to friendly conversation.

The Pharmaceutical Journal.

SATURDAY, MAY 24, 1873.

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

THE ANNIVERSARY MEETINGS.

THE amount of space occupied by the reports of the several meetings which have taken place this week leaves no room for more than a few very brief remarks on some of the most prominent features of the week's proceedings.

Speaking of these in the order of their occurrence, it is with great gratification that we are able again to record the unqualified success of the Annual Dinner, and to add that the number of those present was considerably greater than last year.

In the discussion on the Council's Report at the annual meeting, Mr. ATKINSON PICKERING, still urged by that spirit of "dogged perseverance" by which he desires to be animated, again came forward in the cause of Provincial Education. While admitting that the trade was indebted to the Council for the influence it had exercised on recent legislation, he did not hesitate to declare his opinion that the executive body was wanting in its efforts to educate those who practise pharmacy. This he still regards as the primary duty of the Society. We have already attempted to show that he is in error in this respect, not only in his too literal interpretation of the Charter, but also in disregarding the altered position the Society now holds.

Mr. PICKERING complained that out of an income of £10,000 a year the Society gives almost nothing to further education in the provinces, and with strange inconsistency he prefaced this complaint by a pointed objection to the fact, that while the fees paid for attendance on lectures at Bloomsbury Square amounted to only £193 4*s.*, the expenditure on those lectures was £649 9*s.* 5*d.* We thoroughly agree with him in thinking there is here something radically wrong—something indeed that calls for speedy rectification; but we do not think a remedy would be found in carrying out a similar distribution of the Society's funds in country towns, nor do we concur with him in disregarding the fact that this expenditure of some £450 per annum is incurred mainly for the benefit of the provinces, and of students coming from the country.

We mention this fact not at all for the purpose of justifying the discrepancy between outlay and income for lectures, nor merely to show that the aid rendered by the Society to education of provincial students is really greater than it has credit for, but also for the sake of protesting against the continuance of a system which is inconsistent with the Society's present status, however much it might be appropriate, while the acquisition of competent skill by education, was, for the pharmacist, a purely optional thing.

It is impossible now to follow this subject further, although Mr. PICKERING'S declaration that the Society is not popular with the country members, because it compels their young men to undergo three examinations, and—as he says on their behalf—gives them nothing in return, betrays a state of mind which obviously renders this subject deserving of further earnest attention.

The next subject of interest which occupied the meeting was the question as to the right of women to be admitted into the Society. Mr. HAMPSON, in moving the resolution of which he had given notice, dwelt especially on the words of Lord BROUGHAM'S Act, providing that the word "person" should include women, while at the same time he objected to the Society being regarded in any degree as a private one. On these grounds he contended that, as women were free to become chemists, and be registered as such, they were equally entitled to become members of the Society. His seconder, Mr. BOSTOCK, based his support of the resolution chiefly on æsthetic considerations; and Mr. PICKERING, in proposing as an amendment that the consideration of the question should be adjourned *sine die*, did so mainly on the ground that when the Society was formed there was no intention to include women under the term "person." He also urged that, since the practice of pharmacy was so much less suited for women than many other occupations that were open to them, its adoption by women should not be encouraged by admitting them members of the Society.

Several of the other speakers failed to keep in view the distinction between the right of women to registration as chemists and druggists, and the question actually before the meeting, whether they should also be admitted members of the Society. Indeed it was only with some difficulty that the discussion was kept to the real point at issue. The necessity for observing this distinction was, however, insisted upon by Mr. SANDFORD, Mr. GILES, and Mr. BETTY, while Mr. FLUX, the Society's solicitor, pointed out that Mr. HAMPSON, in refering to BROUGHAM'S Act, had omitted the proviso as to the context of an Act being consistent with the extension of the term "person" to women. He also expressed his opinion that in regard to election of members, the Society possessed all the privileges of a private association, and eventually the amendment was carried by a considerable majority.

The remaining business of the meeting had reference to the bye-laws which were adopted after some discussion, but we must defer any remarks on this subject.

The Conversazione in the evening at South Kensington was attended by nearly 3000 visitors, and was in every respect as attractive and agreeable as it has always been hitherto.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

May 21*st*, 1873.

MR. A. F. HASELDEN, F.L.S., PRESIDENT, IN THE CHAIR.

MR. W. SCOTT BROWN, VICE-PRESIDENT.

Present—Messrs. Atherton, Betty, Bottle, Frazer, Greenish, Hampson, Hills, Owen, Radley, Sandford, Savage, Schacht, Shaw, Stoddart, Sutton, Urwick, and Williams.

Several members, associates, and apprentices who had paid their subscriptions since April 30th, were ordered to be restored to their former status in the Society, on payment in each case of a nominal fine.

The VICE-PRESIDENT asked if it was the rule for the Secretary to apply direct to all members who had not by the end of March paid their subscriptions to the local secretaries. He believed some members felt themselves aggrieved at having their names erased from the list without previously having a reminder.

Mr. SUTTON said he always informed gentlemen in his district who had not paid by a certain time that they must forward their subscriptions to the Secretary direct.

Mr. STODDART having spoken to a similar effect,

The PRESIDENT, referring to the minutes, said the resolution directed the Secretary to apply to all members who had not paid their subscriptions by a certain date.

Mr. SANDFORD said he believed there was a little misunderstanding on this matter. The resolution was passed in order to prevent the occurrence of a difficulty which had sometimes happened, of gentlemen losing their votes at the annual meeting in consequence of their subscriptions being retained in the hands of the local secretaries. The Secretary was therefore directed to apply personally to gentlemen who had not paid by the end of March, but he believed that was only intended to apply to gentlemen whose votes would be endangered by the nonpayment of their subscriptions, not to associates or apprentices.

The SECRETARY said that was certainly the understanding. The first week in January he sent to all local secretaries a list of members and associates in business, but he never sent out a list of apprentices and associates not in business, because they were very migratory, and it would be giving local secretaries unnecessary trouble. A circular was sent, in April, to members and associates in business who had not paid, and if this were not attended to, a second was sent, besides which the notice appeared constantly in the Journal.

Mr. SUTTON said he should be very glad if the local secretaries were relieved altogether of the duty of collecting subscriptions.

THE NEW BYE-LAWS.

The amended bye-laws were passed a third time by the Council preparatory to their confirmation by the General Meeting.

SHOP HOURS' REGULATION BILL.

Mr. BETTY asked if the attention of the Parliamentary Committee had been called to a Bill now before Parliament called the Closing of Shops Bill?

The SECRETARY said the Bill was set down for the 18th June, before which time there would be an opportunity of considering it.

The VICE-PRESIDENT said it was hardly possible for such a Bill to pass the House of Commons, but it would not do to assume too much, and therefore he had no doubt that the Parliamentary Committee would give their attention to it.

THE THIRTY-SECOND ANNUAL GENERAL MEETING OF THE PHARMACEUTICAL SOCIETY.

Wednesday, May 21*st*, 1873.

MR. A. F. HASELDEN, F.L.S., PRESIDENT, IN THE CHAIR.

The Thirty-second Annual General Meeting of the Members of the Pharmaceutical Society of Great Britain was held at 17, Bloomsbury Square, on Wednesday, May 21st, at twelve o'clock.

The SECRETARY having read the notice convening the meeting, the CHAIRMAN said :—

Gentlemen,—For the third time I find myself in the honourable position of Chairman at the Annual General Meeting—the thirty-second of our Society—and I venture to congratulate you upon the steady and prosperous condition which has been maintained up to the present time, and which, as regards the past year, the Report presented by your Council fully declares; it is always a pleasure to meet old friends, more especially when the sky is clear above, and there are no volcanic rumblings underground. The science of pharmacy steadily progresses, and the Pharmaceutical Society of Great Britain is highly esteemed on the Continents—East and West; but I am more particularly desirous of referring to home questions interesting to and affecting ourselves.

The appointment of a professional short-hand writer to attend at and report the proceedings of the Council is satisfactory to all concerned, and has in no way taken from the spirit and earnestness of the debates, whilst it has removed a great weight of responsibility from the members of the Committee who previously did that somewhat difficult work.

The alterations (coming into force in October, 1874) which have been made by the Council in the regulations for conducting the examinations are, in my opinion as a constant attendant and as chairman *ex officio* of the board, also from an examiner's point of view, not merely judicious but desirable. Statements respecting the examinations are partially current to which I should have wished, if possible, to have turned a deaf ear, but I could not. The opinion is entertained by some that the chances of passing are in favour of those who have attended the lectures and laboratory in Bloomsbury Square; for this I say most emphatically there is not the remotest foundation. As a rule the examiners know nothing of the antecedents of the candidates; on the contrary, it is somewhat notorious that young men from the provinces, who have never attended the lectures in London, and students from other schools, have been, numerically, the most successful in passing. Complaints have appeared in the "Correspondence" columns of the Journal against the manner of conducting the Preliminary examination; these strictures should not, as I take it, have been made against the mode prescribed for carrying out the examination, but that occasionally a superintendent has not performed that part of the duty imposed upon him as he should have done. It appears to me that the remedy for this would be to appoint certain towns as centres, where the writing of the papers should take place, and if required, that a member either of the London or Scotch board should be sent to superintend. It may be well, perhaps, to remind you that "Certificates of having passed the Local Examinations of the Universities of Oxford, Cambridge, or Durham, the Examination of the College of Preceptors, or of those of any legally-constituted examining body, previously approved by the Council, *provided Latin and arithmetic be included in the subjects*, are accepted in lieu of this examination;" but to give up our own and compel all to go to one of those Boards would be unwise and unfair. To have passed in silence over this, which has been so freely handled by correspondents, would have been a weakness on my part. How gladly and willingly would I, if I could, report upon improvement in the answers furnished by candidates, and consequent diminution in the number of failures.

As usual, early closing has engaged considerable attention in many localities during the year. I believe that, for the present, as much has been accomplished in that direction as could be consistently with our calling generally, and with the peculiarities of situation and the requirements of our patrons. I sincerely trust that those for whom the arrangements have been made may reap benefit in the way in which it was intended, taking advantage of increased opportunities for study, as well as relaxation from toil.

I cannot refrain from again touching upon the question of prices, a question almost daily in some way or other coming to the fore. The mere cost of an article should not decide the charge to be made, but rather the time, the skill, and the care employed, also the cost of education necessary to fit one for the office of dispenser, even if the cost of drugs, etc., were uniformly the same; but now that speculation in one shape or another is continually affecting the prices of the most important chemicals and drugs in use, this charge for qualification is more than ever necessary. The simplest plan would appear to be a fixed charge per dose, irrespective of the cost of material, supplementing with an increase for increased market value. Indeed, did nothing else suggest such a mode of proceeding, the increase in the price of everything, either pertaining to the business or otherwise, would almost enforce a consideration of the subject. Members should face this boldly by communicating and consulting with each other, put an end to low charges, and form a determination to work upon a fair and remunerative scale.

The number of subscribers to our Benevolent Fund increases. Some difference of opinion still exists as to the most desirable course to be adopted for its distribution—as it is, the deserving are not refused aid or neglected; although it is just possible that money has, upon a rare occasion, been badly made use of, still it is better that the undeserving should occasionally enjoy rather than any deserving be refused.

Provincial associations, I am glad to say, are increasing. There are now twenty-four which report their proceedings through the Journal, besides the North British Branch. Their prosperity seems to be good, if any estimate can be formed from the small number of applications for aid. I may be excused for repeating the language of the Report: "It must not be forgotten that under regulations at present in force, assistance can be rendered to local associations which are doing efficient work."

A deputation from the Council, of which I was one, paid an official visit to the North British Branch of the Society as recently as last month. I should be deficient in courtesy if I did not speak of the excellent spirit which exists in the North towards the parent Society in the South, and the great desire there is to promote in every way the interests of pharmacists generally. Towards your President, and the gentlemen who accompanied him, I cannot speak too strongly of the kindly feelings manifested and the unbounded hospitality.

I regret very much that death has been lately more than usually hard upon us, so much so that I dare not enumerate: but I cannot pass over two names;—the one, Mr. G. Waugh, so many years an honoured and valuable member of Council, and always a generous contributor to the Benevolent Fund; the other, Mr. James Garle, I believe one of the earliest members of the Board of Examiners and to the last, kind, patient, and careful.

In accordance with notice of motion, the question of admitting females as associates and members of the Society will be submitted to you after the Report of the Council has been received and adopted. I will simply remind you that it is not a question of admitting them to lectures or examinations upon which you will be asked to express an opinion, those points having been already settled; but whether it is desirable, whether it was originally contemplated, that our Society should admit them as members. You will vote upon this point, I am persuaded, with that discretion which you have so often shown, and whichever way it may be decided, the minority will bow to the expressed wishes of the majority. I sincerely hope that you will not follow the example of your Council, and place me in the unenviable position of having to give a casting vote.

Notice has been given in the Journal, that at the conclusion of the business of this Annual General Meeting, a Special General Meeting of the members of the Pharmaceutical Society will be held, for the purpose of abrogating or altering some or one of the bye-laws of the said Society, and of considering, and, if thought proper, of confirming and approving such new or additional bye-laws, etc., etc. You will, I am confident, in considering this matter, giving your earnest attention in the interests of the public and also of your Society, confirm the bye-laws or alterations as recommended by your Council.

A few words more and I have finished. Possibly you have observed the absence of my name from the list of candidates for the incoming Council; and it is due to you that I should offer some reason for my retirement. For fourteen years uninterruptedly I have been a member of Council, working ever—as I believe I have done and as I still hope to do—in the interests of pharmacy and the Pharmaceutical Society; but seeing that the number of Councillors residing in London must be limited, in order that the country may be fully and fairly represented, it seems to me desirable that such a one as myself should occasionally retire, if but for a season, and make way for others desirous of filling the office and enjoying the same honours,—beyond this I feel that I may be equally useful in another sphere, viz. the Board of Examiners.

Permit me now to thank you for the attention with which you have listened to me; my colleagues in Council, for their unwavering kindness and support; and our excellent and indefatigable Secretary and Registrar. With this it only remains that for the present I should say—

"Farewell! a word that hath been and must be
A sound that makes me linger; yet, farewell!"

The Report was taken as read.

REPORT OF THE COUNCIL.

In reviewing the proceedings of the past year the Council confidently believes that after full discussion on matters which from time to time have come under consideration, conclusions conducive to the general interests of the Society have been arrived at. It is indeed an advantage that different shades of opinion should be fully represented in the governing body, and in the reports published from month to month of the debates in the Council, these find full expression.

The financial statement is upon all occasions an important feature in the Annual Report. It will be observed that the income of the Society has in no way diminished during the past financial year, but exhibits an increase upon former statements, upon which the members may fairly be congratulated.

On reference to the Registrar's Report for the year 1872 of the number of members, associates, and apprentices of the Society, it will be seen that there was an increase of 90 members, 176 associates—86 in business, 90 not in business—and of 31 apprentices.

One of the most important duties of your Council during the past year has been the revision of the regulations for conducting the examinations. This subject was urgently pressed on the Council by the Board of Examiners, to whose judgment great deference is undoubtedly due in the matter. It was specially represented that, as on passing the Minor examination a candidate was entitled to registration as a chemist and druggist, and certificated as qualified to perform the most important duties of his business, it was essential that the examiners should have better proof of his practical acquaintance with dis-

Dr. FINANCIAL STATEMENT FROM JANUARY 1ST TO DECEMBER 31ST, 1872. Cr.

Dr.	£ s. d.	£ s. d.
Balance in Treasurer's hands, Jan. 1, 1872		758 1 9
Balance in Secretary's hands, Jan. 1, 1872		4 3 6
Life Members' Fund . . . Fees	47 5 0	
Interest	88 2 6	
		135 7 6
Government Securities . . Interest		343 15 0
Subscriptions:—		
1766 Members, Pharmaceutical Chemists	1854 6 0	
749 ,, Chemists and Druggists	786 9 0	
97 Entrance Fees	203 14 0	
247 Associates in Business	259 7 0	
656 Associates not in Business	344 8 0	
644 Apprentices	338 2 0	
		3786 6 0
Arrears		70 17 6
Fines on Arrears		5 15 0
Laboratory . . . . . . Fees	946 6 6	
Breakages	7 1 1	
		953 7 7
Lectures . . . . Fees		193 4 0
Registration Fees:—		
52 Pharmaceutical Chemists, Major Examination	273 0 0	
287 Chemists and Druggists, Minor Examination	904 1 0	
96 Chemists and Druggists, Modified Examination	100 16 0	
782 Apprentices, Preliminary Examination	1642 4 0	
784 Examination Fees	823 4 0	
47 Registration Fees as Chemists and Druggists	246 15 0	
7 Jury Certificates	0 7 0	
		3990 7 0
Stationery—Sale of printed matter		19 12 4
Sundries—Sale of tin cases for Diplomas	1 14 0	
Sale of waste paper	0 17 3	
		2 11 3
Register' Sales		180 10 6
		£10,443 18 11

Cr.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Advertisements				12 2 6
Annuities—Dr. Redwood				100 0 0
Carriage				2 17 4
Certificates of Death				10 16 4
Commission—Collecting Subscriptions, etc.				41 17 11
Conversazione			223 17 9	
Pharmaceutical Meetings			25 19 5	
				249 17 2
Examiners, Boards of (England and Scotland)				1004 1 10
Fixtures and Fittings				73 0 0
Furniture				55 14 7
Government Securities—Purchase of £2000 New Three per Cents.				1836 5 0
Grant to a Provincial Association				10 0 0
House Expenses				69 19 9
Journal—Balance of Account				407 11 5
Laboratory:—				
Director's Salary	£200 0 0			
Percentage on £946 6*s.* 6*d.*, Fees received during 1872	236 11 6			
		436 11 6		
Demonstrator's Salary, three Quarters to Michaelmas	75 0 0			
Percentage on £377 4*s.* 9*d.*, Fees received to end of June, 1872	37 14 6			
Demonstrator's Salary, one quarter to Christmas	30 0 0			
		142 14 6		
Assistant Demonstrator's Salary, three quarters to Michaelmas		60 0 0		
Porters' Wages		91 2 6		
			730 8 6	
Chemicals, etc.			212 5 0	
				942 13 6
Law Costs				187 19 3
Lectures:—				
Professor of Chemistry and Pharmacy			300 0 0	
Professor of Botany and Materia Medica			300 0 0	
Subscription to Botanical Gardens			21 0 0	
Prize Medals, Chemicals, Diagrams, Drawings, etc.			28 9 5	
				649 9 5
Library				78 17 1
Museum:—				
Curator's Salary			108 6 8	
Specimens and Sundries			72 2 4	
				180 9 0
Expense of the Society in Scotland—Grant for current expenses for 1872				*203 19 0
Postage				234 13 5
'Register,' cost of Publication				189 14 0
Repairs and Alterations				575 16 0
Rent, Rates, and Taxes				464 4 7
Repayments (Returned Subscriptions to Associates)				11 0 8
Stationery, Engraving, Printing, and Office Expenses				325 1 1
Salaries:—				
Secretary and Registrar			450 0 0	
Assistant Secretary and Deputy Registrar			200 0 0	
Clerks and Servants			634 3 8	
				1284 3 8
Sundries:—				
Binding Journals for presentation to Chicago College of Pharmacy			4 1 0	
General			18 1 10	
				22 2 10
Travelling Expenses (Country Members of Council)				317 9 6
Refreshments for Council				22 3 9
Local Secretaries' Expenses				13 9 7
Balance in Treasurer's hands				836 14 3
Balance in Secretary's hands				29 14 8
				£10,443 18 11

* Including £132 9*s.* 4*d.*, the cost of fitting up new premises for the use of the Examiners and for the general business of the Society.

BENEVOLENT FUND, 1872.

Dr.

	£	s.	d.	£	s.	d.
Twelve Annuitants, each receiving £30	360	0	0			
One quarter's payment to Midsummer (Annuitant now deceased)	7	10	0			
Two months' payment to Christmas (two Annuitants elected October, 1872)	10	0	0			
				377	10	0
Widow of a late Annuitant at Jersey	7	10	0			
Widow of a Registered Chemist and Druggist, London, age 47	10	0	0			
Orphan Daughter of a late Member at Southampton (fifth grant)	10	0	0			
Member residing at Clapham, age 56	15	0	0			
Ditto (second grant)	10	0	0			
Widow of a late Member at Tring, age 62	15	0	0			
Registered Chemist and Druggist at Sheffield, age 63	15	0	0			
Widow of a Registered Chemist and Druggist, London, age 35	10	10	0			
Widow of a Registered Chemist and Druggist at Landport, age 41	20	0	0			
Member residing in London, age 55	10	0	0			
Registered Chemist and Druggist residing at Hamilton, age 43	10	0	0			
Member residing at Peckham, age 51	5	0	0			
Widow of a late Annuitant at Tenbury, age 64 (third grant)	10	0	0			
				148	0	0
Postage	9	9	5			
Printing and Stationery	28	5	0			
Sundries	1	1	0			
				38	15	5
Purchase of £700 Consols				648	0	0
Balance—Cash in Treasurer's hands, Dec. 31, 1872				683	19	5
				£1896	4	10

Cr.

	£	s.	d.	£	s.	d.
Balance in Treasurer's hands, Jan. 1, 1872				198	18	5
Dividends on Invested Capital				363	0	0
Donations	84	13	6			
Subscriptions	749	2	6			
				833	16	0
Legacy under the Will of the late Mrs. Jane Lyon, late of 17A, Albert Terrace, Knightsbridge				500	0	0
Balance due to Secretary, December 31, 1872				0	10	5
				£1896	4	10

We, the undersigned Auditors, have examined the Accounts of the Pharmaceutical Society, as presented in the Financial Statement and Benevolent Fund Account, and find them correct; and that there was standing to the account of the Society at the Bank of England on the 31st December, 1872 :—

		£	s.	d.	£	s.	d.
General Fund	New Three per Cents.	13,200	0	0			
Life Members' Fund		3,000	0	0			
					16,200	0	0
Benevolent Fund	Consols	12,700	0	0			
Pereira Memorial Fund		100	0	0			
					12,800	0	0
Bell Memorial Fund—Consols					2,050	0	0
Secretary's Casual Relief Fund—Consols					105	0	0
Hill's Prize Fund—Russian Bonds					200	0	0

FREDERICK ANDREWS,
FREDERICK BARRON,
WILLIAM HODGKINSON, *Auditors.*
EDWARD HORNER,
WILLIAM SQUIRE,

April 8th, 1873.

pensing than had sufficed when he only received from them a certificate of competence to take the rank of an assistant. In order to effect this, a small portion of the present Major examination will be, according to the new arrangement, transferred to the Minor. It is, however, extremely difficult to obtain, in the time which can be allotted to the examination of each candidate, satisfactory proof of his manipulative skill and practical knowledge. The Council, agreeing with the Board of Examiners, have framed a regulation, requiring each candidate to be of the full age of twenty-one years, and to produce certificates of having been employed for three years by a Pharmaceutical Chemist or Chemist and Druggist, and in dispensing and compounding prescriptions. This will come into operation in October, 1874. So deeply impressed, however, are the Council with the necessity for this alteration, that in order to give it greater weight, the same principle has been embodied in one of the new byelaws, to be submitted for confirmation and approval to a special meeting of the Society, convened for this day.

Full proof of a practical knowledge of dispensing and pharmacy having been given in the Minor examination, it ceases to be necessary to re-examine on these subjects, therefore "Practical Dispensing" and "Pharmacy" will no longer form part of the Major examination.

The importance of insisting on a youth passing the Preliminary examination before entering on his apprenticeship cannot be too strongly maintained; once apprenticed all his time is required to obtain *technical* education, and the possession of proper elementary education would therefore be an ultimate advantage to him as well as a means of advancing the general status of the trade.

The number of candidates who passed examinations during the year 1872 in England and Wales, as compared with the year 1871, is as follows :—

	1871.	1872.
Major	50	52
Minor	234	287
Modified	123	96
Preliminary	802	782

Since the institution of the Jacob Bell Memorial Scholarships in 1861, only three Senior Scholarships have been awarded, showing that the expectations of the founders have not been realized. The Council therefore determined to abolish the Senior, and in its place institute a second *Junior* Scholarship. They also revised the syllabus of the examination, and enlarged its scope with a view to test the candidates' abilities, industry, and range of education. Thus, *inter alia*, 'Virgil' has been substituted for 'Cæsar,' and one modern language—French or German, at the option of the candidate—has been added. These alterations to come into operation in 1874.

In the report last year it was stated that premises necessary for conducting the examinations and the affairs of the Society in Scotland had been obtained, and were being arranged: the Council has the satisfaction of stating that eligible premises are now occupied by the North British Branch of the Society. A deputation from the Council, consisting of the President, Vice-President; and the Secretary, accompanied by Mr. Williams, has paid an official visit to Edinburgh.

The Council, always solicitous to promote the usefulness of the library, has continued, with the assistance of the Committee, to supply new and suitable books for study and reference. The attendance of readers has been good during the day, and the Council has pleasure in observing that the evening attendance has also increased.

The museum of the Pharmaceutical Society is a most important feature of the establishment, and deserves every attention. There is probably no collection in existence more interesting to pharmacists than that accessible at all times to members and students in Bloomsbury Square. During the past year a new curator has been appointed for the museums, and certain changes have been carried out making him more directly responsible for the safe keeping and proper arrangement of the specimens therein contained. An herbarium is also in course of formation, which will prove useful to students. A catalogue is in preparation.

During the past session the evening meetings have been well attended, and subjects of great interest have been discussed.

The Parliamentary Committee has been much occupied with questions involving the interests of the Society and of chemists and druggists generally. Strong representations were made by your Council to the Solicitor-General, showing the great advantage to be secured to the public by leaving dispensers of medicine at their daily avocation rather than enforcing their absence therefrom by calling them to serve on juries. In compliance with these representations the Bill to amend the Juries' Acts, now before Parliament, contains an exempting clause for chemists and druggists.

Late in the last Session an Adulteration of Food and Drugs Act was passed rapidly, and almost silently, through the House of Commons, and but for the timely action of a deputation from this Committee, would have become law with most obnoxious penal clauses against tradesmen generally, and rendering druggists especially liable for offences over which they had no control. The Marquis of Salisbury, who had charge of the Bill in the House of Lords, and Lord Eustace Cecil, who had taken great interest in the question in the Lower House, at once acknowledged the oppressive character of these clauses and amended them by rendering a man responsible only for such acts of adulteration, or the sale of adulterated articles, as were committed knowingly and with intent to defraud. The Act has since given rise to certain communications with the Government respecting the appointment of analysts, and your Council has had the satisfaction recently of seeing several pharmaceutical chemists appointed by local authorities to the office, which appointments are now waiting the approval of the Local Government Board.

Several prosecutions against offenders under the Pharmacy Acts have been carried to a successful issue, and the Council has every desire to put a stop to the illegal sale and dispensing of poisons, as well as the false assumption of titles protected by these Acts.

During the past year applications have been received for the admission of ladies to the lectures delivered at the Society's house, to the course of practical instruction in the Society's laboratory, and for admission also into the ranks of the Society. The Council determined to admit lady students to the lectures, but not to the laboratory; and deferred the question of their admission to the ranks of the Society, in order that the opinion of the members generally might be elicited at the Annual Meeting.

In compliance with the requirements of the Act of 1868, section 10, one thousand two hundred and sixty-two registered letters were sent by the Registrar to those persons on the register whose addresses were doubtful, and six months having elapsed, second letters were sent to all who had not replied to the first; many addresses were thus corrected, but after a further interval of three months, the names of between six and seven hundred of those who had not answered were struck off the register—clearly showing the necessity for such a provision; at the same time the Council has power to restore the names of such persons on proper proof being given of the justice of doing so.

The Council cannot report any definite progress on the subject of Provincial Education. The scheme which early in the past year was submitted to the trade generally through the local Secretaries of the Society did not appear to enlist such general support as the Council considered necessary to warrant the attempt to carry it into effect. It is gratifying, however, to see that local efforts in this cause are still being made in many provincial centres, and the Council congratulates those who are exerting themselves with so much constancy and zeal. It must not be forgotten that, under regulations at present in force, assistance can be rendered to Local Associations which are doing efficient work.

A Conversazione was held last May at the South Kensington Museum, and the Council has made arrangements for a similar and, it trusts, equally agreeable *réunion*, to take place on the evening of the Annual Meeting.

The Benevolent Fund steadily increases in the number of subscribers and in the amount subscribed; at the same time there has been an increase in the number of applicants for relief, and notably from chemists and druggists and their widows; it is gratifying that assistance could be given, however much the necessity for such applications may be regretted. The amount of annual subscriptions in 1871 was £594 3*s.* 6*d.*, of donations, £74 7*s.* 10*d.*; in 1872, subscriptions, £749 2*s.* 6*d.*, donations, £84 13*s.* 6*d.* In addition to this, a legacy of £500 was received from the executors of the late Mrs. Lyon. Although as a matter of account it will not appear until next year, your Council cannot allow this opportunity to pass without recording publicly the generous gift of £100 from Mrs. Waugh, given at the express desire of the late Mr. George Waugh, who was for many years a member of Council, and always, from its commencement, an ardent supporter of the Pharmaceutical Society.

The Council desires to tender its hearty thanks to those gentlemen who have performed the responsible duties of Local Secretaries.

The following registers were placed before the meeting:—

Register of Members, Associates and Apprentices of the Society.
Register of Pharmaceutical Chemists.
Register of Assistants.
Register of Apprentices or Students, Under the Pharmacy Act, 1852.
Register of Chemists and Druggists, Under the Pharmacy Act, 1868.

Mr. J. O. Davis (Kilburn): Mr. President and gentlemen, it may appear presumption on my part in addressing this meeting; but my apology may be expressed in this fact, that I have been connected with the Society since its formation. The duty I have to perform is of a very simple character. I have read this Report very carefully and I shall move,—

"That the Report now read be received and adopted, and published in the Journal and Transactions of the Society."

The Report speaks for itself, and I have very great pleasure, therefore, in moving this resolution.

Mr. F. M. Rimmington (Bradford): I have great pleasure in seconding the resolution that has been proposed.

Mr. Atkinson Pickering (Hull): Whilst I am willing to admit that the Report, financially, is a success, I feel that, educationally, it is not so. Whilst I feel that we are indebted to the Council, and especially to the Parliamentary Committee, for their action with regard to exempting chemists from attendance on juries, and also with regard to the alterations which they have succeeded in getting inserted in the Adulteration of Food Act, clauses which might have been made very useful in the interests of trade, still there are subjects mentioned in this report which do not altogether accord with my way of thinking, and as a member of the Pharmaceutical Society, I feel that I should not be doing my duty if I did not state those points on which I dissent from the Report of the Council. In the first place, the financial statement is not to my satisfaction. I consider it too concise; and I cannot make out, from the statement which I have in my hand, what surplus income you have now in your possession. I see what surplus you possess on the year's statement; but comparing this annual statement with those of previous years, I apprehend that the sum stated here does not fairly represent the total sum that you have in your hands as surplus income. I see that during the past year you have again invested £2000 in the Three per Cents. You are aware, Mr. President, that last year I stated my dissent from the investment of money in this way, either with regard to the general funds of the Society or with regard to the funds of the Benevolent Fund. I consider it is a waste of money investing them in Consols, bringing in something less than three-and-a-quarter per cent., when you can invest in real securities, and securities quite as safe as Consols, which could be obtained, bringing in an income of four-and-a-half per cent. Were the money of the Benevolent Fund invested in a different way it would produce a much larger income. I think I might appeal to the members present whether they would invest their surplus earnings at three-and-a-quarter per cent., and whether they would be satisfied with such a percentage. I apprehend there is nothing to prevent the money belonging to the Benevolent Fund, and the money belonging to the General Fund, from being invested in real securities; and I apprehend in this large city there could be no difficulty in finding securities bringing in that amount of income. It is a source of pleasure to me to see that the laboratory has been conducted so successfully. The laboratory and many other things in connection with the Society are exceedingly creditable to it; but with regard to the lectures there appears to me to be something wrong, and something radically wrong. Of the ability of the lecturers I have no doubt whatever,—there cannot be two opinions as to their ability; but I see the fees amounted to £193 4*s.*, whilst the cost of the lectures was £649 9*s.* 5*d.* I cannot make out exactly from this statement the number of students who have contributed these fees; but I feel persuaded, from the smallness of the amount that has been received, that they cannot be a very numerous body; and yet I find, on turning to the report, there have been a larger number who have passed both the Minor examinations, the Modified examinations, and the Major examinations. Now these must have been prepared from some source or other, doubtless some by private study alone. But how is it that we see so many people advertising in the Journal offering to prepare young men to pass these examinations in so short a space of time? And how is it (that is what I should like to know) that young men give their preference to going to those—I do not use the word disrespectfully—who "grind?" Why is it they prefer going to those "grinders" to prepare themselves for examination when they have here everything which is calculated to give them a thorough scientific knowledge of their business? The lectures appear to me not to be a success. I regret that such is the case, and I should be glad if some explanation could be afforded to the members of the Society why it is so. It does not appear to be so with regard to the laboratory. Why should not the lectures be equally as successful as the laboratory? There is another subject, too, which is a sore point with me. Out of an income of £10,000 a year, I see the magnanimous sum of £10 granted towards furthering provincial education. Now I believe I am correct in stating that the country members of the trade contribute the larger proportion of the income of the Society; and when there is so large a surplus income as there is, I think the Council might, with this large surplus income, do more for the advancement of the trade than by investing it in Consols at 3 per cent. I apprehend that the founders of the Pharmaceutical Society had specially in view, judging from the first clause of its charter, the education of those who practise pharmacy and chemistry. I believe the very first clause in the charter states this; and yet we find there is less money annually granted for the furtherance of that object than there was twenty years ago, when Jacob Bell was living. I think the country members of the Trade are entitled to their fair share of the income of the Society. The Pharmaceutical Society, I can assure you, is not popular with the country members of the trade, and I will tell you why it is not so. They say you compel their young men to undergo three examinations, and that you give them nothing in return. You yourself, Sir—and I agree very much indeed with what fell from you in your opening remarks—have stated the desirability that the prices of drugs should be increased. How can you reasonably expect such a thing, when the next-door neighbour to a chemist can sell everything the chemist sells except poisons, and nine out of ten do not thank you for the trade of them? Dispensing, in the present position of pharmacy, occupies a very small portion of a country chemist's business. If I were to exempt twenty businesses in the country, I believe there are not more than twenty that could make a living by dispensing alone. I do not find fault with the education you are giving to the young men of the present generation; but it is quite possible so far to educate a young man as to give him in the country a distaste for the sale of those things, and the dealing in those things, by which he must get a living. I should have been better satisfied with the Pharmaceutical Society myself had I seen their anxiety to secure for the trade the entire sale of those things on which it compels men to pass an examination; and I think there would be no very great difficulty in obtaining an Act of Parliament for that purpose. If a young man be compelled to pass an examination here in all the articles mentioned in the British Pharmacopœia, surely, having been compelled to pass the examination in these things, it is not right that his next-door neighbour should be allowed to deal in the same things and undersell him. If articles of food in the British Pharmacopœia,—raisins, for instance, and similar things that might be mentioned,—were to be exempted, there could be no difficulty in obtaining an Act of Parliament that would confine to the educated man the sale of and the dealing in those things which he is compelled to pass an examination for. Were this done you would find the Pharmaceutical Society would occupy a far higher position in regard to the country members of the trade. I trust, Mr. President, that the incoming Council of the Pharmaceutical Society will endeavour to secure pharmacy for pharmacists alone. I trust the day is not far distant when the medical profession will be comprised within two classes, the prescriber and the dispenser. It is so on the Continent of Europe, and I do not see any reason why it should not be so in this country as well. I think I have stated reasons why this should be the case. In the present position of the trade, the country members find very great difficulty in getting apprentices, and very often difficulty in getting assistants. These examinations have acted as a bugbear; and many who are qualified by these examinations are endeavouring to enter the higher branches of the medical profession. If you give a young man in the country a distaste for the sale and dealing in of those things, which he must necessarily deal in to get a living, you are doing a great injury to that young man unless you secure to him a pharmacy pure and simple. He ought to have the sale of drugs entirely confided to his care; and unless you do this, the time is coming quickly when a great many of the country chemists will have to close their shops. Apprentices will not offer, young men will not do the work that is necessary to be done in a great number of country businesses. I see there is another subject contemplated, and that is, the admission of females as members of the Society. Perhaps it would be better for me to reserve any remarks upon that until it is brought before the meeting. I do not intend to move that this Report be not adopted, because I am sure that resolution would not be carried; but I am quite sure there are things left out of this Report which ought to engage the very serious consideration of the ensuing Council.

Mr. Mellin (Wimbledon): I quite concur in several remarks which Mr. Pickering has made, and I have myself found the same difficulty in getting both apprentices and assistants, because young men will not now go into the trade on account of the difficulties they have to go through. I think it is a great inconvenience and great expense to young men coming up to town to pass the examinations. Another remark Mr. Pickering has made is, that he thinks druggists ought to keep entirely to their trade. I quite agree with that, but in some cases they cannot help it, because the trade is very mixed. My business is entirely a dispensing business, and I do not do anything else; but in Hull I know they do a large trade in oil cake, and other things. There are a great many complaints in the country of druggists dealing in things that they ought not. People say, why should we not sell citrate of magnesia? you sell tea, coffee, paints, pickles, and so on. I did so when I was an assistant, and likewise sold blacking, and such things. I should be very glad indeed if we could keep the trade more select; but then we should have to reduce the number of chemists. In that way perhaps they might get an increase in prices.

Mr. Richardson (Leicester): I have very great pleasure in supporting the Report; and there is a suggestion which has often struck me, which I should like to see carried out as regards the publication of the Journal. I shall not enter into the elaborate question which has already occupied the time of the meeting, but on this question I feel very much. I think the country members want a little more than they at present get. It has often struck me that an abstract of the lectures might be published in the Journal. When I was a student in this Institution, there was no greater treat than coming to listen to these lectures, and copying them out, and writing them when I got home. I should feel the same pleasure in reading those lectures now, and I conceive it would be a very great advantage to young men in the provinces. I quite thought when our Journal was published weekly, we should have it very much better conducted than what we have. We do not get a sufficient amount of leading articles; I do not think the facts written about have been dealt with with sufficient vigour by the Editor of this Paper. When Jacob Bell edited the Journal, there was an immense amount of vigour. It appears to me as if they were ashamed of writing about the druggists, as we are generally called, and the articles that appear not only in the *Lancet*, but in the *Globe*, against the chemists ought to be repelled. As to one thing which Mr. Pickering mentioned, namely, the investment of the money both for the General and Benevolent Fund, I think he is quite wrong. I know the difficulty the Council have to contend with in the investment of money. In my private capacity I have several trusteeships, and I know there is no greater difficulty than to steer clear of the law in investing money. A gentleman who is here is going to make a speech, a great financial person, Mr. Giles, and he will give you a better idea of how to invest in railways or securities, and all these sorts of things than I can do. I question very much whether the Council would be justified in investing any money except upon Government securities. I think that they are quite right in maintaining the investments in Government securities.

Mr. Reid (Aberdeen): I had no intention when I came to this meeting of saying one word; I am here pretty much by chance, but I sympathize almost entirely with what Mr. Pickering has said; and therefore I think it is right that I should offer a few remarks, as we seldom have the opportunity of being here, and I think the gentlemen who represent the country districts ought to take the opportunity when they are here of letting their views be known in London. I do feel a considerable amount of misapprehension necessarily exists as regards the wants of the chemists and druggists in the country, especially in the very remote districts in Scotland from whence I come. It is not to be supposed that gentlemen who have been born, bred, and educated in London can know very precisely the state of the case as regards a business there. I do not, however, intend to enter into a general discussion of the subjects which have been raised here, but to confine myself rather to one item that is in this balance sheet, namely, a grant to a provincial Association of £10. Now Sir, I admit most completely that the question of provincial education is one which is surrounded by many difficulties. I quite agree that it is exceedingly difficult for the present Council, or any Council, to frame a code of regulations which would suit the very varied circumstances of our trade throughout the country. But I do think that if there is one thing which ought to press more upon the attention of our Council than another, it is that question of provincial education. I am sure that the country members here will sympathize with me when I say that we find ourselves drifting into a course, and we do not see where we are to land. In the place where I come from, and dozens of other places, attempts have been made, and a good deal of money has been spent in efforts which have been to a certain extent successful. We did it all ourselves, but did not fail to apply to the Council here for a grant of money. We like money in Aberdeen as well as in most places, and possibly many of us cannot afford to spend our money. Understanding that educational grants were given from this Council, we made an application; we had spent a considerable amount previously in erecting premises and buying apparatus, had engaged parties to lecture, and had got the whole thing in work, and what we wanted to have we put, it seems to me, in a simple sort of way. I come from a place which is a place of recognized importance, where gentlemen in the trade are known to be gentlemen, and who can be trusted with money. We applied for a grant or loan, I think, of £25. We made this application, and after a delay of several months (I do not know how it happens, but a delay of several months generally does happen before we get an answer) we got a document which contained ever so many questions, and ever so many things to answer; and we were asked to take, in point of fact, simply a loan for three years of £10. That is what in point of fact it was. We were asked to take £10 in that way. That is all very well. I quite admit that this Society must be careful how they spend money,—there can be no question about that. But is it a thing likely long to be tolerated by country members who are providing the funds, that we should have hundreds and thousands spent in London by way of supplementing this educational establishment, and that we should be starved literally all over the country? There surely is a way of doing something to show that you are willing to assist country members in doing what you can to educate their young men. It is impossible that the thing can go on like that. The real fact of the matter is that I believe, looking at my part of the country, if these things go on for a very few years longer, within the next ten or fifteen years the whole of the dispensing trade will go out of the hands of the chemists and druggists, and back into the hands of the medical profession, who at the present time have almost ceased carrying on dispensing at all. The result is very obvious. Unless some means are taken to place the trade in a position where a man can earn a living by it, it necessarily results that a man will not educate himself for it; and in all the small towns (not to speak of the villages, for there are even druggists in the part of the country from whence I come), there will not be a druggist to be found at all, so that the medical men will resume the practice that existed forty or fifty years ago, and dispense their own medicines. I do not say, however, that is a reason why I have risen to speak, but to urge upon the Council to devote their time to devising some scheme which will give to large towns, or to towns being the large centres of a district, a reasonable amount of money, and trust them at all events for a year or two to see if they produce good fruit, and if not, withdraw the grants. When you are sending papers to be answered categorically, it may give rise to considerable difficulty, and I do not much wonder that the loan of £10 was not taken. I believe many grants have been applied for, but several towns have said that they would not borrow £10 for three years. I would press upon the Council to look that matter in the face, because it is a most serious one. I believe it is the greatest difficulty the Society has to contend with, namely, the education of chemists in the country. It matters little to me, perhaps, but the rising generation will certainly feel it.

Mr. Vizer (London): I feel very great pleasure in rising this morning, because we meet under such exceptionally favourable circumstances, smiling faces around us on all sides, and no dark clouds in the future. The Report I look upon with great satisfaction, and I most heartily support it almost in its entirety. I would draw attention for a moment to the first paragraph, the sentiments of which are highly gratifying. Those dark clouds of which our President spoke so graphically last night have all vanished away, and now we see peace reigning in our midst. But, sir, will you allow me to say that I receive that paragraph—forgive me for saying it—with very profound satisfaction. I am not going to stir up dirty waters, but, if we had asked the Council to have passed a vote of thanks to the Defence Associations, which, for some two or three years, disturbed the equanimity of some of our friends, we could not have got a better vote than we have here,—the Council therein expressing the great advantage which has arisen from the different shades of opinion within that body. I therefore, sir, tender the Council the thanks of the Defence Associations which have now passed away, and, let us hope, never more to return. I thank them for this expression of satisfaction, because—and I do not think any gentleman will contradict my assertion—the existence of those varied opinions upon the Council is decidedly owing in a very great measure to the efforts of those Defence Associations. I want to, Sir, ask a question which no doubt is easily explained, respecting the third paragraph. In that paragraph we find it stated that the number of members, associates, and apprentices of the Society has increased 90 members and 170 associates. If I turn to the report which was published in the February number of the Journal, I cannot make the two tally. I simply bring it forward, because I think some explanation is needed. According to this report, which I hold in my hand, the total number of pharmaceutical chemists in 1872 was 31 less than in 1871, whilst the chemist and druggist members shows an increase of 80. By deducting the 31 decrease of pharmaceutical chemists from the 80 increase of chemists and druggists, I make 49 the absolute increase, instead of 90 as mentioned in the Report. Again, as regards the associates, I should make the number 151 instead of 170; thus 87 associates in business and 64 not in business. The total increase of the Society according to that reckoning, taking in 31 apprentices, would be 231 instead of 291, showing an error of 60 in the Report. I state this not only for explanation, but also with another motive, namely, because it confirms an assertion which I made here last year, and subsequently in the pages of the Journal, that our strength as a society of pharmaceutical chemists was decreasing rather than increasing. I consider it is the duty of the Council to look into this matter, or otherwise the time will come when we shall have the unpleasant duty of recording the death of the last pharmaceutical chemist of the Society. Another point I should like to draw attention to is the prosecutions which have taken place under the Pharmacy Act. We see that several such have taken place in order to prevent the illegal sale and disposing of poisons. I am perfectly aware of the difficulty with regard to that question. How far we can possibly prevent the sale of medicines by grocers and such like, is a question of great difficulty; but, at the same time, I do think that in any alterations which may at some future day be contemplated by Act of Parliament, some provision ought to be made for towns over a certain population where a chemist could be supported; leaving small towns only where drugs might be procured at the grocers or elsewhere. But that we should all have to compete, as we do now with every oilman and grocer, does seem to me very hard. The paragraph recording the increase of the Minor examinations I entirely endorse. I only wish one thing, as has been expressed by other gentlemen this morning, that there was a brighter prospect before our young men, the rising generation of chemists, but unfortunately it is not so. The Benevolent Fund is cause for great satisfaction. I think it is one of the most satisfactory parts of the Report, and thoroughly gives an answer to the complaints which have been made recently in the Journal upon the distribution of that fund. We see clearly by the Report that there is a considerable increase in it, which shows the confidence the members of the Society have in the Council, and the way that fund is distributed. Reference has been made in the Journal to the idea of disposing of the annual subscriptions to annuitants. Such a process would be an utter absurdity. To imagine that we could distribute any proportion of the annual subscriptions for granting annuities would be, I take it, dangerous to this Society and most deceptive to those who received them. It has, however, been stated that the religious societies act on that principle. I admit that fact. But, sir, do those gentlemen, who advocate the distribution of our funds upon that principle, consider the analogy between the two? There is not the most remote analogy. From what source do those societies draw their funds? Why, the wide world. They have subscriptions coming in from all parts of the world, whereas ours are limited to some 8000 or 10,000 members supposing every member of the trade subscribed. Then, again, there is another objection. Those societies make no stipulation with their agents. At any moment they can discharge them. If we take in an annuitant we cannot give him notice to quit unless, indeed, we follow the King of Dahomey's example, and send him on a message to departed friends. Another objection is the amount of subscriptions to our Benevolent Fund. The total sum raised last year was only £1896; whereas, take four of the leading religious societies which support their dependents. The income of the London City Mission last year was £40,000, and that of the Pastoral Aid Society £48,000. And if we go to a still larger example, the Church Missionary Society, or the Wesleyan Missionary Society, we have an income over £156,000 each. What comparison is there between the two? I therefore consider the Council have acted perfectly right in the way in which they have distributed this fund, and heartily support the Council, and the report which has now been moved.

Mr. Mumby (Gosport): I do not propose to trespass on your time, but I wish just to call attention to one fact; I do not propose to go at all into the general question of the Report and its adoption, but to refer to the fact which has been alluded to by the gentleman who has just sat down—namely, the prosecutions against offenders under the Pharmacy Act. One of the duties of the Council was to promote, and watch over legislation affecting the interests of members of this Society, and also to enforce the law made for our protection. I take it that so far as watching over legislation, the members have no fault to find with the Council, but I do not think we can speak with quite the same satisfaction of the way in which they have enforced the law in existence for the protection of members of the Society. Because, as I understand, if you submit a case to the Council with absolute evidence as to the violation of, so to speak, the title clauses of the Pharmacy Act, and can do that conclusively, they have no hesitation in ordering a prosecution. But (and this is the special point to which I wish to call the attention of the meeting) if, while the spirit and intention of the Pharmacy Act are distinctly violated, through the ingenuity of the persons carrying on the business, or through the defect of the Pharmacy Act itself, they are able to avoid any infraction of the title clauses, although openly violating the poison clauses of the Act, the Council decline to prosecute, and say that that is a question for the police. Now, gentlemen, what is the result of this caution, or rather want of caution? Why, simply this. The Council decline to interfere, because they say they consider it is no part of their duty to enforce these clauses, but it is the duty of the police; and the police do not trouble themselves about the matter. In fact, they perfectly ignore this point altogether; and thus the Pharmacy Act becomes simply a dead letter. It appears to me it is the duty of the Council to protect the members of the Society by enforcing the Pharmacy Act. If, while the title clauses are not infringed, still the spirit of the Act is openly violated, it is the duty of the Council to protect their members by prosecution. The case on which my observations are based is this. A person goes into the country and opens a business:—He does not adopt any of the titles allowed by the Pharmacy Act, but he puts up his name, A. B., we will say, and underneath he puts in very conspicuous letters, "Registered." To all intents and purposes he is carrying on the business of a chemist and druggist. He can dispense any prescription you like to take to him. Therefore I say he is to all intents and purposes carrying on the business of a chemist and druggist, although he does not call himself a pharmaceutical chemist, but simply "registered." He violates the poison clauses of the Act, but yet the Council refuse to prosecute,—at all events they have hitherto refused,—and a gentleman who came down to inquire into a case, said the person to whom I allude was sailing so close to the wind that the general clauses of the Act had not been infringed, but only the poison clauses, and it was a case for the police. If I am wrong I am open to correction. As this is the only opportunity we have of introducing these matters, I thought it right to submit this particular case to you. Certainly the reason the Council do not act in this matter cannot be on the ground of poverty, because the financial account is an extremely satisfactory one. They have invested £2000 in the Three per Cents, and still have a balance in hand of £850. But if that money were used occasionally to prosecute in a case such as I have mentioned, it would be for the benefit of the members at large. No doubt any one living in the locality, can, upon proper evidence, go before a magistrate with evidence as to the violation of these poison clauses, and obtain a conviction. But I say it is an extremely invidious thing for a member in the country to place himself in such a position, because it would be thought that proceedings were taken from some personal spite or ill feeling against the accused, and not simply to carry out a law which was passed for the protection of the chemists and druggists. Therefore, I say if the Council leave the prosecutions to the police, they will very likely have in a large number of small country places mere grocers and hucksters, and all kinds of persons, vending poisons. When a man opens a chemist's shop for the express purpose of carrying on business as a chemist and druggist, and violates the Act, I think it is a case in which the Council ought to interfere.

Mr. Bostock (Ashton-under-Lyne): One remark was made by Mr. Pickering to which I should like to refer. It appears that the fees from students amount to about £149, while the amount paid to the lecturers is £600, so that there is a loss of between £400 and £500. The important question to consider is how we can avoid that loss; and I think something ought to be done to remove that state of things. In the country we take young men for four or five years; they come to live in our families as our sons, and there springs up a kind of fatherly regard for them. Then in course of time comes a desire to go to London. I think a young man has not completed his education until he has been to the metropolis and seen a little life in London. But many of them obtain situations where they can. They cannot all be at the dispensing houses. Some take a position in wholesale houses, which close at six or seven o'clock. The question is what becomes of young men for the two or three hours afterwards. In Manchester we have excellent evening classes for the young men, which have been well sustained, and have paid their expenses. But I find in London this parent Society has no evening classes, which I think is a great misfortune. Some of the young men from my own establishment are in London, and they have nowhere to go. Some have joined the Good Templars, and I am very glad they have done so. What we want is, that they should be qualified for future life. We shall not live to carry on our businesses for ever; and unless these young men are qualified there will be no one to carry them on unless we educate them for it, and that can only be done by their pursuing a course of study. I think it desirable, if possible, to attract young men to this institution by having evening classes. Young men having obtained a taste for this business and shown some desire to fit themselves for future life, if you can encourage them to evening classes, keeping them out of the theatres of your city, you will assist in creating a better tone, and qualify them to take positions in the country. A great many members will leave the Society unless you do something like this. If you can devise any plan of giving evening classes I think you will make the Society more paying, and confer a great benefit both on the masters and the young men themselves.

Mr. Wilkinson (Manchester) said, anyone who read the fourth paragraph would suppose that there was not much alteration intended, but on looking at the Calendar it would be seen that there was much more than many would anticipate, and instead of its being slightly more stringent than before, it appeared to him that the new Minor examination was more severe than the old Major; but if a practical knowledge of dispensing were required before the Minor examination, it would not be necessary to re-examine on that subject for the Major.

Mr. W. S. Brown suggested that Mr. Wilkinson's remarks would come in better when discussing the amended bye-laws.

Mr. Wilkinson said he was quite willing to adopt that suggestion.

Mr. Humpage (London), having read the Report with a great deal of satisfaction, said, many of the remarks already made had been, in his judgment, so thoroughly brought before the Council, and canvassed and answered in the Journal, that it was almost needless to bring them forward again. It was quite manifest at two or three meetings that an impression was abroad that if upon the Council there were placed some gentlemen who understood the nature of the country business better than their London friends did, a different state of things would arise, and that many of the difficulties which were felt would be solved to everyone's satisfaction. Thereupon, a body of gentlemen were returned from the country, and he was sure they had given their very best consideration to the question. No one could read the report and see the number of attendances, recently given in the Journal, without seeing that those gentlemen had not regarded their position as a sinecure, but that they had gone into it as gentlemen who were prepared to do their best. And as they had found when they came to approach the difficulties which had been so graphically pointed out by Mr. Pickering, so these gentlemen on the Council, when they came to grapple with them, found that practically very great difficulties did exist, which, with all their judgment and determination, they could not successfully overcome. He regarded the Report as highly satisfactory on the whole; and looking at it in that way, he thought the whole trade ought to congratulate themselves upon it. No doubt they were not in a perfect condition, and they had many grievances. Much was said about the prosecution of parties who infringed the law, and of putting down those who undersold and kept their shops open late at night, and all that. He wished they could do it, but they could not. He thought it a very wise suggestion which had come from the chair, that each individual should in his own neighbourhood adopt such arrangements as were best suited to it, and endeavour to give to the body individually a *status* and power which it could not possess as a whole. Those in the west could not legislate for those in the east, but those in the east and in the west too could step out of their own business and call upon their neighbour, and reason with him either as to keeping open till eleven o'clock at night, or selling a mixture at 8*d*. for which he ought to charge 1*s*. 6*d*. They might say, "If you will do it I will do it; and a little private mark might be introduced which would obviate all difficulty as to prices." Then the answer would often be, "Oh, Mr. Jones will not agree to it." No; and if they waited until Mr. Jones would agree to it they would never do anything. If a person came in and asked the price of making up a prescription, and when they were told a fair price said it was very dear, that they could get it for so and so, he should reply, "I daresay you can, and have the chance of being poisoned into the bargain; but if you go to what you term a respectable chemist, such as Mr. So-and-So, I think you will find his price very much the same as mine." That was the way to do; not run down their neighbours and call them dirty fellows, or anything of that sort. Call them gentlemen, and treat them as gentlemen, and then they would be more likely to act as such. If they wanted to raise the whole body they must raise the individuals; a house could only be built by piling up brick after brick, and the same thing applied to a Society. This course had been pursued in some neighbourhoods, and it answered very well, as the till bore witness. In conclusion, he remarked that the subject had been very well discussed in the letters in the Journal, which were always interesting to read, more particularly, sometimes, the Editor's comments upon them. It was very easy to find fault, and raise objections, and no doubt there were objections and difficulties, but it was no use getting out of humour with them; if you could not throttle them, the only way was to "bolt" them.

Mr. Hustwick (London) said, there was one paragraph in the Report which seemed to have escaped the attention of the meeting so far, but which appeared to him a matter of considerable importance, he meant the paragraph relating to the evening meetings, which was dismissed in two and a half lines, simply stating that subjects of great interest had been discussed. That, no doubt, was the case; the meetings had been well attended, and the subjects had been of great interest, but in his opinion these evening meetings did not recur often enough, nor was there sufficient time when they were held for the subjects to be sufficiently discussed. They found that some of the provincial Associations held their meetings once a fortnight, or at any rate once a month, for eight months out of the twelve. For instance, there was the Liverpool Chemists' Association, whose proceedings were reported in the Journal twice a month for about eight months; and it appeared to him if Liverpool chemists could afford to spend so much time on pharmaceutical subjects, in a place like London, where everything interesting in the pharmaceutical world was to be found, it would be only proper to afford a little more time for such meetings than had been done. No doubt many gentlemen who attended these meetings must have been struck with the rapidity with which the time passed; a subject was no sooner abandoned by the original speaker than the discussion commenced, and the time appeared to be at an end, and it often occurred that the discussion on such and such a matter had to be postponed until the next meeting. When that happened to take place at the last meeting of the session, there was a period of something like five or six months would elapse before it came up again. He, therefore, hoped that greater facilities would be offered for the purposes of discussing matters of importance.

Mr. S. R. Atkins (Salisbury) wished to make one remark on the paragraph relating to the Preliminary examinations, in consequence of what fell from the President in his opening address. Everything which came from the chair deserved the most careful attention of every member, but in the paper he had the honour of reading at the Brighton Conference, he ventured to express a desire that the Preliminary examination would be taken out of the hands of the Local Secretaries, although having been a Local Secretary himself for many years, and having had long experience in conducting these examinations, he had no wish to retire from the work which he had cheerfully undertaken, and should be prepared most cheerfully to carry on. Still he entertained the opinion that it would be well if these examinations were taken out of the hands of the Local Secretaries, and in the place of them the Local Examinations of the three Universities, or of the College of Preceptors, or any other duly constituted body, were accepted. At any rate he was glad to find this matter was engaging the attention of the Council, though he could not for one moment endorse the remarks made in some correspondence which had appeared, that the Preliminary examinations had been conducted in a slovenly or improper manner. So far as his own observation went, and from what he had heard—and he had taken the trouble to obtain all the information he could—his impression was that they had been conducted honourably and fairly. At the same time he did think some change would have to be made, and he was glad to find that this subject had been and would be further considered. With regard to provincial education, he had been much struck with the force and good humour of the remarks made by Mr. Humpage, with regard to the extreme facility of finding fault, but the extreme difficulty of making useful suggestions. It was no difficult matter to do the first, nor was it an easy matter to do the second, and he was rather glad that the Council had not committed themselves to any definite scheme with regard to provincial education. He would not attempt to refute the admirable remarks made by the gentleman from Aberdeen; there might have been in the reply to that application a little want of wisdom, or perhaps a little red-tapeism, but he did feel that the country members, if they went into the Council, would have to face some very difficult questions, and if Mr. Schacht, a most able representative of the provincial body, had failed to find the exponent of that difficulty, other men might well feel the pressure of it themselves. He ventured to think that the true solution of the difficulty was this, that they themselves should become personally educated. If every pharmacist undertaking the responsibility felt it was his duty to train the young men under his charge, they would then relieve the Society of this which was really a very pressing difficulty. He should like to ask Mr. Reid whether he met with much response from the young men in Aberdeen, and whether they appreciated the privileges which had been so liberally furnished to them. For his own part, he must say that after he had, in his own humble way, for some years, endeavoured to create a love of study, and had furnished the means of study to those under his charge, his greatest difficulty had been to create a taste for it; and until that demand was made, and until the young men pressed forward, determined to utilize the opportunities already at their command, he could not be surprised that the Council hesitated before spending much of the Society's money in that way.

Mr. RANDALL (Southampton), said, he would only make a remark on two points: First, with regard to the country lecture question. There were two ways in which lectures might be viewed. Young men might want lectures in order to have nice scientific recreation, or they might want them for the purpose of real study, with a view to their approaching examination. He did not think it was the business of the Council to do more than give very small grants, at least, for lectures for mere scientific amusement, not because they were not important, but because that was not real education. Then, considering the matter with regard to lectures which could be so prepared as to qualify those who attended them, and studied afterwards for passing their examination, he contended that except in very large places such courses could not be given with any reasonable amount of assistance from the Society. He thought so, but they must look to schools where there were other things to be done as well, such as the school which existed in London, and in some universities. In his own locality there was the Hartley Institution, which was well known to all. Up to the present time they had there a gentleman, formerly a professor of chemistry at Birmingham, who was an exceedingly good teacher, and he gave a series of lectures. He generally had several assistants wishing to pass the Minor examination, and they had not been young men who objected to study; but they did not attend these lectures, simply because the scope of them was not what they wanted, and they found they could spend their time better in reading and working hard at home. He did not mean to say but what if there had been a course of lectures extending over three months, they might not have found benefit from them, but when the lectures were given in short courses, as a general rule young men would find they could spend the time better at home. One gentleman had suggested the publication of the professors' lectures, but he presumed those lectures consisted principally in reading from their hand-books, and making explanations of the experiments as they went along; at any rate that was his experience when he attended a course of seven months' lectures by Professor Graham at University College, and that was not at all the sort of thing which could be expected to be published. With regard to the Preliminary examination, he would say this: the Council was necessarily a little cautious in advancing, especially unless they were clearly given to understand by the members at large that they were desired to go faster,—he did believe that if Preliminary examination were not increased in difficulty, it would be found very soon that, excepting the Latin, boys of about the fourth standard of the elementary schools would be able to pass it with very little difficulty. Now it was not desirable that such lads should be introduced into the business, but unless this was to be the result, they must be exceedingly careful as to the sort of examination required. In these primary schools the boys were constantly being inspected and examined by the Government officer, and the master's salary depended to a considerable extent on whether they passed or not; they were kept constantly up to the mark. Unfortunately there was nothing of that sort in the schools above that grade, to which their scholars must go, because they wanted to learn Latin, and therefore he believed it to be a fact that in the elementary schools the teaching as far as it went was far more thorough than that given in what might be called the lower classical schools. It was very necessary therefore that the examination should be rendered more exact in the matter of English and arithmetic. The examination in Latin also he contended was much too slight,—it was scarcely a test at all. This did not at all touch the question of educating boys so highly that they would be above going into the business, but they must insist on a more thorough knowledge of English and the elements of mathematics being taught, and if they did so he believed they would not have so many failures, and he hoped therefore the Council would pull up a little in that direction; not so as to increase the expense of education, but to let the schoolmasters know that they should teach more thoroughly the subjects they professed to teach.

Mr. WHEELER (London) said, that, at a previous meeting, he had brought forward the question of the illegality of associations of traders dispensing prescriptions, and he understood from the Council that if the matter were left in their hands, something should be done. As it was not referred to in the Report, he should like to ask if anything had been done, and whether it was within their knowledge that prescriptions were actually dispensed at the Civil Service Stores in the Haymarket, containing Scheele's prussic acid.

The PRESIDENT said, the question had been under consideration, and he himself took a very prominent part in bringing it forward; but he was not supported to an appreciable extent by chemists outside, or by the members of the Council, to carry on any action against these stores. Otherwise, he should have done so very willingly. He believed that if any action was to be taken, there must be a more decided feeling manifested by the trade at large, so that it should be done in their names, rather than in that of the Council.

Mr. SUTTON (Norwich) wished to add one word on the question of provincial education. He said they had a little association at Norwich, carried on amongst the assistants themselves, which was commenced with the help of two or three of the principal chemists, and a small grant from the Society. The difficulty was, to know how to apply it; and that was the difficulty in which the Council often felt themselves; they did not know how to help these provincial societies to the best advantage, though they were perfectly willing to do so if they could. His experience of young men was, that they came and said they did not want to go through a very extensive course of materia medica, botany, and chemistry, but only to learn just enough to squeeze through the examination. It therefore came to this: How could you possibly help people who would not help themselves?

Mr. FLUX (the Solicitor), said he had been asked to say something with regard to the prosecution of offenders, with a special reference to the remarks made by Mr. Mumby. He believed he knew something of the case to which that gentleman referred, and in that case, as in nearly all others, the difficulty was to get satisfactory evidence. It must be borne in mind that any proceedings were proceedings for penalties, and they must have proof *strictissimus*. In that case he believed they had no inconsiderable difficulty in getting to direct evidence; but he believed. though he could not speak distinctly from memory, that evidence was now obtained, and; if so, there would be very little delay in prosecuting it with effect. But in the latter part of Mr. Mumby's observations he alluded to the cause of the great difficulty which the Council had in dealing with these matters. Those who brought forward cases of this sort, in nearly every case stipulated that their names were in no way to be disclosed; the result was that they in London had put into their hands a case, perhaps 100 or 200 miles distant, and none of the local gentlemen connected with the Society would be identified with it. He did the best he could, but to show the difficulties in the way, he might mention that he lately had placed in his hands what was said to be a class of cases in a large manufacturing town in the north. No local gentleman would give any assistance at all, so thinking he would act as economically as possible, he wrote to the chief constable of the county, pointed out that it was a public grievance, and a matter which the police might undertake, and that if they would not undertake it as a matter of police, they might do so under his directions, purchasing any articles he should direct, and keeping them according to his instructions. But from the police he got no assistance at all, rather the reverse: then, on sending from London a special agent to go round to the persons who had been named to him, and make purchases, what was the result? the messenger was scoffed at in nearly every instance, and had not the chance of obtaining the evidence that was required. In one or two instances he was even told that it was known a messenger was coming down from the Pharmaceutical Society to make purchases. If gentlemen would only be a little bold, and take up a position as representatives of the Society, make purchases on the spot, and instead of sending them to London in such a way as to break the links, which it was most important to preserve, keep them, and write to him for instructions, there would be no difficulty in getting a great many convictions in various parts of the country if that were thought desirable. It is very easy to get convictions for selling poisons if gentlemen would only take the matter into their own hands; they must get an article purchased, and in nearly every instance it would pass at once into the hands of a skilled gentleman who could prove that it contained poison, and then a summons before a magistrate, and proof of the purchase, and of the existence of the poison in the article purchased, would ensure a speedy conviction. It did not always follow that an article purchased as a poison really contained the poison, and therefore both proof of the purchase and of the presence of the poison was necessary. If proof of those two things were secured, he did not believe that there was any reluctance on the part of the Council to prosecute, although at the same time it was felt that the real mission of the Council was to point out how the thing could be done, and that chemists and druggists throughout the country ought to take a little trouble and put the law in force in their own localities. Anything with regard to the register must of course be done through the Society, and wherever there was evidence to warrant proceedings, they were always taken so far as he knew.

Mr. FRAZER (Glasgow) said the course taken in Scotland was this: there was there as there was in England a class of gentlemen called writers or lawyers, and another class called messengers-at-arms. Now, in Glasgow, there was the same delicacy felt by the local secretary as to prosecuting his immediate neighbour, so they employed an agent, who, under the instructions of Mr. Flux employed two messengers-at-arms to get the necessary evidence. They came to him, and he gave them some old prescriptions containing poisons; then they took them into the different shops and got them dispensed. Having thus got the necessary evidence, the case was brought into court, and there was no difficulty whatever. He did not see why the same thing should not be done in every town in England.

Mr. GILES (Clifton) said he should be very sorry to go so far as the gentleman in Glasgow did in employing messengers-at-arms to entrap a man in that way. Acting on the maxim *qui facit per aliam facit per se*, he should not like to do a dirty underhand thing for anybody, and what had been described was very similar to the action sometimes taken by the Excise, who having been participators in some possibly provable offence, convicted the party upon it. He should be very sorry to do that himself, and he did not think any member of an honourable trade should be guilty of such a thing, but what he thought they might very well do would be this: In discharge of their duty to themselves, and carrying out the Act of Parliament, he should not hesitate in going straight to any man whom he intended to trip up and telling him he understood he was doing so-and-so; that it was against the law and contravened his own privileges, and cautioning him that, if he continued it, he should take means to ascertain whether he did so, and to prosecute him for it. That would be perfectly manly and upright, but he did not like the idea of taking a prescription which he did not want, and getting it made up by a man who supposed it was really wanted, for the sake of prosecuting him afterwards.

Mr. FRAZER (Glasgow) said the men he had referred to were warned by the Secretary that they were breaking the law, and it was only after repeated warnings that steps were taken to prosecute them in the way he had mentioned.

Mr. SCHACHT (Clifton) said he had listened with the greatest pleasure in the world to the full expressions and discontent which had fallen from several gentlemen in reference to the small amount of work done by the Council in the matter on which he felt very strongly, namely, provincial education. His only object in rising now was to assure the meeting the Council had not been idle in their efforts to do something even if the results had been small. They had been very anxious to find if possible some scheme which should affect all cases arising within that scope of the subject, and a step had been taken by the putting forward of one scheme for general discussion. Unfortunately it did not elicit so much general approbation as he hoped, and they were obliged after a time to abandon it, but still some advance had been made in the general appreciation of the necessities of the case, and he hoped it might lead to some more practical work in the future. In the meantime he would ask all gentlemen interested in the question to express their opinions as practically and distinctly as possible, for this would immensely assist the Council in their work. There was one stumbling-block in the way of all schemes of this kind, that unless there were a general co-operation in one scheme it was of very little use. He himself naturally thought his own scheme a splendid one, but it did not meet with general approval, and that being so, it could not be carried into effect. At present it had received a great deal more criticism than approval. However little they might appear to be doing, they were very anxious to do more; and for himself he might say that nothing in the Report dissatisfied him so much as finding that they had funded £2,300. It seemed to him a most unfortunate fact that they had no process by which that very large sum could be made useful to the community who supplied it.

Mr. W. S. BROWN (Vice-President), in reference to the application from Aberdeen referred to by Mr. Reid, said when that application was first received in 1871, it was referred to the Committee, as usual. It asked for £25 for providing suitable apparatus for teaching chemistry, materia medica, and botany, and so on; and for an annual grant of £20 to assist in paying lecturers and providing materials, etc. That seemed rather a startling application; and the Committee, after consideration, advised the grant of a sum of £10 to aid in affording education to the young men at Aberdeen and the district. This sum was quite as much as could be expected in proportion to the amounts granted to other places, and was certainly not out of proportion to the sum received by the Society from Aberdeen. The largest number of members there at any time was twenty, and that had now diminished to about twelve. Under those circumstances, he thought the grant of £10 was quite as much as could have been reasonably expected. That grant was refused, and some eighteen months afterwards another application was made; this being referred to the Committee, they repeated their former offer, the cheque originally drawn being still in existence. It was again refused, and he did not think under these circumstances the good people at Aberdeen had any reason to complain.

Mr. REID said the facts, as stated by Mr. Brown, were quite correct, except that, as he had stated before, it was not an unconditional grant of £10, but, in point of fact, a loan of £10 to provide chemical apparatus, which was to continue the property of the Society, and to be redeemable at the end of three years. Looking at it in that point of view, they thought if they could get on without the £10 it was not a very large matter. Their object in making the application was to establish a principle which should govern the application of these large savings or accumulations in the hands of the Society, so that they might be made more available throughout the country. From the statement just made, it appeared as if Aberdeen had presumed to ask a great deal more than they were entitled to, in proportion to their subscriptions. He had not the figures with him, but in addition to the ten or twelve guineas per annum from annual subscriptions, he believed that as Aberdeen formed the centre for almost the whole of the north of Scotland, there was a very large sum sent up in the shape of fees for preliminary examinations—he should think several hundred pounds. The application they made for assistance was simply in order to set the Society going, and they had spent out of their own pockets four or five times as much. They had hired a suite of rooms, and engaged gentlemen to give senior and junior courses of lectures, extending over three months; and though these lectures were not supported to the extent they could heve wished, still they had about twenty-five students, twelve or thirteen in each class. There was no difficulty in Aberdeen, or any similar place, as he believed, in finding gentlemen who would give, partly from a desire to benefit their fellow-citizens, and partly in return for what remuneration could be afforded them, such courses of lectures as would enable the students to see their way and follow them up by a proper system of reading and study. He had no hesitation in saying that anyone who had attended the course he had mentioned would be enabled to carry on his education with very great facility. The great difficulty of finding a generally acceptable scheme had been referred to, and he thought that was the great mistake. It would be impossible to make a scheme suitable to all parts of the country; each district and county differed in its habits and customs; what suited one would not suit another, and therefore he thought it a pity to attempt to have one stereotyped scheme for all. If the Council would, as men of business, make such inquiries as they deemed proper with regard to the status, size, and requirements of any large centre of population which applied for a grant, and then give what they could afford, and take an account after twelve months had elapsed as to what use had been made of it, continuing it or not, as circumstances might dictate, he thought a great deal of trouble might be saved in endeavouring to devise a universal scheme. When it was known that there was a large surplus available, and that in London these classes were kept up by the Society at a loss of £400 or £500 per annum, it was hardly likely that the country members would remain satisfied so long as the accounts contained this item, "Grant for provincial education, £10."

Mr. Brown said the offer to the Aberdeen Society could not be properly characterized as a loan. At that time the regulation by which the Council were governed prevented the absolute grants of money, and the grant was made for the purchase of apparatus. Now Mr. Reid himself advocated the principle of the Society retaining some control over the grant so made, and that was all they proposed to do. It not unfrequently happened that these provincial societies had but a very ephemeral existence, and therefore it was a very proper condition that in case it were dissolved before the end of three years the apparatus should be returned to the Society.

The resolution for the adoption of the Report was then put and carried unanimously.

Mr. Hampson (London) was then called upon by the Chairman to move the resolution of which he had given notice as follows:—

> "That inasmuch as the Examiners of the Pharmaceutical Society are empowered by law to test the qualifications of persons—*female as well as male*—before the state permits them to be registered as persons fitted to 'keep open shop' to practise pharmacy, and as all persons having passed the Major and Minor examinations are eligible for admission into the Society, as members and associates, that they may exercise control and direction over the working of the Pharmaceutical Society, and have the benefit of its associative influence and protection, this meeting is of opinion that it is contrary to the plain intention of the statutes to refuse admission to female persons, who, having conformed to the legal tests of the Examiners and the regulations of the Society, may desire to become connected with the Pharmaceutical Society in the capacity of apprentices or students, or associates, or members."

He said: Mr. President and Gentlemen, I dare say this motion may not be as pleasant, in some respects, to speak upon as many others; and, perhaps, it may be unpopular; nevertheless, I feel bound, in duty to my own conscience and my own general principles, to present it to you. I do not think there is any apology required for its introduction, but am disposed rather to think one is required for the necessity of its introduction from those who have opposed female students having all the privileges of the Society in the same way as male students. I dare say many of you think that too much has been made of this question, simply because a few women are concerned. I quite agree in that opinion, inasmuch as I think, where principles are at stake, it is as important to see to the interests of a few persons, as of a large and powerful class. I desire, as much as possible, and I hope all speakers will follow me, to address myself strictly to the resolution. I do not want to see you wander off into any outside questions which may be accidentally connected with it; but I desire as much as possible to confine myself to the words of the resolution. There is one thing I feel bound to mention at this stage of my remarks, and that is, that our Editor has thought proper to introduce a political article into last week's Journal with a view to bias this discussion. I do think that is a most reprehensible course. The organ of this Society is in no way a political organ, and I do not think it is a right thing for an article of the kind to which I refer to be introduced. I shall not endeavour to define what is a woman's avocation or duty. I think the public and the women themselves will find that out. All that we have to do is to consider the relationship of persons, qualified under the Act of Parliament, with this Society. There is no doubt about this, that a certain number of female persons (as the Act terms them) are entering into the vocation of pharmacy; a number are getting their living by pharmacy, in London especially, and two or three have sought instruction here. I was exceedingly pleased that the Council allowed them to receive that instruction on the same terms as the other students; and I certainly did hope that when the legitimate consequences of that instruction came about by examination, that they would also receive the same reward and be entitled to the same privileges. The question is this: Have we any moral or legal right to keep women out from the Society? You remember that when the list of apprentices or students was brought before the Council for admission into the Society, the names of three ladies appeared on that list, and I can assure you the scene in the Council was something extraordinary. The names of those three individuals—and one them had stood at the top of the tree as regards the Preliminary examination—were separated from the rest, as if they had to go into quarantine, or had been affected with a plague. We had a separate resolution whether they should be admitted or not, and I am sorry to say I was not successful in procuring them admission. But I will just call your attention to clause 10 of the Pharmacy Act, 1852—"Every such person who shall have been examined by the persons appointed as aforesaid, and shall have obtained a certificate of qualification from them, shall be entitled to be registered by the registrar according to the provisions of this Act, upon payment of such fee or fees as shall be fixed by the bye-laws; and every such person duly registered as a pharmaceutical chemist shall be eligible to be elected as a member of the said Society; and every such person duly registered as an assistant shall be eligible for admission as an associate of the said Society, and every such person duly registered as a student or apprentice to a pharmaceutical chemist shall be eligible for admission into the said Society, according to the bye-laws thereof;" and also clause 20 of the Act of 1868—"Every person who shall have been registered as a chemist and druggist under this Act, by reason of having obtained a certificate of qualification from the Board of Examiners, shall be eligible to be elected an associate of the Pharmaceutical Society; and every such person so elected and continuing as such associate, being in business on his own account, shall have the privilege of attending all meetings of the said Society and of voting thereat," etc. I would also call attention to the bye-laws, which, when they pass, become a part of the Act, section 1, rule 2—"Persons qualified to be elected members, associates or apprentices, or students of the Society shall at a meeting of the Council be proposed and seconded by members of the Council. The qualification of the proposed member, associate or apprentice, or student shall be stated in a written resolution." Now, gentlemen, you will observe that the word "qualification" is very prominently brought out in the bye-law and in the Act. I take it to mean this: that qualification is a test of eligibility. If a person is qualified I suppose, and I think that it is natural to suppose that person is eligible. That is simply the ground upon which I move. Now women have been registered, both women who were in business before the passing of the Act of 1868 and also several who have passed their examination since, and I consider this registration to be a practical acknowledgment of the position I assume. We have tested their qualifications and so far we read the Act as assuming that there is no distinction to be made between a male and a female person in the Act. That so far is our interpretation of it. Our own solicitor I have no doubt will support me when I refer to Lord Brougham's Act, 13 & 14 Vict. sect. 4.—"That all words importing the masculine gender shall include the feminine unless there be an express provision to the contrary." Under that particular Act of Parliament I have no doubt our solicitor advised this Society to admit women to registration and examination. He would not move without authority, and I believe it was under his authority that they were admitted to examination. The Society has so far adopted this view, and I believe it is simply a matter of prejudice which prevents the Society taking the consequence of continuing this view and allowing women to become apprentices or students, associates, or members. There is a notion abroad something to this effect, that this is really a private society. It was a private society, I am free to admit, but it is no longer, strictly speaking, a private society. I believe that statement to be a most fallacious one. Our authority comes from the public, we have important public duties to perform, and I think, in our duty to the public, we should read the Act in a spirit of liberality, and that is the mode in which I should wish to read it. We cannot view the Act of Parliament as conferring power on a private society. It is a society of a public character; we have a Council which you elect periodically to represent you; we have members joining for the purpose of controlling that Council; and all the principal functions of the Society are of a public character. Do you suppose, gentlemen, that if the Council refused to elect a number of men to various grades in this Society, the Government would not step in and say that we were using our power badly. Do you think if we refused to elect a certain number of members coming from a particular town, or for some reason or other, that the Government would rest satisfied, and that there would be no remedy to set us right? I am quite sure that if there were a powerful class of men anxious to enter the Society, they would soon find a remedy. Then, if that be the case, I think we ought to be thoroughly just in this matter. It is a question of simple justice and common fairness. I think in excluding women in this way we are not dealing according to the great principle of English fair-play. We have been told that women must not do this, that, and the other, and many tell us they must not be chemists; but you cannot prevent them being chemists, and why should you prevent them entering the Society as men do? I will just mention two facts. We are constantly told that women must stay at home, and that is a very good thing, too, sometimes, but there are at this moment between two and three millions of women earning an independent livelihood, without masculine assistance, in this country. That is a grave statement, and we ought to ponder it well before we shut up this Society, and say we will shut this Society against them. A few weeks ago there were eleven situations offered in London for young women in the Post Office, and for those vacancies there were 1500 personal applications. Over a thousand were examined, each candidate being questioned and having to give evidence of a certain capacity. Now in the face of these facts we ought really to consider before we say we will not be fair and just and allow women equally to enjoy the privileges of this Society. Again, I cannot conceive that any dishonour would be done to us by the admission of women. If it be possible, it is highly improbable that more than a few women will distinguish themselves in pharmacy, but women do occasionally distinguish themselves in various ways, and if they do so in Pharmacy, would it not be an honour to us to have them as part and parcel of our body. I would conclude by repeating we shall do no dishonour to ourselves by admitting women, but shall be simply acting fairly at least to a few women who wish to join us.

Mr. Bostock (Ashton-under-Lyne) said that he hoped to spend the evening at South Kensington with many of those he saw around him, and each gentleman was invited to take a lady with him. The presence of ladies would add much to the agreeableness of the evening, and he must say he should not consider himself as a member of this Society in any way degraded if ladies, properly qualified, were admitted to membership. On the other hand, it would be an honour to the Society rather than a disgrace, to have ladies associated with them. There were many cases in which it was very desirable that women should be able to conduct the business of pharmacy. Sometimes the head of a business was removed, and if his wife or daughter could make a living by carrying it on, it was very desirable that she should do so. If they passed the examination they were entitled to become chemists and druggists, and why should they be denied admission as members of the Association. If they had gone through the course of study necessary to qualify them, which was not a very easy one, be thought their perseverance and industry should be rewarded by accepting them as members. They could not be kept out of the trade, and if they applied for admission as members of the Society, it should be our duty and our pleasure to allow them to join. He, therefore, had much pleasure in seconding the resolution. Men themselves would have thought it very hard if they were shut out from any ordinary rights of citizenship by the accident of birth, and what they would not like to have done to themselves they should not impose upon others.

Mr. Atkinson Pickering (Hull) begged to move:—

"That the question of admitting ladies as members, associates, apprentices, or students be adjourned *sine die.*"

He did so for several reasons, which were perfectly conclusive to his own mind, and he hoped it would be so to others. It was a matter of great doubt to him whether, when the rules and regulations of the Society were framed, the word "person" was ever intended to include the female sex, though, in strict legality, no doubt it did so; but the question was this, was it desirable that the women should occupy the position of pharmaceutical chemists? There were many callings which females could adorn with credit to themselves and advantage to society, such, for instance, as the duty of educating the rising generation. Again, he could understand how a young lady behind a draper's or silk-merchant's counter—— (cries of "question"). He contended he was speaking to the question.

Mr. HAMPSON said this was not the question.

The PRESIDENT said, he thought a great deal of time would be saved if the discussion were confined to the question,—members or not members. All the other parts of the question, as to admission to lectures, and so on, had been already settled; and if gentlemen would confine themselves to the real point of the resolution, it would simplify the matter very much.

Mr. PICKERING said, the regulations of the Society never contemplated admitting women to membership, and with that broad assertion, he was willing to leave the question in the hands of the meeting. He had intended to have gone at more length into the question, but he would simply say now that there were matters connected with pharmacy which it was not desirable that women should be connected with, matters which it was not delicate for them to listen to, and articles they would have to deal in which it was not fit that they should touch. That was especially so in the country trade. He therefore hoped the resolution would be rejected.

Mr. FRAZER (Glasgow) said he intended to vote for Mr. Hampson's motion, both on general principles and on the question of expediency. The general principle was this, that women were entitled by law, as was acknowledged, to have a field of labour, and he knew of no law restricting them to this trade or that; it was for the women themselves to choose their own trade. Referring to the concluding remarks of the last speaker, he would only say that if there was a particular description of work which ought not to be done by women, they knew who was to blame for it, and more the shame that it was so. They all knew that women were now employed to a large extent in the manufacture of articles which all chemists dealt in. Even within the last fortnight the President had visited one of the largest establishments in Scotland, where a woman was employed doing nothing else but manufacturing suppositories and pessaries. They had no right to restrain women from taking up any occupation which they desired. Then as to the question of expediency —he held that these examinations, which were now being made more stringent, would restrict the supply of assistants. He himself had put a dozen advertisements in three Glasgow papers, and yet failed to get one apprentice, and the same thing was occurring elsewhere. Young men, in fact, were leaving the trade in all directions, and some one must be found to supply their places. It had been said that if the men could not pass the examinations, how could the women do it? But the fact was, the young men could pass them, but they had so many other fields open to them that they did not think it worth while to spend the time and money which was required for these stringent examinations, and therefore he believed they would be driven to employ women who wanted a field for their labour; he should therefore have much pleasure in voting for the resolution.

Mr. BOOTH said he should support the resolution.

Mr. RANDALL said, a good many remarks which had been made were not strictly to the point. Some time ago the trade was divided between pharmaceutical chemists and chemists and druggists, and chemists and druggists claimed to be on the register. When that was conceded they said it was unfair, because they had only taken the first step, that they should be kept out from any share in the government of the Society, and then it was admitted that they must come in and be admitted to membership. At that time there was a little suspicion as to what might be the result, and it was asked whether they could insist upon coming in, or whether they might not be rejected by the Council by a sort of side-wind. He remembered very well that at that time it was stated as a legal opinion that though the Council might exclude individuals on account of some individual incapacity, they could not keep out a class or a large section, for that if they attempted to do so a *mandamus* would issue compelling them to elect. Now it appeared to him that women were exactly in that position; they had been admitted as pharmaceutical chemists, and it was now too late to keep them out of the Society. He would ask the solicitor to say why, if he had correctly stated what passed on the previous occasion, a *mandamus* would not lie in the same way on the part of those women who were refused admission. It seemed to him simply a question whether they would do it spontaneously or be compelled to do it.

Mr. SANDFORD, referring to Mr. Hampson's objection to the Journal having contained an article advocating certain opinions, said it was only fair that the Journal should admit all opinions. It had done so on this question, sometimes even admitting poetic effusions, sometimes in favour of the ladies, and sometimes against them. He himself had written one or two letters on the subject, and as it was important that all should have a fair opportunity of expressing their views, he could not go with Mr. Hampson in finding fault with the Editor on that score. With regard to Mr. Randall's observations, he, Mr. Sandford, had most emphatically asserted that men, being eligible, would have a right to come into the Society; but it was with a reservation that individual disqualifications might exist which would justify the Council in rejecting them. According to the principle laid down by Mr. Randall, they must elect anybody and everybody who was on the register. Mr. Hampson said that these women were qualified, and therefore eligible. Now, it was very true that there must be qualification before eligibility, but there might be a disqualification, and he thought in the case of women their sex was a disqualification. He could not help thinking that Mr. Pickering was quite in order in the remarks he was making when interrupted, he was only stating his objections to admitting women to membership. There was no objection to any one employing his wife, or any other woman if he thought proper, in his shop, but he did not wish the Society to encourage the employment of women in pharmacy. He was glad one gentlemen had reminded them of meeting the ladies that evening, and he should be delighted to do so on any such occasion; in fact it was out of respect to the ladies that he opposed this motion, and because he had the pleasure of the acquaintance of many women, some especially of the highest mental qualifications, who were utterly disgusted with the present movement. To show what change might be expected in women, he handed to the President the current number of *Punch*, representing Mrs. Dr. Mandragora Nightshade calling on a physician, when the housemaid, in great dismay, described her as a man in woman's clothes.

Mr. HAMPSON said this was not dealing with the question before the meeting.

Mr. SANDFORD said he was giving his reason for opposing the motion. He opposed it both on behalf of the Society and of the women themselves. Mr. Hampson referred to the scene at the Council Board when three ladies were proposed to be admitted as apprentices. He remembered that scene perfectly well, and could not see that there was anything very remarkable about it. A list was handed in containing twenty or thirty names, and amongst them were these three ladies; when the list was first read over and the motion made, that the whole should be admitted, he moved that the three ladies should not be admitted, and then their names were taken out and put on a separate list by themselves. Therefore, the amendment was perfectly in order, and there was nothing extraordinary about it. It was quite open to these ladies, if they felt aggrieved, to go to the Court of Queen's Bench, and get a *mandamus*, to try the question at once. The Council had not passed any resolution that women should not be admitted, but certain names having been submitted, they had rejected them. In like manner, he remembered some few years ago, a Miss Leech applied to be admitted as a member. He believed she had been on the register, because her father had been a chemist and druggist, and she had carried on the business for a time after his death. She afterwards became manager or housekeeper in an asylum, and applied to be admitted a member of this Society. He opposed her admission, and when she asked him what his objection was, he told her it was simply that she was Miss Leech; to which she replied very truly, that was not her fault. There were many other means of earning a living open to women, and he was opposed to encouraging them to enter a business where they would have, day by day, to deal in things which he should be very sorry for any near female friends of his own to have any knowledge of. He trusted, therefore, the meeting would entirely negative the proposition.

Mr. GILES thought it particularly desirable that the question should not be settled on a false issue, which was not at all unlikely to be the case. On the one side gentlemen might be influenced by chivalrous feelings and on the other by something like jealousy. Now, there was really no room for any jealous feeling, because competition was not a question of sex, but of the number of shops. This question had been advanced a certain stage by a measure the Council had taken in conceding what he considered the essentials, in admitting women to the lectures, and what remained was he believed in great measure a matter of sentiment. Now it was not their business to adjudicate upon the sentiments of other people, or to say what sphere of action women should occupy. Every gentleman might influence his own friends or relations in accordance with his own views; but at that moment he knew a young lady who was devoting herself to nursing, which many others had done, and he apprehended that in that vocation they would come into contact with many things which might be very offensive. At the same time he must say *puribus omnia pura*, and it was possible that women might find a proper place in pharmacy quite consistent with all delicacy. He feared that a great many would be influenced in voting upon this question by their individual disposition rather than by reason; but it appeared to him that ladies had received permission to enter the trade, and to qualify themselves for it, and that being done it could not be undone. For his own part, he should have hesitated a great deal before going so far as that, for he was pretty certain that when the Acts of Parliament were passed such a thing was not contemplated. During many hundreds of years there had been a certain kind of separation between the functions of the sexes, and their duties in ordinary life, which they must believe, if they had any respect for their ancestors, was founded on good reason. Still the circumstances of life changed, and in an overcrowded country things which were once fitting were no longer to be maintained, and they must be prepared to give to woman a more independent sphere of action. If they desired them all to be married they would to a certain degree be only adding to the difficulties which already existed, at any rate, many of them did not get married and therefore required some means of honourably and independently maintaining themselves. These facts must be looked in the face, and they must expect that the state of things, which he confessed he preferred, might have to give place to something different. He therefore thought the Society might have been excused if this question had been postponed for a time, but as this had not been done, and access had been given to the lectures, it simply became a question whether the Council were justified in excluding women from membership. He thought it was perhaps a doubtful question whether they had any right at law to exercise that power of selection. It appeared very much as if the Council's function in relation to the election of members was simply executive, and not judicial, but that was a legal question which could not be settled there, and he hoped they would not attempt it. He noticed, however, a difference in the expression which applied to people being entitled to registration, and to their being eligible for membership; that was a difference which must be left to legal acumen to determine the value of, but he did not think it followed that because a person was eligible that therefore the functions of the Council were executive. For instance, a person might be eligible to be commander-in-chief, but if she were a woman, though she had passed the requisite competitive examinations, he apprehended the answer would be—"You are eligible *quoad* the examination, but you are not eligible *quoad* your sex." He thought the best way would be for the ladies to go to the Court of Queen's Bench and get a *mandamus*, and then the question would be satisfactorily settled. If it were settled now by refusing them admission, it would still be left open for agitation until it was settled by a court of law. If they were obliged to admit them they must do so by all means, but if it was a matter of choice he should certainly prefer their not being elected.

Mr. SAVAGE said they seemed travelling a good deal beyond the record. It was admitted that they had no power to exclude ladies from passing the examinations, and the only question was whether they should be admitted to membership. He should be very sorry to have a lady dispensing in his shop, but at the same time, if there were ladies who wished to encounter any indelicacy that might occur, they had nothing to do with that. He did not believe there would be a dozen present themselves in forty years, but whatever the number might be, they must be above the average character, or they would not pass the examinations, and he did not see why they should be kept out in the cold.

Mr. LINFORD begged to propose, as an amendment, that the question be referred back to the newly-elected Council.

The question being raised whether Mr. Pickering's amendment had been seconded, Mr. MARSDEN said, he should be very glad to second it.

Mr. HUMPAGE remarked, there was one point of view from which this question had not been looked at. They were about to confirm an alteration in the bye-laws, the effect of which would be that, in future, after the close of 1866, no individual should be eligible for examination except after passing three years' apprenticeship. That was virtually what it amounted to. But if they voted for ladies being admitted, then these would have to undergo this three years' apprenticeship the same as the other sex. Now this he strongly objected to, because, as had been observed by Mr. Pickering, they would have to undergo a certain routine, and hear and see things which would entirely destroy the delicacy of any young lady. Let ladies assist their husbands if they thought fit, though he should not like them to do so, but that was a widely different thing to sanctioning and encouraging them to enter the business. It was said that, having opened one door, they should open the second, but he had no responsibility on that point, for he had never voted in favour of ladies being admitted, and he certainly should oppose the motion; not out of any disrespect to the ladies, but he did not want them as members.

The SOLICITOR said, that as silence was sometimes taken to mean assent, he was anxious that silence on his own part should not be deemed assent to the proposition contained in the resolution, as to the law of the subject. At the same time, he had not made up his mind upon it, but he had an impression, rather than an opinion, that if the ladies did go to the Queen's Bench for a *mandamus*, they would not be successful. He believed that the Society possessed all the privileges of a voluntary association, with regard to election to membership, so long as those privileges were reasonably exercised. In many clubs in London, ladies were absolutely excluded; that society was formed of gentlemen, and he was under the impression that if gentlemen chose so to continue it, the law would sustain them in so doing. Brougham's Act, which had been referred to, showed that the expression implying one gender should be held to include the other, "unless the context be repugnant thereto." And he believed that there would be no difficulty in finding in the charter sufficient in the context and in the sanction of the long usage from the commencement of the Society to the present day to warrant the exclusion of women from membership. He would also remind the meeting that when the last Reform Act was passed it spoke of persons and men; and the ladies' advocates went to one of the courts, with the Act of Parliament and with Brougham's Act in their hands, and contended that ladies were admitted to the franchise. The courts, however, held the contrary, and it seemed to him that the ruling in that case was strictly applicable to this one. He would point also to the difference between the admission to the register and the admission to membership. The register was simply a creation of the Act of Parliament, and all persons duly examined were bound to be admitted to it. But though the Act of Parliament gave the members of the body the privilege of going on the register, it did not give to those on the register the right of becoming members of the body. The body itself was the creation of the charter, and at the very beginning of the charter it would be found that certain gentlemen having associated themselves together for a certain purpose, they were to establish a fund for the relief of their widows and orphans; they did not find the word *widower* there. And that very sentence was repeated in the last Act of Parliament. He did not profess to have formed a strong opinion on this subject, for, until coming there, he never imagined that it would be seriously discussed in the sense in which it had been; but he did not wish to have it said that he sanctioned the idea that the law would compel them to admit ladies. If the matter was to be fought out in a court of law,—speaking as a lawyer,—he should prefer fighting on the side which he believed would win, and if he had his choice on which side he should be, it would not be on the ladies' side.

Mr. HILLS asked, if the meeting decided to admit ladies would there be any legal difficulty in doing so?

The SOLICITOR replied, that if the admission of ladies was voted, there was nothing to prevent a gentleman going to the court for a *mandamus* calling upon the Council to show cause why the ladies were admitted.

Mr. HILLS said he had given this subject a great deal of consideration, and he had taken a considerable time to make up his mind upon it. He had not voted against the ladies as yet, and as he had not heard anything to convince him that they ought not to be admitted he should vote in favour of the proposition.

Mr. WARD inquired what would be the consequence if a lady became a member of the Society, and carried on business, and afterwards took a husband, and changed her name. Would she be allowed to retain her maiden name on the register, or would it be altered to the married one?

The SOLICITOR said he had had to consider that question with regard to the register, when he advised as he should again, that the register ought to describe the individual by that individual's known name or designation for the time being; and that the register might have to be corrected in the same way as it would be if a gentleman

Mr. SCHACHT said, it seemed rather a bold thing for a

changed his name.

layman to utter an opinion which was in any sense opposed to that of a professional man, but he could not help thinking that Mr. Flux was quite correct in saying that he had scarcely given this matter sufficient consideration; and, curiously enough, the quotation he had made, seemed to him to bear against his conclusion. He said the usage in these matters very materially determined the conclusion arrived at, and that the context of that word which would seem to admit ladies, served to show that they would be excluded, because the usage would be against them. Now, he must have forgotten that usage up to the present time had not excluded women at all. He had seen numbers of cases in which women had been employed as pharmacists behind the counter, and it was not denied that they were quite at liberty by law to be recognised as pharmacists by being on the register. Further than that, the Society admitted them to a course of instruction, and surely those arguments would be quite sufficient, at any rate, to give them a *locus standi* in any court to which they might apply for a *mandamus*. It was also said, that if the Council thought it right to admit ladies to membership, it would be open to a man to apply for a *mandamus* to show cause why they had done so, but he apprehended that if they admitted any particular man, say John Jones, it would, legally speaking, it would be open to anybody else, Mr. Thomas Smith, to apply for a *mandamus* to compel the Council to show why they had admitted him. If the solicitor thought there was a legal difficulty in the way, which he did not see his way to giving an exact answer to, that was a very good reason they should adopt Mr. Giles's suggestion and postpone the matter for further consideration. He had always voted on the Council in favour of the admission of women, because he thought it was only just, and he could not help saying that if there were any doubt as to the justice of the matter, generosity should lead them to give way. They need not fear that there would be more than two or three at the most. Beyond that it must be remembered that now members of the Society had control over the whole trade to a certain extent, and if once women were admitted to the register he did not see they had any right to exclude them from their fair share of executive control over the occupation they had adopted.

Mr. BETTY (London) said, the subject logically and practically divided itself into two portions—one, the right of women to carry on the business of chemists and druggists, and the other, and the main question, whether they should be admitted to take part in the conduct of the Society, and form a portion of the governing body. This was a matter eminently fitted to be decided by public opinion, and therefore the Council had delegated it to the Annual Meeting, especially looking to what had been done in other kindred societies and to the feeling in the country at large. The question was being agitated for the admission of ladies to vote for members of Parliament, and when they found public opinion year after year decidedly averse to such an innovation it behoved them to very carefully consider before they went in opposition to the general feeling of public bodies throughout the country. He very much objected to the admission of ladies to the lectures, and had he not been accidentally absent should have voted against the motion on the Council; indeed he was much surprised to find that it had been carried. The French proverb *ce n'est que le premier pas qui coûte* was particularly applicable to all dealings with ladies. It did not so much matter how the negotiations were begun; they might be comparatively harmless; the difficulty was you could never tell to what lengths they might go afterwards. He very much objected to the mixture of the sexes in educational establishments, as he had himself seen what inconveniences—to use the mildest word—might have arisen therefrom. As a public body, therefore, he hoped they would be guided by the truly English feeling that the delicacy of an English lady should be above suspicion. When there was a mixture of the sexes at Eton, Harrow, Marlborough, and Rugby, then he would say, let them be associated together in the public school of pharmacy.

Mr. BURDEN (London) rose to address the meeting, but was met with so many cries of "Vote" that he resumed his seat.

Mr. ATKINS said, no doubt time was valuable, but he had come up at some personal inconvenience on purpose to hear this discussion, and he thought everyone ought to have an opportunity of expressing his opinion.

Mr. BURDEN thought this was one of the most important questions which could be debated, and he deprecated its being decided by mere passion or prejudice. He should be glad if it could be postponed until it could receive further consideration, and when everyone had expressed their opinion. He had been waiting for a long time to hear some solid arguments why women should not be admitted to practise pharmacy, but had not yet heard them. He believed that in many cases they would be much better fitted for such positions than young men. In the druggists' shops in Paris you constantly saw the wife assisting her husband.

Mr. Giles reminded the speaker that it was not a question of practising the business, but of membership in the Society.

Mr. Burden did not see how women could practise as druggists unless they were admitted to all the privileges of membership. They ought to be qualified to do everything which they might be called upon to perform.

Mr. Atkins said he must object, although time was valuable, to a vote being taken on this question without a full discussion, and the Annual Meeting was the only opportunity for provincial members to make known their views, except in writing, which many had not time for. The question as to the desirability of women entering the business was, it appeared to him, a question for the women to decide for themselves. He did not wish to speak in the least degree personally or offensively, but he believed a great deal of the opposition to this motion arose from an unwise feeling of jealousy. Mr. Sandford had said that there was a large sphere of labour open to women; but, with all due respect, it appeared to him that their sphere of action was very limited, at any rate an opinion existed, wisely or not, on the part of many women, that a certain section of their own business, being somewhat refined in character and light in its manipulation, was capable of being appropriated by them. It seemed to him that the whole argument had been conceded when females were admitted to the register. He did not pretend to prophetic power, but he believed they were only now attempting to resist the inevitable. The suggestion had been made—and received with approbation—that women should be driven to apply to the court for a *mandamus*, but if it came to that, would it not be much more chivalrous, honourable, and manly, to admit them without that? He would not say how he intended to vote, for he simply came to hear the debate, and though he had a natural feeling of conservatism, prompting him to say no, he wished only to be influenced by the force of argument.

Mr. Urwick (London) had no wish to see ladies enter the trade, but at the same time he would not oppose them if they thought themselves adapted for it. He was guided in this matter by the 10th clause of the Act, which said they were eligible to conduct business and to be pharmaceutical chemists. Ladies having come forward and passed the requisite examinations, it was simply a matter of justice to admit them to membership, leaving it to each individual who presented herself to stand upon her own merits, and judging in each case, as in the case of a man, whether there was any moral reason for rejection. They could not assume that ladies who passed their examination were going to conduct business in an improper manner, and as a pure matter of justice he should vote for the resolution.

Mr. Hampson, in replying to the adverse criticism which the resolution had received, said he had taken care to fortify himself with legal opinions, and he had authority to use the name of Mr. Hinde Palmer, Q.C., M.P., who distinctly coincided with the principles he had laid down. Two other legal opinions were in the same direction, all three gentlemen agreeing that women occupied exactly the same position as men in relation to the Society. With regard to the disagreeable nature of the business and the awful consequences of women being mixed up with these disagreeables, he could not share the fears which had been so eloquently expressed. Those women who passed the examination and carried on business themselves would very probably employ female assistants, and in such cases there could be nothing in any way derogatory to female modesty or propriety.

The President then put the amendment that the question be adjourned *sine die*, and declared it to be carried by a considerable majority.

Mr. Davis called for a division, but this was not pressed.

The President was then proceeding to put the amendment as a substantive resolution, when—

Mr. Wade said he had an amendment to propose—"That it is the opinion of this meeting that, the solicitor of the Society not being able to give a decided opinion on the meaning of the Act, it is the duty of the Council to obtain Counsel's opinion thereon."

Mr. Randall seconded the amendment.

The President said he could not consider that as an amendment to the resolution before the meeting.

Mr. Randall said that difficulty could be easily got over. He could put himself perfectly in order by moving to omit the words "*sine die*," and to substitute "for the purpose of obtaining Counsel's opinion on the point."

Mr. Wade seconded.

Mr. Giles wished to know what "the point" was.

Mr. Randall: The point whether women can legally demand to be admitted. He would not press the motion if the Council would undertake to do so.

Mr. Brown appealed to Mr. Randall whether it was worth while to press the amendment after the meeting had so decidedly expressed its opinion that the question should be adjourned. The Council was as yet an unelected body, but he had no doubt there would be some gentlemen on the incoming Council who would not let the question entirely rest; and there could be no doubt that before the Council brought it forward again they would take care to have an authoritative expression of opinion from the highest legal gentlemen. He hoped, therefore, the meeting would at once proceed to the important business they had still to transact.

After some further conversation, Mr. Randall said he must press his amendment, as he could not get a distinct understanding that the question would not be allowed to drop altogether. The amendment was therefore put, and lost by a considerable majority; and Mr. Pickering's motion being put was immediately carried.

Scrutineers were then appointed to examine the voting papers sent in for the election of gentlemen to the vacant seats at the Council, and the meeting was adjourned to eleven o'clock on Friday, to declare the result of the poll.

SPECIAL GENERAL MEETING.

The Secretary having read the notice convening the Special General Meeting for the purpose of abrogating or altering some of the Bye-laws of the Society, and of considering, and, if thought proper, confirming and approving the new Bye-laws submitted to the said meeting by the Council as follows:—

FIRST SCHEDULE. Present.	SECOND SCHEDULE. Proposed.
Section 1.	
Clause 10.	*Clause* 10.
All subscriptions for the current year shall become due upon election, and all annual subscriptions shall become due on the first day of January in every year; and if any Member, Associate, or Apprentice or Student, shall not have paid his annual subscription before the first day of May in any year, his name shall be omitted from the Register of Members, Associates, and Apprentices or Students of the Society, certified by the Council at the Annual Meeting.	All subscriptions for the current year shall become due upon election, and all annual subscriptions shall become due on the first day of January in every year; and if any Member, Associate, or Apprentice or Student shall not have paid his annual subscription before the first day of May in any year, his name shall be omitted from the Register of Members, Associates, and Apprentices or Students of the Society, certified by the Council at the Annual Meeting.

It shall be competent to the Council to restore any defaulter to his former status in the Society on payment of his arrears and any fine which it may be thought fit by the Council to impose, not exceeding half-a-guinea.	It shall be competent to the Council to restore any person whose name has been so removed to his former status in the Society on payment of his subscription for the then current year, and a sum not less than the amount of half of one year's subscription, nor exceeding five guineas, as for and in commutation of his arrears of subscription.

SECTION 3.

Clause 3.	*Clause* 3.
The Common Seal shall not be set or affixed to any deed, instrument, or writing whatsoever, unless in the presence of the Council of the Society, and in pursuance of an order or minute entered in their books.	The Common Seal may be set or affixed to any deed, instrument, or writing, in pursuance of an order or minute of the Council entered in their minute book, and in the presence of the President, or Vice-President, or two Members of the Council, and not otherwise.

SECTION 4.

BYE-LAWS.	BYE-LAWS AND REGULATIONS.
The making, altering, or abrogating any Bye-law shall be in the following manner:—	The making, altering, or abrogating of any Bye-law or any Regulation, to be prescribed by the Society, in accordance with any statute, shall be in the following manner:—
Clause 1.	*Clause* 1.
A written formula for any proposed Bye-law, or for altering or abrogating any Bye-law, being delivered by a Member of the Council to the Chairman, shall thereupon be read, and, if seconded and approved, shall be referred to two subsequent ordinary or special Meetings of the Council for confirmation, and then to a special General Meeting of the Members of the Society, and afterwards to the Privy Council, according to the provisions of the Statute, 1852, as amended by the Act, 1868.	A written formula for any proposed Bye-law or Regulation, or for altering or abrogating any Bye-law or Regulation, being delivered by a Member of the Council to the Chairman, shall thereupon be read, and, if seconded and approved, shall be referred to two subsequent ordinary or special Meetings of the Council for confirmation, and then to a special General Meeting of the Members of the Society, and afterwards to the Privy Council, according to the provisions of the Pharmacy Act, 1852, and the Pharmacy Act, 1868.

SECTION 9.

Clause 1.	*Clause* 1.
This Committee shall consist of not less than four Members, two of whom shall constitute a quorum. The Committee shall meet once in every month, and report from time to time to the Council.	This Committee shall consist of not less than five Members, three of whom shall constitute a quorum. The Committee shall meet once, or oftener, in every month, and report from time to time to the Council.

SECTION 10.

Clause 1.	*Clause* 1.
The Board of Examiners heretofore appointed shall continue in office until the first monthly meeting of the Council after the general meeting in the year 1869.	The Boards of Examiners respectively heretofore appointed shall continue in office until the end of the year 1873.
Clause 2.	*Clause* 2.
The Council shall, at the first monthly meeting of the Council after the general meeting in 1869, and in every subsequent year, appoint such competent persons as they shall think fit, to be examiners to conduct all such examinations as are provided for or contemplated by the Charter or by the Statute, 1852, and the persons so appointed shall constitute and be called the Board of Examiners for England and Wales.	The Council shall, at their first meeting, in December, 1873, and in every subsequent December, appoint such competent persons as they shall think fit, to be examiners for the year to commence on the then following first day of January, to conduct all such examinations as are provided for or contemplated by the Charter or by the Statute 15 and 16 Vict. c. 56, and the persons so appointed shall, for the period of their appointment, constitute and be called the Board of Examiners for England and Wales.
Clause 3.	*Clause* 3.
The Council shall, at the first monthly meeting of the Council after the general meeting in 1869, and in every subsequent year, appoint fit and proper persons in Scotland to be examiners, and to meet in Edinburgh or Glasgow, or such other place or places as the Council may think desirable, and to conduct there all such examinations as are provided for or contemplated by the Statute, 1852, and the persons so appointed shall constitute and be called the Board of Examiners for Scotland.	The Council shall, at their first meeting in December, 1873, and in every subsequent December, appoint fit and proper persons in Scotland to be examiners for the year to commence on the then following first day of January, and to meet in Edinburgh or Glasgow, or such other place or places as the Council may think desirable, and to conduct there all such examinations as are provided for or contemplated by the Statute 15 & 16 Vict. c. 56, and the persons so appointed shall for the period of their appointment constitute and be called the Board of Examiners for Scotland.
Clause 4.	*Clause* 4.
The President and Vice-President of the Society shall, *ex officio*, be members of the Boards of Examiners, and shall preside at all meetings of such Boards at which they shall be present.	The President and Vice-President of the Society shall, *ex officio*, be members of the Boards of Examiners, and either of them present at any meeting of either of such Boards shall preside thereat.
Clause 5.	*Clause* 5.
After the first day of January, 1871, the Council shall not appoint any person who has attained the age of sixty-five years at the time of the appointment to be an examiner, unless such person shall be the President or the Vice-President of the Society.	The Council shall not appoint any person who has attained the age of sixty-five years at the time of the appointment to be an examiner.
Clause 6.	*Clause* 6.
After the first day of January, 1871, no person shall be appointed an ex-	No person shall be appointed an examiner who at the time of appointment

aminer who at the time of appointment is, or who during one year prior to the time of appointment has been, a Member of the Council, other than the President or Vice-President; and the election of any examiner to be a Member of the Council shall vacate his appointment as an examiner.

Clause 7.

The Board of Examiners for England and Wales shall consist of not more than twelve nor less than eight Pharmaceutical Chemists, exclusive of the President and Vice-President of the Society. The Board of Examiners for Scotland shall consist of not more than eight nor less than four Pharmaceutical Chemists, exclusive of the President and Vice-President of the Society. The Council of the Society may from time to time appoint Professors of Science to assist either of the Boards of Examiners at any of their Examinations. Eight Members of the Board of Examiners for England and Wales, and four Members of the Board of Examiners for Scotland, exclusive in each case of assistant Professors, shall constitute a quorum.

Clause 12.

All persons who shall tender themselves to the Examiners for Examination in accordance with the Charter and the Statute, 1852, shall be examined in their knowledge of the Latin language, in English Grammar and Composition and Arithmetic, which Examination shall be called the First Examination.

Such of the said persons as shall desire Certificates of competent skill and qualification to be engaged or employed as Assistants shall be examined in the First Examination, and also in the translation and dispensing of Prescriptions, in Botany, in Materia Medica, in Pharmaceutical and General Chemistry, the Chemistry of Poisons and Posology, which examination shall be called the Minor Examination; and such of the said persons as shall desire Certificates of competent skill and qualification to exercise the business or calling of Pharmaceutical Chemists shall be examined in the Minor Examination, and in more extended knowledge of Botany, Materia Medica, the translation and dispensing of Prescriptions, Pharmacy, General Chemistry, the Chemistry of Poisons and Posology, which examination shall be called the Major Examination.

Clause 16.

All persons before registration as Apprentices or Students shall pass the First Examination, and shall pay a Fee of Two Guineas, whereupon they shall be registered as Apprentices or Students.

is, or who during the six months prior to the time of appointment has been, a Member of the Council, unless he shall within the said six months have been the President or Vice-President; and the election of any examiner to be a Member of the Council shall vacate his appointment as an examiner.

Clause 7.

The Board of Examiners for England and Wales shall consist of not more than fourteen nor less than eight Pharmaceutical Chemists, exclusive of the President and Vice-President of the Society. The Board of Examiners for Scotland shall consist of not more than eight nor less than four Pharmaceutical Chemists, exclusive of the President and Vice-President of the Society. The Council of the Society may from time to time appoint Professors of Science to assist either of the Boards of Examiners at any of their Examinations. Eight Members of the Board of Examiners for England and Wales, and four Members of the Board of Examiners for Scotland, exclusive in each case of assistant Professors, shall constitute a quorum.

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All persons who shall tender themselves to the Examiners for Examination in accordance with the Charter and the Statute, 1852, shall be examined in their knowledge of the Latin language, in English Grammar and Composition and Arithmetic, which Examination shall be called the First Examination.

Such of the said persons as shall desire Certificates of competent skill and qualification to be engaged or employed as Assistants shall be examined in or produce Certificates of having previously been examined in the First Examination, and shall be examined in the translation and dispensing of Prescriptions, in Botany, in Materia Medica, in Pharmaceutical and General Chemistry, the Chemistry of Poisons, and Posology, which examination shall be called the Minor Examination; and such of the said persons as shall desire Certificates of competent skill and qualification to exercise the business or calling of Pharmaceutical Chemists shall be examined in or produce Certificates of having previously been examined in the Minor Examination, and shall be examined in more extended knowledge of Botany, Materia Medica, the translation and dispensing of Prescriptions, Pharmacy, General Chemistry, the Chemistry of Poisons, and Posology, which examination shall be called the Major Examination.

Clause 16.

All persons before registration as Apprentices or Students shall pass the First Examination, and shall pay a fee of Two Guineas, whereupon they shall be registered as Apprentices or Students.

After the 31st day of December, 1874, no person shall be admitted to the Major or the Minor Examination who shall not have attained the full age of twenty-one years; and after the 31st day of December, 1876, no person shall be allowed to pass the Major or the Minor Examination unless he shall satisfy the Examiners that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translation and dispensing of prescriptions.

Persons who have passed the Minor Examination at least three months previously may be admitted to the Major Examination, and all other persons desirous of passing the Major Examination may make application to the Board of Examiners for special leave in that behalf.

The PRESIDENT moved—

"That this meeting do confirm and approve the proposed alterations in the Bye-laws in the sections numbered respectively 1, 3, 4, 9 and 10, by erasing therefrom the several portions of the said sections in that behalf appearing in the first schedule hereto, and substituting for the respective portions of sections so erased the several clauses and words in that behalf appearing in the second schedule hereto, and that the said alterations do take effect from the date of confirmation and approval thereof by Her Majesty's Privy Council."

The VICE-PRESIDENT, in seconding the motion, said he believed the alterations had been well considered, and that they were judicious and necessary. Many of them referred only to matters of detail, but others involved questions of some importance. It was for the meeting to express its opinion and to suggest any amendments; but unless some principle were violated, it was very desirable that no alteration should take place, as it would cause considerable delay and inconvenience. They had been very fully discussed in Committee and at the Council, and he believed they would be found in accordance with the best interests of the Society.

Mr. GILES, suggesting that the alterations should be considered *seriatim*,

The SOLICITOR read or described the various alterations.

Mr. GILES, with reference to section 4, clause 1, relating to the alteration of bye-laws, said he did not raise any objection, and he was aware that similar provisions existed in many other societies, but he was not quite sure whether it might not be useful to afford members outside the Council an opportunity of initiating a new bye-law if they desired.

The SOLICITOR said there was no alteration in this respect.

Mr. GILES said he was aware of that. He only threw out the remark for consideration at some future time.

Mr. GILES asked with regard to section 10, clause 12, whether the certificates referred to were certificates of qualification to be granted by other bodies.

The SOLICITOR said only as regards the Preliminary examination.

Mr. GILES said he might take that opportunity of saying that he hoped the Council would not lose sight of the desirability of dissociating themselves as much as possible from that Preliminary examination. It was not the object of the Society to constitute itself an examining body in *literæ humaniores*, but they should confine themselves as much as possible to technical matters.

The SOLICITOR having concluded reading the alterations,

Mr. HAMPSON said: Before the motion is put I must claim the liberty of moving an amendment, as follows:—

"That the altered Bye-laws be approved and confirmed, save and except clause 16, section 10."

I am exceedingly sorry to have to oppose this bye-law again, but I have opposed it, and I hope to oppose it until it is thoroughly exterminated, for the simple reason that it is not legal. I am warranted in that opinion by legal authority which I have obtained; I will read the section of the Act, 1868, clause 6, which is as follows:—"All such persons as shall from time to time have been appointed to conduct examinations under the Pharmacy Act, shall be, and are hereby declared to be Examiners for the purposes of this Act, and are hereby empowered and required to examine all such persons as shall tender themselves for examination under the provisions of this Act." Now, there the Examiners are "required;" there is no option; and under this clause any one can come up, of course, unless this bye-law passes; then it will stand in the way. There are other reasons besides legal reasons, but I think I ought to state this also with reference to the legal opinion that our own solicitor distinctly affirmed before the Parliamentary Committee, and I do not think I am committing any breach of privilege in stating boldly my opinions. I believe what occurs before the Parliamentary Committee and comes to the knowledge of the Council becomes, or ought to become, open to all the members. On these grounds, I say again, I do not think I am guilty of any breach of privilege in referring to this opinion, and I must again state what our own solicitor's opinion was. Mr. Flux distinctly told us that it was illegal, and that we had no power to cause an interval of three years to be placed between one examination and the other. If that opinion be correct we have no right to pass this bye-law; if we want to bring about such regulations let us go to Parliament and get the alteration in a straightforward way. I maintain that this is not a straightfoward way of making the alteration, it is opposed to the statutes, and I say it is unjustifiable to press it forward in this way. But besides that there is something to be said on the general question. I think it is very undesirable to make these hard and fast lines, and no evidence has been brought forward to show that they are necessary. The old bye-law has stood for a long time, and I believe it has borne good fruit. Why should we interfere in this manner, and say that a young man, a candidate, shall not pass his examination when it is most convenient to him. Why should we say a young man should not pass in two years or two and a half years? But this bye-law says no, you shall pass your examination at a certain time; that is to say, there shall be an interval of three years. Besides that there is another restriction in this bye-law. It affirms that any one entering the trade shall be three years with a chemist and registered, or engaged for three years in dispensing prescriptions. If this bye-law passes it will be constantly evaded, and besides that the three years with a chemist is no guarantee whatever. In the majority of shops even in the metropolis, the great centre of pharmacy, it would be no guarantee of capacity or practical training. Is it not patent to us all that numbers of tradesmen do not make any of their own preparations, but buy them all, and their stock is on their shelves? How, then, would a candidate obtain the knowledge of pharmacy? Again, the subjects of examination are all practical subjects. You have botany; surely, if there is any practical subject in the world it is botany; and the examiners ought to be able to tell whether a candidate knows anything of botany or not. So with dispensing—is it not possible to test the capacity of a dispenser in compounding emulsions or pills? There is scarcely a person in the room but would be able to tell in five minutes whether a man knew his business or not. Again, coming to chemistry, the new regulations impose increased stringency in the examination, giving the examiners the power of testing the candidates in their knowledge of chemistry, and all this is in a practical direction. Therefore I say there is no necessity for this term of apprenticeship. On these grounds, and especially on the ground of illegality, I must oppose this bye-law. Only this morning I received an opinion from a barrister on this question. He says: "It seems clearly contrary to the 6th section of the Pharmacy Act, 1868, which requires and empowers the examiners to examine all persons who shall present themselves. The proposed bye-laws would restrict this generally;" and he goes on to confirm this statement, and to say that it must be contrary to law. Why need we go and do things illegally? Have the examiners become so worthless that we must step out of our way in this surreptitious manner—I use the word advisedly—to press this bye-law on the Society? I believe the members generally scarce know what will be the consequence. Already there is a difficulty, as we have heard mentioned this morning, in getting assistants, and this will only be another barrier in the same direction. When evidence is brought forward to show that such a change as this is necessary, it will be quite time for us to consider whether we shall go to Parliament in a straightforward way and obtain a modification of the statute.

Mr. URWICK seconded the amendment, simply on the ground that it was a departure from the principle of the Act. The Act clearly pointed out the examiners' duties, viz., to examine every person who presented himself. It was the duty of the examiners to test the qualifications of the candidates. This new regulation would be putting a clog upon young men in compelling them to wait three years when they might be ready in two years or a little more. He opposed the alteration. He considered the bye-law ought to be in every respect in conformity with the statutes.

Mr. M. CARTEIGHE (London) was much astonished to see two gentlemen, members of the Parliamentary Committee and of the Council coming forward, and one of them bringing rival lawyer's opinions, and asking the meeting not to accede to the proposition, which appeared to have been carried by a very large majority of the Council. Did they suppose that the other members of the Council were blind to the interest of the Society, or that they deliberately shut their eyes for the purpose of acting unjustly towards the members? As a member of the Society, he must be pardoned for saying he thought it hardly desirable for a gentleman in office to publish business transacted in Committee. If that kind of thing were continued, there would be many difficulties constantly occurring, and he hoped future members of Council would, as in times past, consider the proceedings of Committees as being private. It was as easy to get a lawyer's opinion as to get up a petition. He remembered a gentleman's saying, after a petition had been obtained on a certain subject, that if he had a shilling a head, he could go round and get the same persons to sign another in the opposite direction. The value of a legal opinion depended entirely on the way in which the case was drawn. He did not profess to know anything about this as a question of law, but the examiners left it to the Council to consult their proper authorized officer, and to do what they thought desirable for the benefit of the candidates, by adopting such proceedings as would, in their judgment, improve the calibre of their men in what was always clamoured for—practical knowledge. It was all very well to say that a man's capacity could be tested in five minutes. He should like any of those present to try. If they were conscious how easy it was for a man to get up a certain kind of knowledge, even a certain kind of practical knowledge, they would not make such statements. Men would actually make up difficult emulsions, pills, and even silver them, and get a certificate, who still did not know their business; and the examiners felt they had no right to give certificates unless they carried—what they should carry—a certain amount of money value, and be a guarantee that every man who passed the Minor examination might be considered reasonably competent. It often happened now that employers would say to assistants, We do not care so much about the Minor examination; where have you been?—they each wanted some test of practical knowledge. If the examiner devote two hours to every candidate, in ninety-nine cases out of a hundred he would be able to pass an accurate judgment; but for that purpose they would require an enormous increase in the number of examiners, or the duties would be so heavy that no one would undertake them. The proposed alteration was asked for in the interest of the candidates themselves, in order that they might have ample opportunity to digest their knowledge, and so be better prepared to pass creditably. The great fault of the present system was, that many men got up their scientific knowledge too quickly, and while they came up thoroughly prepared in chemistry and botany, they often failed in a practical subject, because of some little technical matter which experience only could have made them familiar with. If such men had waited a little longer they would have passed with credit. Any man who was competent to pass under twenty-one should be infinitely more competent at that age; there could be no question of that. With regard to apprenticeship regulation, it must be remembered that the examiners were men who had taken some interest in the constitution of the Society; they had had something to do with the passing of the Pharmacy Act and with the old voluntary examinations which previously existed. They did not want to force on any bye-law, but simply, in accordance with the often-expressed wishes of the members, to make the examinations more practical. If Mr. Hampson were an examiner for twelve months he would find it much more difficult to discover the amount of a man's real knowledge than he supposed. Men might be, and he believed were, prepared for the examination who had never been in a chemist's shop at all. They wanted men having an honest, *bonâ fide*, practical knowledge of the various subjects. Believing they would assist in this direction, the examiners had proposed the new regulations, and he took it for granted that the Council consulted their solicitor and knew what they were about. Assuming that no breach of law was involved, he supported the bye-law, and was quite sure it would be beneficial both to candidates and employers, the latter of whom would in the course of time find they could obtain a better class of assistants.

Mr. ANDREWS (London) considered the new bye-law a wise one in every respect, and he had devoted a good deal of thought to the subject.

Mr. MELLIN said he should support the amendment. There were many young men apprenticed at fourteen or fifteen for three years, and if they could not pass their examination until they were twenty-one, they might be kept out of a situation for two or three years. Many were as well qualified at seventeen as others were at twenty-one; but he thought it quite right to insist on a three years' term of apprenticeship.

Mr. GILES said the greatest respect was due to the suggestions of the Board of Examiners and the decision of the Council, but at the same time it was a very fair subject for discussion, and Mr. Hampson was quite entitled to move his amendment. He did not attach much importance to the legal question; because, after all, they could do pretty much as they liked until they were disturbed, but he should put his vote in the hands of the Council; and if they felt they must ask for a vote in favour of the alteration, he should give it. At the same time there were objections. It was within their knowledge that there was a great difficulty in obtaining assistants able to pass the examinations, and they were considering how best to offer educational facilities to assist them; now this was raising up an artificial obstacle, it appeared to him, unnecessarily. A young man should, he thought, be allowed to pass when most convenient to himself; he was frequently controlled by circumstances, as to when he should come up to Bloomsbury Square and undergo a course of instruction, but when that was concluded he was best prepared to come up for his examination. He quite agreed that no young man ought to be allowed to conduct a business before he was twenty-one, but that was quite a distinct question, and the two ought to be separated. It would be much better to allow the examination to take place at any time, when most convenient, and introduce a clause restricting the age for opening a shop. What would be the use of this clause? What would it effect? In the majority of places which would confer this three years' qualification, a young man might never see a prescription from one year to another. Taking the chemists and druggists throughout the country, he did not believe the majority had a prescription once a month. He was very sorry for it, and always stood up for those members of the trade who were not doing the class of business they could wish, and he considered it a great mistake to set up a standard which would make it impossible to find men to fill useful and necessary positions. The object of the examinations was not to certify that the candidate was qualified to discharge all the duties which might devolve upon him, but that he was so far qualified that he was in a position to qualify himself. One of the most essential qualifications—good handwriting—did not appear to be considered at all.

Mr. CARTEIGHE said Mr. Giles could not have read the regulations.

Mr. GILES: If they did attend to handwriting, they failed most miserably in securing anything like a good standard; probably the standard was fixed rather low. Something must be left to the employer. The examiners did not certify that a candidate had two legs, but he should not like to have a man with a wooden leg in his shop. Still he could judge in that matter for himself. He repeated that he placed his vote at the disposition of the Council, remembering that even if this new rule were not found to work well, it could at any time be revoked.

Mr. COSSEY supported the amendment, and desired to endorse the sentiments expressed by the last speaker. A three years' apprenticeship would in no way ensure a qualification to dispense, whilst cases might occur, say of a person dying and having a son in the business not quite of age, in which a hard and fast rule would work great hardship. He thought some remarks which had been made as to the desirability of re-opening questions which had been fully discussed at the Council quite uncalled for, seeing that unless matters were to be considered at the General Meeting, it was a mere farce to bring them before it. No doubt the Council had done their best, but he could not consider it a mark of wisdom to go out of their way to propose prohibitory measures calculated to prevent young men entering the business.

Mr. WHEELER agreed with the remarks of Mr. Carteighe, and considered that an apprenticeship qualification was the only means of preventing the cramming system, under which a young man might pass an examination, though his practical knowledge might be almost *nil.*

The amendment was then put and lost, eight hands only being held up in its favour.

The original motion was thereupon put and carried.

Mr. URWICK proposed a vote of thanks to the President for his able conduct in the chair; desiring at the same time to express on behalf of the members generally what he knew was their feeling of gratitude for the long-continued and conscientious services rendered by Mr. Haselden to the Society. He was about to retire for a time from the Council, but he hoped before very long that he would resume the seat at the Board which he had so long and worthily filled.

The motion having been carried by acclamation,

The PRESIDENT said, I am very much obliged to you, Mr. Urwick, and to you, gentlemen, for the kindness you have shown towards me at all times. I have only one thing to add, that though I part with you as a Councillor, I do not leave you as a member of the Society.

This terminated the proceedings, which had lasted about five hours.

NORTH BRITISH BRANCH.

Dr. STATEMENT OF ACCOUNT FROM JANUARY 1ST TO DECEMBER 31ST, 1872. **Cr.**

	£	s.	d.
To Postage Stamps	7	10	3
,, Printing and Advertising	8	2	1
,, Rent of Rooms for Examinations, Meetings, etc.	12	8	6
,, Drugs, Specimens, etc.	3	6	6
,, Clerk and Curator of Library	8	0	0
,, Curator of Museum	5	0	0
,, Towels	0	13	4
,, Insurance	0	4	6
,, Petty Expenses	1	11	0
,, Storage of Museum and Library during Summer	2	10	0
,, Removing to New Rooms, St. Giles Street	4	11	9
,, Cost of Furnishing New Rooms in St. Giles Street	132	9	4
,, Balance	35	10	1
	£221	17	4

	£	s.	d
By Balance on 31st December, 1871	21	1	9
,, Cash from London	200	0	0
,, Interest on Money at Bankers to December 31st, 1872.	0	15	7
	£221	17	4

We, the undersigned, have examined the foregoing accounts, with relative vouchers, and find the same correct.

Signed { H. C. BAILDON.
WM. GILMOUR.
JAMES GARDNER.

EDINBURGH, *January 29th*, 1873.

ADJOURNED MEETING.

Friday, May 23, 1873.

MR. A. F. HASELDEN, F.L.S., IN THE CHAIR.

The Scrutineers brought up their report as follows :—

SCRUTINEERS' REPORT.

We, the undersigned Scrutineers, appointed at the Thirty-second Annual General Meeting of the Pharmaceutical Society of Great Britain, do hereby certify that we have examined the voting papers committed to us, and report the following :—

Voting Papers received	1067
Disallowed from informality	10
Votes registered	1057
Received by post too late 76 } Unsigned by Voters on envelopes 13 }	89

Hills	952	Radley	731
Sandford	934	Baynes	704
Mackay	927	Robbins	646
Bottle	908	Hampson	631
Savage	897		
Greenish	872	Baldock	502
Brown	865	Turner	476
Williams	838	Guyer	429
Atherton	836	Palmer	370
Betty	799	Wright	340

FREDERICK ANDREWS, *Chairman.*
JOHN LINFORD.
STANLEY FOWLER.
DAVID MORGAN.
JOHN MOSS.
WILLIAM GULLIVER.
J. M. HUCKLEBRIDGE.
GEORGE MEE.
THOMAS SHEPHEARD.

May 22nd, 1873.

The Chairman then declared the Council for the ensuing twelve months to consist of the following Members :—

COUNCIL.

ATHERTON, JOHN HENRY, Long Row, Nottingham.
BAYNES, JAMES, 24, Waterworks Street, Hull.
BETTY, SAMUEL C., 6, Park Street, Camden Town, N.W.
BOTTLE, ALEXANDER, 37, Townwall Street, Dover.
BROWN, WILLIAM SCOTT, 113, Market Street, Manchester.
FRAZER, DANIEL, 113, Buchanan Street, Glasgow.
GREENISH, THOMAS, 20, New Street, Dorset Square, N.W.
HAMPSON, ROBERT, 205, St. John Street Road, E.C.
HILLS, THOMAS HYDE, 338, Oxford Street, W.
MACKAY, JOHN, 119, George Street, Edinburgh.
OWEN, JOHN, 234, Upper Street, Islington, N.
RADLEY, WILLIAM VALENTINE, 74, Market Place, Sheffield.
ROBBINS, JOHN, 372, Oxford Street, W.
SANDFORD, GEORGE WEBB, 47, Piccadilly, W.
SAVAGE, WILLIAM DAWSON, 4, Park Road, East, Brighton.

SCHACHT, GEORGE FREDERICK, 7, Regent's Place, Clifton.
SHAW, JOHN, 24, Great George's Place, Liverpool.
STODDART, WILLIAM WALTER, 9, North Street, Bristol.
SUTTON, FRANCIS, Bank Plain, Norwich.
URWICK, WILLIAM WALKER, 60, St. George's Road.
WILLIAMS, JOHN, 14, Buckingham Street, W.C.

AUDITORS.

There being only the requisite number of Candidates (five) for the offices of Auditors, the Chairman declared the following duly elected for the ensuing twelve months :—

ANDREWS, FREDERICK, 23, Leinster Terrace, Hyde Park, W.
BARRON, FREDERICK, 2, Bush Lane, E.C.
HODGKINSON, WILLIAM, 127, Aldersgate Street, E.C.
HORNER, EDWARD, 20, Bucklersbury, E.C.
SQUIRE, WILLIAM, 5, Coleman Street, E.C.

The Scrutineers also handed to the President their report of the return for the election of Local Secretaries.

Votes of thanks were given to the Scrutineers and the Chairman, and the meeting separated.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL ASSOCIATION.

The usual monthly meeting of the above Society was held on Wednesday, May 7th ; Mr. W. Ward, F.C.S., President, in the chair, when, after some preliminary business, a lecture was delivered by Mr. G. A. Cubley, M.P.S., on "Pharmaceutical Arithmetic." The lecture, which was of a most interesting character, was listened to with great attention, and Mr. Cubley was frequently applauded during its delivery ; the obvious practicability of his remarks being appreciated by a numerous meeting of members and associates. During the course of his remarks the lecturer alluded to the necessity of a good knowledge of arithmetic required in pharmacy, and which becomes year by year more important. He then entered into an examination of the weights and measures of the Pharmacopœia, the old apothecaries' weight, and the metrical weights and measures ; these he illustrated with comparative tables. The proportions of active ingredients in the preparations of the Pharmacopœia as there given were next alluded to and their great use shown. The case of mucilage under the head of Acaciæ Gummi being, however, said by the lecturer to convey a wrong impression, as it is stated in the Pharmacopœia to contain 1 part gum in 2½ mucilage, which, though right as regards weight is wrong by measure, for mucilage being a fluid would according to the Pharmacopœia be measured not weighed. The method of calculating the measure of a fluid, its specific gravity and weight being known, was then given, and the necessity of calculating the quantity of excipient used in pill masses shown.

He then proceeded to the use of arithmetic in prescriptions, and proved its especial use in those now becoming so frequent where a single dose is prescribed, and then so many doses ordered. He brought forward several peculiar instances and gave the various calculations required. After illustrating the mode of converting Fahrenheit degrees of temperature into Centigrade, and showing various easy methods of converting the various weights and measures into one another, the lecturer concluded with an appeal to the students of the Society to apply diligently to their arithmetical studies, not only for their own sakes in relation to business, but because life frequently was at stake whilst they were calculating.

At the close a vote of thanks, moved by Mr. Dobb and seconded by Mr. Malcham, was unanimously accorded to Mr. Cubley, which brought the meeting to a close.

Parliamentary and Law Proceedings.

HEAVY SENTENCE UNDER THE ADULTERATION ACT.

On Saturday, May 17, Henry Howard, a milk dealer, carrying on business at 270, Euston Road, appeared before Mr. Mansfield to answer the complaint of the inspector appointed by the vestry of St. Pancras to enforce the Adulteration Act.

From evidence adduced it appeared that on the 3rd instant, the inspector went to the defendant's shop and asked for a pint of milk. The niece of the defendant served him, and he poured the milk into bottles, which were sealed in the presence of defendant, and afterwards given to Dr. Stephenson, the analyst, who found it was half water, and he gave a certificate to that effect, but stated that in his opinion it was not injurious to health. On the 16th instant Mr. Hartley again entered the shop of defendant and asked for a pint of milk, which was served by the defendant's wife, but he was standing by her side at the time. The milk was placed in a bottle, sealed, and given to the analyst, who found that the milk was adulterated to the extent of one-fourth of water.

The defendant, in answer to the charge, said the inspector did not ask for pure milk, if he had done so he could have had it.

As this was the first prosecution by the parish the full penalty was not asked for.

Mr. Mansfield said he should not inflict the full penalty, but he hoped the vestry would proceed against every person offending against the Act. The defendant would have to pay a fine of £10 for the first case, £5 for the second, and 25*s.* costs.

The money was at once paid.—*Standard.*

ROBBERY OF DRUGS.

Frederick Tucker, who had been in the employ of Messrs. Herring and Co., manufacturing druggists, Aldersgate Street, for over twenty-one years, and had held the position of manager of the tincture department, and John Holland, a general dealer, living in Spitalfields Market, were charged on remand at the Guildhall Police Court, on Thursday, May 15, before Sir Benjamin Phillips and Alderman Owden, with stealing half a pint of essence of ginger, belonging to the prosecutors.

Mr. Humphreys (of the firm of Humphreys and Morgan) prosecuted on behalf of the Wholesale Chemists and Druggists' Protection Society ; and Mr. Buchanan appeared for the prisoners.

It appeared that Messrs. Herring found they were being robbed, but could not tell how, or by whom, so they employed the detectives to find out ; and Frederick Charles Brett saw Tucker leave his employers' premises, and go into a public-house in Jewin Street, where he met Holland, and gave him a bottle of essence of ginger. They had some gin together, and then parted. Brett stopped Holland in Bishopsgate Street, and questioned him as to what he had got about him, when he produced the bottle, and said that it was his medicine. He afterwards apprehended Tucker, when he admitted that he had given the other prisoner essence of ginger for his asthma. At his house several bottles were found, some of which were empty, and others contained chemicals such as Messrs. Herring manufactured.

The prisoners, by the advice of their solicitor, pleaded guilty, so that the magistrates might deal with them summarily, and that course was acquiesced in by the prosecution.

Sir Benjamin Phillips, having consulted Alderman Owden, sentenced them each to four months' imprisonment with hard labour.—*Evening Standard.*

Correspondence.

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

The Shop Hours' Regulation Bill.

Sir,—I was greatly surprised at reading an article in this month's number of the *Chemist and Druggist*, commenting very strongly on the provisions of the above Bill; and as a reply to that journal would not appear for another month, will you kindly allow me space for the purpose?

In the first place, I cannot see how compelling chemists and druggists to close their shops at 2 P.M. for one day in the week would be "seriously affecting them," for at the present time in several towns the shops are closed early one night in the week, so it would only be adding a few more hours; besides, any chemist would be at liberty to supply medicines himself after closing time, or to keep a qualified assistant for the purpose. Now that the examinations are to be made more severe than ever, which of course will necessitate very close application to study, what could be more refreshing to the student than an afternoon's trip into the country, where he might study botany from real plants, and thus learn more in one afternoon than he could by a week's reading at home? As to closing at 9 other evenings, that certainly would not be "seriously affecting them," as 8 is the general hour now in most country towns, and even in London some of the principal chemists have agreed to close at 9 (as lately reported in this Journal); and as I said before, medicines urgently required could be supplied by qualified persons at any time. I hope the exigencies of our trade (or profession!) will never compel us to keep open shop on Christmas Day and Good Friday, when every other tradesman is holding holiday! If this Bill is made law, the public, of course, will soon become aware of it, and consequently come earlier for their goods. I am sure if any one tradesman would be more benefitted by it than another it would be the chemist, who has hitherto been working the longest hours of any. I think Sir J. Lubbock has taken a step in the right direction, and I trust he will not be influenced by petty representations. In conclusion, let me urge on all assistants and apprentices the necessity of prompt and united action in preventing this desirable privilege being taken from us. I hope the subject will soon be taken up by abler hands than mine.

Audi Alteram Partem.

May 17th, 1873.

Pharmacy Act, 1868.

Sir,—I quite agree with "Registered Chemist" that the system of wholesale firms supplying small grocers and costermongers with drugs, etc., should be investigated. For several miles around my shop, you can purchase from the above class of dealers a penny powder, box of pills, ointment, or paregoric, etc. The above are put up and sold by persons called wholesale druggists or manufacturers of pharmaceutical preparations. It is time such a practice was put a stop to,—but how are we to do it? I think by refusing to do business with such firms as are known to supply drugs to the above-mentioned dealers.

Boz.

Proposed Addition to the British Pharmacopœia.

Sir,—The pulv. glycyrrhizæ co. of the Ph. Borus., to which attention was directed by an article in *The Practitioner* about a year ago, has been found in many cases an excellent aperient.

When prepared with 2 oz. of ginger instead of 3 oz. of fennel, as ordered, I find that patients do not complain of the taste so much, and the medical man to whom I suggested this slight alteration finds it an improvement, and frequently orders the pulv. glycyrrhizæ co. prepared with ginger.

George Brown.

Sandown, I. W., May 12th, 1873.

An Inquiry.

Sir,—A public confession of ignorance, if not exactly conducive to a feeling of self-respect, is sometimes a necessary preliminary to the acquirement of knowledge; such—having completely failed to obtain the information I seek in the circle of my acquaintance—I fear it is in my case. This is my difficulty: I am familiar with analytical chemists, dispensing chemists, manufacturing chemists, but I don't know what a *consulting chemist* is; yet such is the title a gentleman who has recently opened what an auctioneer would describe as "commanding premises," not a thousand miles from Broad Street, has conferred on himself in letters of no common magnitude. Can you or any of your readers enlighten

An Ignoramus?

Pharmaceutical Curiosities.

Sir,—Mr. J. Bower Williams, A.P.S., has the honour to occupy a quarter-page of the Journal of the 3rd May, 1873. Such an advantage brings responsibility. He fulfils his by holding up to view,—

1st. A small exhibition of *popular* ignorance; and

2nd. A specimen of *trade* ignorance which may be taken as not the worst to be found, although such instances cannot possibly be numerous. *En parenthèse*, the remedy is already provided, for henceforth "vested rights" can only be possessed by the initiated.

But in reference to No. 1, I would say it is always possible for a teacher to expose the ignorance of his pupils. Chemists are teachers, and the general public are their pupils. For this reason many of the now absurd names for drugs are historical; *e. g.*, oil of Exeter, oil of swallows, and oil of earthworms, which are legitimate names of things formerly dispensed to the public as medicaments of value. The *things* are obsolete, but the *names* are not totally forgotten. Names of another class are equally absurd: take, for instance, the series of "copperas." The public retain the use of the terms, but the chemist, being a little in advance of his pupils, calls them sulphates according to their kind. It is probable that, for some time to come, the chemist will be asked for things under obsolete and corrupted names, and he will still continue to teach his pupils a more correct nomenclature, for he is in that department the only true pioneer.

I am happy to see that Mr. Williams is going "to send you some more ere long." Might I suggest his line to be—A research into the history of curious and old-fashioned names of medicaments, and their corruptions? I have no doubt many would feel pleasure in aiding in that pursuit, and in doing so, many a quaint old book might turn up to daylight again.

I will just add a specimen which will serve to indicate the occasion to be informed of the meaning of old terms, and then conclude.

Bolus ad Diarrhœam.

℞ Cons. rosar. r. semidrachm.
Terr. japonic.
Coral. rub. pp. vel occ. cancr. pp. ana gr. xij.
Croc. martis astring. gr. vj.
Syr. e mecon. q. s. f. bolus.

L.

Mr. Lawrence.—We are unable to insert your inquiry except as an advertisement.

E. K. (*Chemicus*).—Essence of patchouli is obtained by distillation from the *Pogostemon Patchouli*, Pell., a plant of the Labiate order.

T. Dibbs.—(1) Angus's 'Handbook of the English Tongue;' Mason's 'English Grammar.' (2) Newth and Wormell. (3) Roscoe and Barff.

"*Inquirer.*"—(1) Decomposition, rather than solution, would take place. (2) We believe that no further knowledge of chemical processes is required to pass the Minor examination than may be obtained in a pharmacy where the pharmacopœia preparations are made for home use. (3) No. (4) The expense need not be great. See a list in the Appendix to Attfield's 'Manual of Chemistry.'

Communications, Letters, etc., have been received from Messrs. R. G. Mumbray, A. Patterson, J. J. Smith, M. H. Arundell, J. Askew, W. H. Griffiths, Buckler, J. Hallawell, J. Abraham, C. R. Blackett (Melbourne), W. Axford, "Country Chemist," "A Student," "Hypo," G. W.

THE COLOUR OF CANTHARIDES.

BY HENRY POCKLINGTON.

The colours and colouring matter of the thorax, head, and other portions of cantharides that bear the metallic green lustre so characteristic of these insects, agree so closely in origin and kind with those that formed the subject of my last paper* that it will be convenient to discuss the colouring matters without reference to any particular portion of the insect. As with the wing cases the colours of the thorax, etc., are in large part due to interference and in part to fluorescence. The persistent green colour referred to in my previous paper has been the subject of the later investigation of which I now propose to give the results.

Many readers of my former article have expressed their regret that it did not include any account of the mode of working followed in these inquiries, and have also intimated a desire that a more graphic method of charting the spectra should be followed in the paper, that non-spectroscopists may be able to follow the description better; I will endeavour as briefly as possible to meet their wishes in both respects.

As stated in my former paper, the instruments of which I make use, are a Sorby Browning micro-spectroscope, a small direct vision spectroscope adapted for use with the microscope, and capable of showing two spectra at once, and side by side to permit comparison; and a stand-spectroscope of moderate dispersion, giving a much longer spectrum than the micro-spectroscope, and working, on this account partly, rather better when bands occur in the blue or extreme green. A very simple and inexpensive arrangement will enable any of my readers to see absorption bands, and thus enable such of them as are not acquainted with the subject to understand what sort of things they are. Having closed the shutters of a room looking south, make a narrow slit in the shutter and place before it a small prism (the triangular pendant of a chandelier will do if nothing better be at hand, or failing this, three pieces of glass may be fastened into a cork so as to form a triangular bottle, and this, filled with water, or carbon bisulphide, will make a very good make-shift prism) with its thin edge at right angles to the length of the slit, and pointing downwards. A more or less pure spectrum will be projected on the opposite wall, or may be allowed to fall upon a white paper screen. If a bottle filled with dilute solution of the permanganate of potash be placed outside the slit so that the sunlight passes through the bottle, then through the slit and prism, the spectrum will be seen to be no longer "continuous," that is, the various "prismatic" colours will be no longer uniformly shaded the one into the other from red to violet, but there will be seen four (or five if the arrangements be very good) black bands crossing the spectrum, and the violet will be entirely missing. These are absorption bands, the spectrum being "discontinuous," with general absorption of the violet. These bands are, of course, due to the absence of certain colours that are absorbed by the solution in the bottle, and the rays of light that our senses translate into the colours being missing when the sunlight (or lamp-light) falls upon the prism, the prism simply disperses those that are present into their proper places in the spectrum, and leaves the other places blank, and the absence of light meaning darkness (that is, blackness) we have a spectrum of such colours as the incident light was composed of, crossed by black band spaces due to the absence of such colours as the incident light had been deprived of. That they are bands is due to the fact that the prism paints an infinite number of images of the slit, each image being of one colour, and when all colours are present, so exactly side by side that the most cunning eye cannot discern the piecing, any absent colours being represented by black portraits of the slit, their number side by side determining the width of the absorption band.

The production of the spectrum is due to the different amount of refraction that each constituent colour of white light suffers in passing through the prism, and this is connected with the wave-length of the rays in question, the short waves being most retarded in passing through the prism, and therefore the most refracted, and the long or red waves (those that vibrate least rapidly) the least retarded; thus each wave of the infinite number that composes the spectrum is differently affected by the prism. Out of this law arises the wonderful modern method of scientific inquiry known as spectrum analysis. The subject is one much too large for discussion here, and has only been introduced to this extent to clear the atmosphere of a misapprehension induced by an error in Mr. Stoddart's interesting paper on "Spectral Analysis adapted to Pharmacy," in this Journal for September, 1869, in which Mr. Stoddart, by a remarkable slip of the pen, refers the prismatic dispersion to this cause, that, "the red rays of the spectrum vibrate so weakly that they can only penetrate the thin edge of the prism. Those of greater intensity are capable of penetrating the thicker portions of the glass, and are thereby refracted at a greater angle."*

To meet the other desideratum I have charted the spectrum of the cantharides previously described in addition to the spectra of the new ones.

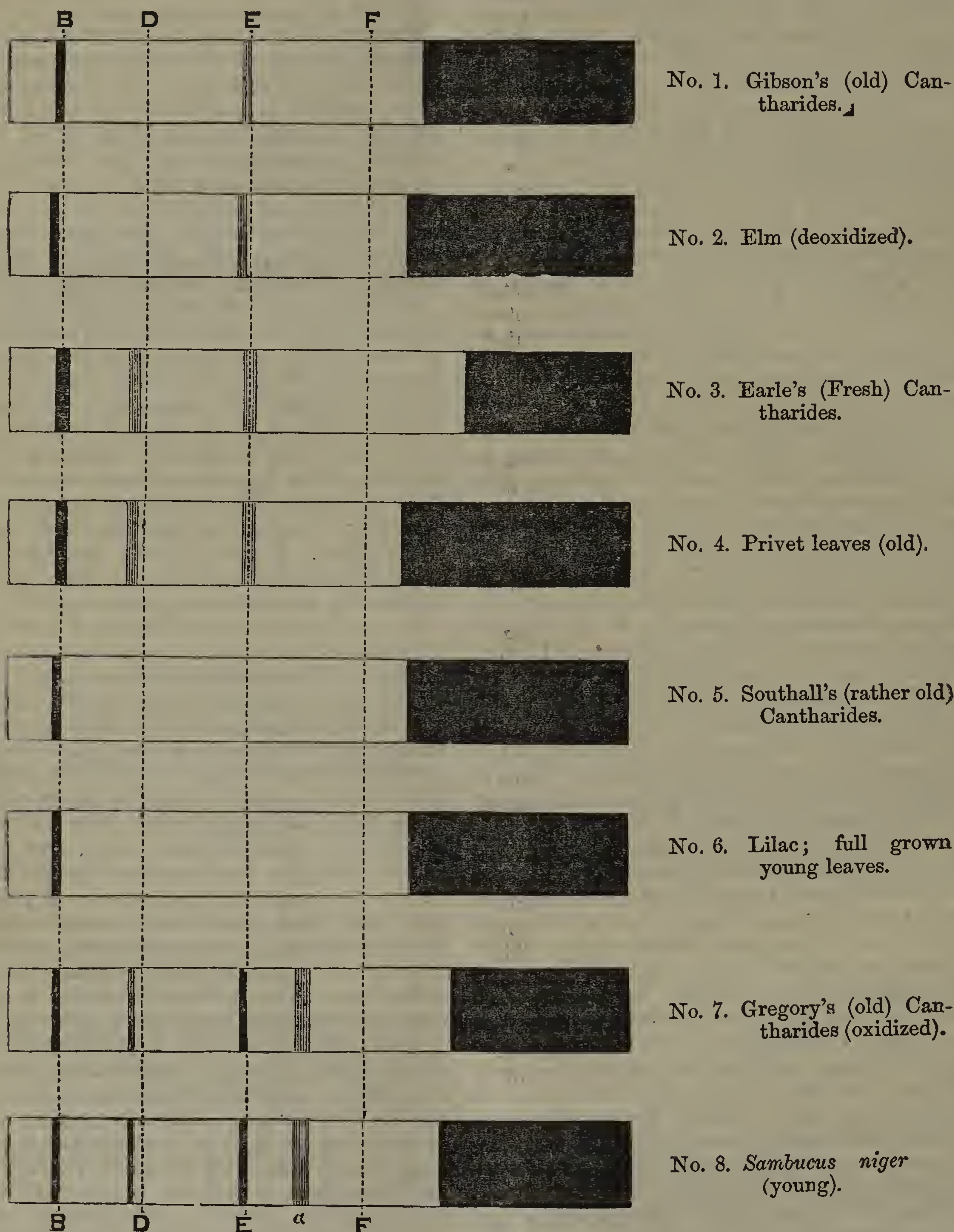
The green portions of the insects were carefully pulverized and macerated in cold ether, alcohol, and bisulphide of carbon for forty-eight hours. The solution was poured off and examined in a narrow test-tube placed before the slit of the instrument. In the other field was placed the interference spectrum, crossed by its twelve black bands, and the position of the absorption bands read off against these. If it be desired to chart them, a piece of paper may be ruled with faint pencil lines to correspond with the bands of the interference spectrum, and the absorption bands easily and exactly drawn to correspond with them. This mode of charting is exceedingly easy and permits of the greatest accuracy. If thought desirable, the position of Fraunhofer's lines may be compared with the interference bands and drawn on the chart to facilitate comparison by those who have not the Sorby plate. Before beginning work, and at frequent intervals, it is desirable to calibrate the instrument by comparing the sodium yellow bright line spectrum (there is only one bright "D" line in these small spectra) with the interference spectrum, to make sure that the two spectra lie truly side by side, otherwise the spectra will be inaccurately charted. The spectrum given by the simple solution of the colouring matter having been carefully charted, the

* PHARMACEUTICAL JOURNAL, 3rd Ser., Vol. III. p. 681.

* A moment's reflection, of course, leads one to see the fallacy of this. The sun shines as white light through the thickest plate-glass window equally with the thinnest of crown. Those who desire to pursue the subject may refer to Ganot's 'Physics' or Deschanel's 'Natural Philosophy.'

effect of certain reagents is tried, and if any effect upon the spectrum is produced, the spectrum is charted as before.

Thus, the normal spectrum of a certain specimen of cantharides is that charted in No. 3. The addition of hydrochloric acid removes the band from the orange and lowers the absorption of the violet. Protosulphate of iron restores the violet absorption but does not restore the band. The alcohol solution of twenty-eight hours' maceration does not give the band in the orange, but in forty-eight hours more this band is visible. If metallic sodium be added to the ethereal solution as in No. 3, and water added when the violent action of the metal has ceased, the water carries down all the colouring matter, but yields it again on the addition of any oxidizing agent. Caustic potash added to the alcoholic solution removes the band by continuing the absorption to the red end (that is, the



absorption of the extreme red is general), and intensifies the absorption of the violet. After having carefully examined the solutions, in this and many other methods giving more or less negative results, my attention was turned to the chlorophylls of the various plants on which the insects were likely to have fed, with a view to ascertaining the absolute identity of the chlorophyll of the plants with the chlorophyll-like green substance of the cantharides. This was a more difficult matter than would at first appear, because newly gathered and young leaves, such as one would gather now, give a very different spectrum from that of old leaves, especially if these latter be kept long and become thoroughly dried.

There is, for example, one notable reaction of young leaves which has not, so far as I know, been published. It is this: If an ethereal solution of the chlorophyll of, say, a young lilac leaf be acted upon by sodium or potassium in small quantities, and water added when the action of the metal has nearly subsided, the water will carry down a substance canary-amber by transmitted light and roseate-hued amber by reflected light, insoluble in ether but soluble in water, and giving only general absorption of the blue and violet, with enfeeblement of the green and extreme red, and a small quantity of a rose-coloured fluid, partially soluble in water and soluble in alcohol.

But with care it is possible to ascertain what are the probable changes that the colouring-matter of the cantharides will have undergone by taking note of the age of the specimen and its condition, and we may then submit the chlorophyll to similar conditions. Such has been the course followed in my investigation, and the charts illustrating this paper will show that the result is, that there is little room for doubt that the green colouring-matter of cantharides is chlorophyll, and derived from the food on which the insects feed. This is confirmed by the fact, that whilst the wing-cases contain only small quantities of it, the thorax and contents of the stomach contain considerable quantities, and that the latter contain also a substance soluble in water, which gives a spectrum in all cases similar to that given by a product of the chlorophyll that agrees with the green colouring-matter of the particular insect.

I have extended the inquiry to specimens of insects procured from different quarters, and, as will be seen from the spectra, they evidently have been gathered from off different feeding-grounds; and although the creatures may have been dead (like one of my specimens) these ten years, yet it is possible to tell off what plant they had lately dined.

Spectrum No. 1 is that described in my last paper, and is the one given by the ethereal solution. The cantharides were old and full of mites, having been kept as specimens by my friend Mr. C. P. Gibson, on account of their large size. Their spectrum does not quite agree with the normal spectrum of any leaf likely to be involved, but does agree with a deoxidized solution of the chlorophyll of young elm leaves; and the behaviour of the two solutions under the action of the different reagents runs very closely on all fours. No. 2 represents the elm-leaf spectrum. No. 3 is the normal spectrum of an ethereal solution made from some very fine and fresh specimens kindly given me by my friend Mr. Francis Earle. These cantharides give a band in the yellow and less absorption of the violet. The spectrum is precisely similar to that of old privet leaves allowed to macerate forty-eight hours in cold ether. In six hours each solution gives a single band in the red, and the alcoholic solutions equally agree.

If the alcoholic solutions be treated with liquor potassæ and agitated with carbon disulphide, the upper stratum of each is yellow amber and fluorescent. The ethereal solutions treated with sodium or liquor potassæ and water also agree, and each gives a spectrum agreeing with the aqueous solution of the stomach contents. The privet spectrum is shown in No. 4.

No. 5 represents the spectrum given by some small flies obtained from one of Messrs. Southall and Dymond's specimen materia medica chests, by the kindness of a medical friend. The spectrum is exceedingly simple, and agrees with that given by the chlorophyll of full grown young lilac leaves.

No. 7 is from the solution of some cantharides obtained in Hull. They were old, but in good preservation, and fine flies. The spectrum runs on all fours with that of elder leaves. The spectra given are from the ethereal solutions of the cantharides, allowed to remain in contact with chlorate of potash for some hours. The effect of this reagent is to partially remove the absorption from the violet end of the spectrum, leaving a broad feeble band in the blue, and is due to slow oxidation, and may be much more rapidly produced by passing nascent oxygen through the solution. The elder spectrum is from young leaves, and is the normal spectrum.

Other specimens of cantharides examined have fallen under one or other of these now described. I have probably said enough to show that the spectroscope does enable us to tell with tolerable certainty from what feeding-grounds the creatures were gathered and the source of a part of their colour.

NOTES ON THE MEDICINAL PLANTS OF THE RUTACEÆ.

BY JOHN R. JACKSON, A.L.S.,

Curator of the Museums, Kew.

The Natural Order *Rutaceæ*, as at present constituted—that is, including as tribes such groups as *Zanthoxyleæ* and *Aurantieæ*, which by former botanists have been dignified as Natural Orders—includes a great number of medicinal and economic plants; for besides such well-known articles as rue, buchu or barosma leaves, and cusparia bark, many others of less repute are brought together. We purpose to refer to those which, though being used by the natives of the countries in which they grow, are seldom seen except in museum collections in this country, and some not even there. In the tribe *Cusparieæ*, besides the genus *Galipea*, which is, of course, well-known as the source of cusparia bark, occurs *Ticorea*, two species of which are medicinal in Brazil. *T. febrifuga*, St. Hil., a tree of about twenty feet, has a very bitter and astringent bark, and is used as a substitute for cinchona in intermittent fevers. In the province of Minas Geraes it is known as *Quina* or *Folhas brancas*. The leaves of *T. jasminiflora*, St. Hil., also a tree about twenty feet high, growing in the same country, are boiled by the natives for the sake of the juice, which they value as a medicine. *Peganum Harmala*, L., is a powerfully disagreeable-smelling herbaceous plant, common in Southern Europe, Asia Minor, and throughout Scinde and the Punjaub. In Turkey the seeds are used as a vermifuge, and in the Crimea the Tartars collect them for the same purpose. In the Pharmacopœia of India it is stated that "these seeds have long held a place in Eastern materia medica as a stimulant, emmenagogue, and anthelmintic. Mild narcotic properties have also been assigned to them, and, according to Kæmpfer, delirium characterized by cheerfulness follows their use in some cases. Further investigations as to the properties of these seeds are desirable."

The European dittany (*Dictamnus albus*, L.), a plant sometimes cultivated in gardens for the sake of its handsome flowers and fragrant leaves, is well known for the abundance of volatile oil or resinous matter, which is secreted in such large quantities that the plant not only ignites on the approach of a lighted candle, but the air surrounding the plant becomes itself inflammable in hot weather. The root is resinous, bitter, tonic, and stimulating. *Monnieria* *trifolia*, L., a shrubby plant of Guiana and Brazil, has an aromatic and acrid root, much prized by the natives as a diaphoretic, diuretic, and alexipharmic. The leaves of species of *Adenandra*, a South African genus of plants, having the habit of the common rue, are used at the Cape for the same purposes as those of *Diosma*, while in Australia the leaves of some of the species of *Correa* are used as tea. They are handsome, shrubby plants, and are in cultivation in greenhouses in this country.

The genus *Zanthoxylum*, the type of the tribe *Zanthoxyleæ*, has a wide geographical range, and a variety of applications. In India the fruits of *Z. alatum*, Roxb., *Z. hastile*, Wall., and *Z. Budrunga*, DC., are all articles of the native materia medica. They are aromatic and pungent, and are said to possess stomachic and carminative properties. *Z. Rhetsa*, DC., a large spreading tree, growing on the mountainous parts of the East Indian coast, has its unripe capsules and small berries of a gratefully aromatic taste, somewhat like the skin of a fresh orange, the ripe seeds have a pungency somewhat like pepper, and the inner bark has an acid bitter taste. The name *Rhetsa* is said to signify in the Telinga language a committee, and alludes to the fact, that under the shade of this tree the hill people assemble to deliver discourses and to consider and discuss matters of public concern. In China the root of *Z. nitidum*, DC., is aromatic, and is used as a sudorific, emmenagogue, and febrifuge, the leaves also are used as a condiment on account of the volatile oil they contain. The fruits of *Z. piperitum*, DC., are known as Japan pepper, they are of an agreeable aromatic flavour. In the West Indies the barks of *Z. ternata*, Desv., and *Z. Clava-Herculis*, L., are regarded as antisyphilitic, and the bitter astringent leaves are used as a vulnerary. *Z. fraxineum*, Willd., is known in America as the prickly ash or toothache bush, from its reputation as a masticatory in curing toothache. The bark is officinal in the United States, and as seen in the shops is in small quills varying from a line or two to about an inch in diameter. It is of a darkish grey colour with occasional lighter patches and covered with fine transverse cracks, and in the younger pieces the prickles are sometimes remaining. It is light, brittle, and has at first a somewhat sweetish aromatic taste, which changes to a bitter acrid flavour; this acridity is extracted either by boiling water or alcohol. The bark is stimulating, producing a sense of heat in the stomach. It is also said to be a "powerful sudorific and diaphoretic, and to have been used successfully in paralysis of the muscles of the mouth." In chronic rheumatism it is very highly extolled, and is given in the form of a powder, a dose being from ten grains to half a drachm repeated three or four times a day. A fluid extract has likewise been prepared and administered in doses of from fifteen to forty-five drops. A favourite form of administration, however, is a decoction prepared by boiling an ounce of the bark in three pints of water until it is reduced to a quart, a pint of which should be taken in divided doses during the twenty-four hours. A tincture made from the berries is sometimes employed as a carminative in doses of ten to thirty drops, which can be increased if the stimulating effects are desired.

In New South Wales, *Geijera salicifolia*, Schott, a moderate-sized tree, is known as the "Balsam Capivi Tree," from the strong flavour of that balsam which pervades the bark. I am not aware whether or not it is used in medicine, but a good ink is said to be prepared from the bark. *Esenbeckia febrifuga*, Mart., or *Evodia febrifuga*, St. Hil., a native of the forests of Brazil, is remarkable for its extremely bitter bark, which is used as a tonic and febrifuge; while *Toddalia aculeata*, Pers., a moderate-sized shrub, widely dispersed through Tropical Asia, has considerable reputation as a stomachic and febrifuge, all parts of the plant being used. In India the bark of the root is officinal, and is used as an aromatic tonic and stimulant "in constitutional debility and in convalescence after febrile and other exhausting diseases." It is given in the forms both of tincture and infusion. The following notes on the value of *Toddalia* root-bark are from the 'Appendix to the Indian Pharmacopœia:'—"Strong testimony to the value of *Toddalia* root is borne by Dr. G. Bidie, who states that though he has not employed it as a febrifuge, he can speak with confidence as to its great value as a stimulant and tonic. Every part of the plant, he remarks, has a pungent, bitter taste and a pleasant aroma, but these qualities are most marked in the root. The dried root-bark is of a yellowish-brown colour, and retains its pungency and bitterness for a long time. The whole plant possesses active stimulant, carminative, and tonic properties; and he adds that he knows of no single remedy in which all these three qualities are so happily combined. This article possesses additional interest from having been identified by M. Guibourt with *Lopez root*, which formerly enjoyed considerable repute in Europe as a remedy for diarrhœa. Mr. Daniel Hanbury, from examination of genuine specimens of the root, confirms M. Guibourt's views." The natives also prepare a liniment by frying the root and green fruits in oil, which they consider good for rheumatism. The fresh leaves are likewise eaten raw in stomach complaints, and the ripe pungent berries make capital pickles. The bark, root, and leaves of *Murraya Königii*, L., a small East Indian tree, are used in native practice as a tonic and stomachic: the young leaves of this species, as well as those of *M. exotica*, L., are used to flavour curries. In Mauritius the latter are said to impart a flavour superior to that of bay-leaf, while in India they further have the reputation of aiding digestion.

The wood-apple tree, or elephant apple of India, *Feronia elephantum*, is the only species of the genus, and is common in India, Ceylon, and Java. The fruit is hard and woody, globose, about the size of a large orange; the pulp is used in India in cases of dysentery and diarrhœa. The leaves smell like anise, and are used in native medicine as a stomachic and carminative. A decoction of the unripe fruit is said to act as a powerful astringent, and the ripe fruit as an antiscorbutic. A gummy substance flows from the stem when wounded, which is used by painters for mixing with colours, also in dyeing and for making ink and varnish, as well as by bricklayers in preparing a fine kind of whitewash. This gum occurs in irregular, reddish-brown, semi-transparent tears; powdered and mixed with honey, it is used in dysentery and diarrhœa. The Bael fruit (*Ægle Marmelos*, Corr.) has been brought into notice in this country recently; it is imported in slices, dried, or in quarters or pieces with the rind still attached. The entire fruit is round, somewhat resembling a large orange. It is officinal in both the British and Indian Pharmacopœias, and is used in India "in atonic diarrhœa and dysentery; and in the advanced stages of those diseases, in irregularity of the bowels, and in habitual constipation, it is a remedy of much value." It is administered in the forms of a mixture and an extract: those prepared from the dried fruit, as seen in this country, are said to possess much less medicinal power than those prepared in India from fresh fruit. It will be needless to recapitulate all that has been said and written on the medicinal value of this fruit, as they will be fresh in the minds of the readers of the Journal, many of whom have likewise probably tested the article itself.

In concluding these notes it only remains to mention two or three plants, the properties of which are little known, but which are nevertheless reputed to be useful in their native countries; thus, for instance, *Hortia brasiliana*, Vand., is said to possess febrifugal properties and to be used in Brazil. The leaves and shoots of *Ptelea trifoliata*, L., a North American shrub, are used in infusion as an anthelmintic, and the aromatic fruits are said to be a good substitute for hops. *Casimiroa edulis*, a tree of Mexico, has a bitter bark, which, together with the leaves and seeds, are used as a medicine when burnt and reduced to a powder.

TOXIC EFFECTS OF TETRAMETHYLAMMONIUM AND OF TETRAMYLAMMONIUM.*

BY M. RABUTEAU.

In the course of some uncompleted researches upon the amines, or compound ammonias, the author made the following observations, which he deemed of sufficient importance to lay before the French Academy at once. Whilst the most diverse salts of the primary, secondary, and tertiary amines, from the methylamines to amiline and the phenylamines, are comparable in their physiological effects to other ammoniacal compounds, and would be, according to the author's experiments, muscular poisons in large doses, the salts in which all the hydrogen of the ammonium is replaced by alcohol radicals, such as the iodides of tetramethylammonium and tetramylammonium, appear to be poisons of the nerves of movement, completely analogous in their effects to those of curara. The following are the experiments upon which he bases his proposition :—

Iodide of Tetramethylammonium.—After having injected into the veins of a dog two grams of hydrochlorate of trimethylamine (chloride of trimethylammonium) dissolved in forty grams of water, without observing any other effect than a slight slackening of the circulation and lowering of the animal temperature, it was intended to inject into another dog the same quantity of iodide of tetramethylammonium. (This salt is but slightly soluble in water, which takes up scarcely one-twentieth of its weight at ordinary temperatures.) Scarcely, however, had one-fourth of the quantity entered the circulation, when the animal was greatly affected; the respiratory movements ceased nearly immediately. The heart, which was accelerated at first, afterwards slackened, not beating more than once in five or six seconds, till it stopped completely at the end of four or five minutes; consequently, some time after all respiratory movement had ceased and the animal had been reduced to an inert mass. It proved, therefore, to be a substance infinitely more active than the primary, secondary, or tertiary amines, which operated rather by paralysing the motor nerves than by paralysing, as do these latter salts, the muscular system, since the heart did not stop till after the suspension of the respiration.

Twenty-five centigrams of iodide of tetramethylammonium were injected with a Pravaz syringe in five places under the skin of the chest of a large dog. Immediately afterwards the cardiac beats were accelerated, salivation took place, the pupils were enormously dilated, respiration became difficult and painful. A thermometer which, introduced into the rectum, previously marked 39·2° C., rose quickly to 39·4° C. The animal was unbound, but could not move itself; it made vain attempts to drag along the ground; the posterior members were affected more than the anterior; it retained its intelligence, and was sensible to prickings of the parts least affected. The animal recovered at the end of about half an hour, from which it would appear the poison is quickly eliminated.

The symptoms were exactly similar to those produced by curara. These experiments were supplemented by others on frogs, which are described by the author, and which confirmed his opinion as to iodide of tetramethylammonium being an energetic poison, paralysing the extremities of the motor nerves, but not affecting sensibility or muscular contractility.

Iodide of Tetramylammonium.—This compound, which is pretty soluble in boiling water, is nearly insoluble in cold; so that it is necessary to inject into frogs at least twenty drops of a saturated aqueous solution at ordinary temperature, to cause death, which follows much more slowly than under the influence of but three or four drops of a saturated solution of tetramethylammonium at the same temperature. The symptoms observed were of the same order as those previously noticed, showing that the amylic compound is a poison of the same nature as the methylic compound. So that the salts of tetramylammonium and of tetramethylammonium, such as their iodides,—

$$\left.\begin{matrix}CH_3\\CH_3\\CH_3\\CH_3\end{matrix}\right\}NI \quad \text{and} \quad \left.\begin{matrix}C_5H_{11}\\C_5H_{11}\\C_5H_{11}\\C_5H_{11}\end{matrix}\right\}NI$$

are active poisons, whilst the hydrochlorate of trimethylamine—

$$\left.\begin{matrix}CH_3\\CH_3\\CH_3\\H\end{matrix}\right\}NCl$$

is not. The most striking point in these results is that the substitution of CH_3 for all the hydrogen of ammonium transforms a slightly active compound into an extremely poisonous one, operating similarly to curara. However, it should be remembered that the compounds obtained by treating the alkaloids with the hydriodic ethers produce analogous effects; thus iodide of methylstrychnium acts by paralysing the motor nerves.

Such are the results of the author's first researches, and if, as he thinks probable, the salts of tetramethylammonium, tetrapropylammonium, tetrabutylammonium, and those which correspond to the other alcohols, produce similar effects, he will have pointed out a new and very numerous group of curaric poisons.

* 'Comptes Rendus,' vol. lxxvi. p. 887.

THE COMPARATIVE THERAPEUTICAL VALUE OF SALTS OF PROTOXIDE AND SESQUIOXIDE OF IRON, AND ON A NEW SERIES OF TASTELESS IRON COMBINATIONS.*

BY J. L. A. CREUSE.

It is not my intention here to treat on the medical properties and uses of ferruginous compounds as a class; this has been done before me by more competent persons. My purpose is only to discuss the relative physiological and

* Read at the second annual meeting and published in the annual report of the Alumni Association of the College of Pharmacy of the city of New York.—*Amer. Journ. Pharm.*

chemical properties of the various iron combinations and describe a new series of tasteless ferruginous compounds.

Iron has been used in medicine, it may be said, from time immemorial. Metallic iron, green copperas, iron rust, carbonate of iron, bole armenia, etc., are mentioned in the oldest authors on medicine and pharmacy. It seems also that in former times little importance was attached to the peculiar form in which iron was administered. Some fifty or sixty years ago, however, a decided preference began to be shown for metallic iron, finely comminuted, and for the protosalts of iron. It was thought, then, that the easy solubility of those preparations in the stomach was a great advantage, and that theory gave rise to a number of officinal remedies like iron by hydrogen, Vallet's mass, protoiodide of iron, etc., etc., well known to all pharmacists.

But of late years, especially since the discovery of the citro-ammonical pyrophosphate of iron, by Robiquet, my old master, salts of sesquioxide of iron have been steadily growing into favour. It has been argued, with reason, that, since iron in human economy is invariably found in the shape of sesquisalts, such compounds should be preferred to all others whenever iron is indicated. I may add, also, that it is always in the form of sesquisalts that iron exists in all vegetable and animal substances which compose human food, and that metallic iron or its protosalts cannot be mixed with the simplest aliments without completely decomposing them. Protoxide of iron is as unyielding as it is unstable: when you have combined it with strong acids you can go no further with its salts: you can do nothing with them, not even an alum. Sesquioxide of iron, on the contrary, is a perfect Proteus; sometimes a base, sometimes an acid, it is always ready to enter some combination or other on the slightest provocation.

In a paper published some time ago I demonstrated that nearly all the insoluble sesquisalts of iron could be combined with the alkaline citrates, forming soluble and tasteless compounds, to which I gave the name of quadruple citrates.

Since then, further experiments have shown me that other vegetable salts, besides the citrates, possessed also the same property, and that not only the insoluble but also the soluble sesquisalts of iron could form similar combinations.

In other words, I may lay down this rule:—*All the salts of sesquioxide of iron, without exception, soluble or insoluble, form combinations with all the alkaline citrates, tartrates, and oxalates.* Such combinations are invariably green, whatever may be the colour of the iron salt; they are all soluble in water, nearly insoluble in alcohol; they are all free from ferruginous taste, all perfectly stable, and miscible with preparations of Peruvian bark without decomposition. In all of them the presence of iron is so disguised as not to be detected by chemical reagents, unless after the addition of strong acids or sulphuretted hydrogen, both of which destroy the combination.

In other papers I have described the soluble compounds obtained in combining the phosphate, hypophosphate, valerianate, and arseniate of iron with the alkaline citrates. In this I will merely describe the tasteless combinations of the alkaline citrates with iodide, chloride, sulphate, and nitrate of iron.

*Tasteless Iodide of Iron.**

This is, no doubt, the most important of the whole series, both therapeutically and chemically; therapeutically, because iodide of iron is admitted to be the best of all iron combinations; chemically, because all the reactions happening during its preparation are so remarkable and so easy to follow with accuracy as to be likely to give a key to the real composition of the rest of the series—a result which can hardly be obtained with any of the other similar combinations.

The salt is obtained in the following manner: 126·3 grs. (1 eq.) of iodine are first combined with metallic iron, in the usual way to obtain the protoiodide of iron; this is filtered, and 63 grs. ($\frac{1}{2}$ eq.) of iodine are dissolved into it. Then, a solution of 201 grs. (1 eq.) of citric acid saturated with a fixed alkali, such as potassa, for instance, is added by small portions to the sesqui-iodide of iron. The ferruginous solution which is at first of a ruby red colour and has a strong smell of iodine, becomes lighter by degrees, till, as the last drop of citrate is added, it takes a bright apple green colour; at the same time, all smell of iodine, all taste of iron have disappeared; the solution strikes no colour on starch paper, and gives no precipitate with either tannin or ferrocyanide of potassium. It may be then evaporated at a low heat, with gentle stirring, to dryness, when it gives a green mass formed of very small acicular crystals, looking somewhat like cauliflowers. It is tasteless, perfectly stable, unless exposed to direct sunlight, and may be exhibited, in the shape of syrup, elixir, solution, tincture, pills, etc. The dose of it need not be more than one-half of that of the protoiodide of iron, as it is absorbed much more readily.

Chemically, this iodide of iron seems to be a combination in which sesqui-iodide of iron plays the part of an acid and the alkaline citrate that of a base; but the subject requires further investigations before it can be decided with complete certitude.

The other alkaline citrates may be used instead of citrate of potassa; similar combinations may also be obtained with the alkaline tartrates, oxalates, and malates, but none are so tasteless, and especially none so *stable* as the one just mentioned.

I must add a few words on this subject which is a most important one, for the same remarks may be applied to all the other analogous iron combinations, pyrophosphate included. On reading the above process, some may think that, after all, the product is only a mixture of citrate of iron, iodide and iodate of potassium. But, aside of the fact that the different ingredients are not in proportion to form such combinations, chemical tests show that such is not the case. Citrate of iron, for instance, is of a ruby red colour and turns immediately ink black on the addition of tannin, while tasteless iodide of iron is bright green and is not coloured black by tannin, but only turned to a light purple hue, after some time. Iodide of potassium dissolves iodine freely; the new salt dissolves it but sparingly, unless when in a concentrated solution. Iodate of potassium is coloured red by solutions of morphia; no colouration is produced by them in solutions of the new salt. This last reaction is important, as iodate of potassium is deemed poisonous by some physicians.

Tasteless Chloride of Iron.

Sesquichloride of iron, the salt which enters into the preparation generally known as tincture of muriate of iron, has the property of forming combinations precisely similar to those of the sesqui-iodide. If an alkaline citrate be added to a solution of sesquichloride of iron, in the proportion of two equivalents of the former to each three equivalents of chlorine, a new salt will be obtained of a green colour, quite tasteless, and miscible with vegetable preparations such as infusions of bark, quassia, etc., without change or discolouration.

This tasteless muriate of iron may be dissolved in diluted alcohol in the proportion required by the Pharmacopœia of the United States; it forms, then, a tincture of muriate of iron, which is as superior to the old one as a civilized man is above a barbarian. Its effects, I know, from experience, are fully equal to those of the officinal tincture.

I cannot give the exact weight of citric acid required for a given quantity of the officinal tincture of muriate of iron, on account of the great variation in the strength and acidity of that preparation, but, on an average, 120 to 140 grains of citric acid saturated with either soda or ammonia

* The tasteless iodide of iron has been patented, but with no intention of interfering with any druggist who wishes to make it himself for his own dispensing.

will answer for one fluid ounce of the tincture. This is to be added to the iron solution before the alcohol, and the alcoholic strength of the tincture, when finished, must not be more than 30 or 40 p. c. instead of 70 p. c., as usual.

The sesquisulphate and the sesquinitrate of iron form also combinations precisely alike to those described above, but present no special interest to be entitled to more than a simple mention.

All these combinations, however, lack the property of coagulating the blood, and for that reason cannot be used as styptics in cases of hemorrhagia, etc. The old officinal preparations will have to be retained for external use, the only thing they are fit for in a civilized community.

THE OLIVE OIL TRADE.

The trade in olive oil in this country has been an interesting one, regarding it in its past and present characteristics. If we look at the statistics of the importation of this article in past years as compared with present, we are enabled to perceive the augmentation which has occurred in the trade, and the rapid progress it has made. We have some interesting figures before us bearing upon this subject, showing the amount of olive oil imported into this country during the years 1840–1870—that is to say, during three very important decades in our commercial history. As these figures have been prepared under official authority, their correctness cannot be brought into question. Commencing with the year 1840—say thirty years ago—we find that olive oil was imported into the United Kingdom to the extent of 8783 tuns, while in 1842 the amount had increased to 14,095 tuns. After this we note considerable fluctuations in the import, the amount having dwindled down in 1846 to 8534 tuns. In 1850, however, it increased, being in that year 20,784 tuns, thus showing a very considerable and rapid augmentation. In the few following years again we observe that the imports languished, but in 1858 they amounted to 25,121, at which amount they remained with more or less fluctuation for some time. The next important increase we find was in the year 1865, when the imports amounted to 32,005 tuns—the largest amount imported into this country during the period under notice. In subsequent years the imports have somewhat declined, as compared with 1865, according to the official statistics, although we have every evidence to show that the trade has been of late both brisk and healthy. Our readers will bear us out in this assertion.

Having thus considered the imports of olive oil as regards actual quantity, it will be next interesting to see what is their actual sterling value. Going back to the year 1856 we find that the computed real value of the olive oil imported into the United Kingdom amounted to the large sum of £1,124,755, while in 1865 it was no less than £1,684,852. Our readers will perceive from these statistics how important this branch of our import trade is, considered in regard to its actual sterling value, although it may be noted that during the few years subsequently to 1865, the amount has somewhat decreased. In 1870 it was £1,185,950. Chemists and druggists will assuredly view with interest the fact that merely one article of their stock-in-trade—an important article certainly, but not prominently so—is imported into this country annually to the extent of over a million pounds sterling. This is one of those satisfactory commercial facts which speaks for itself, and needs no comment from us.

The exports of olive oil from this country next invite attention. Going back to the year 1840 we note that these exports only amounted to the insignificant total of 517 tuns, which in the year 1845 had further decreased to the amount of 303 tuns. Subsequently, however, the exports seem to have increased, and were in the year 1854 1749 tuns, thus manifesting an increase of an important character. In the following year there was another considerable increase, the amount of the exports being 2203 tuns, after which they dwindled down again in 1858 to 587 tuns. From this time we observe continual fluctuations in the amount exported, sometimes the total showing a decrease, sometimes an increase, until, in 1870, we find the total exports reach the comparatively satisfactory total of 2168 tuns. With respect to the fluctuations in the trade of olive oil, interesting evidence is furnished by these statistics giving the exports of the article. Thus, while in the year 1845 the exports only amounted to 303 tuns, in the year 1870 they amounted to 2168 tuns—certainly a very large augmentation, and one which is pertinent in the way of comparison. It shows how much this branch of the trade is liable to fluctuation; how the exports are large one year and small another, and how it is not always easy to trace reliable causes of this commercial vicissitude.

Our readers will naturally feel an interest in the average prices of olive oil in past and present years. According to the official tables giving these prices, we find that in the year 1856, this oil, imported from Italy, fetched £51 10*s.* per tun, whereas the price of that from Morocco was £48 10*s.* In 1860 these prices had increased, the Italian oil being quoted at £59 7*s.* 6*d.* per tun, and the Morocco £55 11*s.*; and it will be observed that the latter had increased in value comparatively with the former. In 1865 the prices decreased, being as follows:—olive oil from Italy, £52 17*s.* 9d.; from Morocco, £49 6*s.* 8*d.* per tun. In the following year, however, the prices increased again to the extent almost of £5 per tun, which is to be accounted for by reason of the decreased imports. In 1868 the prices reached a very high point, viz. £68 3*s.* per tun for the Italian oil, and £63 for the Morocco; and we do not find these prices equalled in any other year during the period under notice. In the year following the prices diminished as much as £15 per tun—a not unimportant fact.

AN AIR BATTERY.*

BY J. H. GLADSTONE, PH.D., F.R.S., AND ALFRED TRIBE, F.C.S.

The authors describe a galvanic battery which is founded on a reaction that they brought under the notice of the Royal Society last spring.† They then showed that if pieces of copper and silver in contact are immersed in a solution of nitrate of copper in the presence of oxygen, a decomposition of the salt ensues, with the formation of cuprous oxide on the silver and a corresponding solution of the copper, while a galvanic current passes through the liquid from copper to silver. They stated that this was only one of a large class of similar reactions, and that it seemed desirable to examine more fully the history and the capabilities of the electrical power thus produced.

It was previously ascertained that the combination of the oxygen takes place only in the neighbourhood of the silver; and the following formulæ may serve to render the chemical change and transference more intelligible:—

Before contact—

$$m\mathrm{Ag} + \mathrm{O} + \mathrm{Cu}2\mathrm{NO}_3 + \mathrm{Cu}2\mathrm{NO}_3 + n\mathrm{Cu};$$

after contact—

$$m\mathrm{Ag} + \mathrm{Cu}_2\mathrm{O} + \mathrm{Cu}2\mathrm{NO}_3 + \mathrm{Cu}2\mathrm{NO}_3 + (n-2)\mathrm{Cu}.$$

This action is evidently a continuous one until either the oxygen or the copper fails. The oxygen of the atmosphere is practically unlimited in amount, but there is a difficulty in bringing any large quantity of it into contact at once with the silver and the dissolved salt.

To facilitate this, the silver plate should have a horizontal position just under the surface of the liquid in the cell; and, in fact, the authors convert it into a small silver tray, full of crystals of the same metal which rise in projections to the very surface. The copper plate lies

* Abstract of a paper read before the Royal Society, April 3 ('Transactions,' vol. xxi. p. 247).

† Proc. Roy. Soc., April, 1872, vol. xx. p. 290.

horizontally under it, separated, if need be, by a piece of muslin, and connection is made by a wire as usual. The vertical part of the copper plate, from a little above the liquid to the bend, should be varnished; otherwise solution principally takes place there, which causes the horizontal part of the plate to drop off. Holes are made in the silver tray with the view of shortening the communication between the air-surface and the copper plate and of facilitating the movements of the salt in solution. The solution itself may be contained in a shallow trough or saucer.

That dissolved oxygen is absolutely necessary for this chemical change had been already shown; but it was interesting to measure by a galvanometer the difference of the currents obtained by means of an ordinary, that is aërated, solution of copper nitrate, and one from which the air had been separated to the greatest possible extent. A Thomson's galvanometer was employed, which had a resistance of 2631·5 units at 18·3° C. Two cells were prepared with vertical plates and alike in all respects, except that the one contained an ordinary 6 per cent. solution of copper nitrate, and the other a similar solution which had been deoxygenized. Another experiment was made with a different pair of cells and an 11 per cent. solution. It was necessary to use the 1·99 shunt; and the following were the amounts of deflection:—

Time after immersion.	Expt. I.		Expt. II.	
	Oxygenized.	Deoxygenized.	Oxygenized.	Deoxygenized.
1 minute	78	14	130	11
4 minutes	72	9	90	8
12 „	68	6	75	6
49 „	—	—	58	3·5

The contrast is evident. That the deoxygenized solution does give a deflection at all is due partly to the difficulty of excluding air, and partly, perhaps, at first to the oxygen condensed on the surface of the silver plate. The effect due to the water itself is inappreciable. From the nature of the reaction it might be expected that the current would gradually diminish on account of the using up of the dissolved oxygen in the neighbourhood of the silver; such a diminution always does take place, at least after the first few vibrations of the needle. As might be expected, too, when the amount of action has run down considerably, the mere moving of the liquid so as to bring fresh parts of the solution against the silver augments the currents.

The same resulted from stirring up the crystals of silver in the tray so as to expose new surfaces. If the wire be disconnected for a time so as to allow the oxygen to diffuse itself from other parts of the solution, and connection then made, the current will be found as strong, or nearly so, as before.

A cell with the plates connected by a wire was placed under a bell-jar full of air over mercury. The mercury gradually rose inside, as might be expected from the absorption of the oxygen in the air.

The necessity of oxygen and the avidity with which it is taken up are both illustrated by the following experiment:—Two cells with horizontal plates were prepared alike in every respect, except that the first was filled with a solution simply deprived of oxygen, the second with a solution through which a stream of carbonic acid gas had been passed for some time. The first was placed in the air, the second in a vessel from which the air had been expelled by allowing carbonic acid gas to flow into it for an hour or two.

The deflections obtained were as follows, the 1·999 shunt being used and the temperature being 13·7° C.:—

Time after immersion.	In air.	In CO_2.
1 minute	165	76
5 minutes	135	62
10 „	135	58

As the cell in an atmosphere of carbonic acid gas showed nearly half as much action as that in the air, each cell was short circuited for twenty-three hours, with the expectation that any oxygen in the closed vessel would be used up; and, indeed, the most prominent crystals of silver in the cell in carbonic acid gas became reddened, while a cuprous deposit extended over the whole of the crystals in the other cell. When, however, the short wires were removed and the galvanometer interposed, the cell in the air gave a deflection of 136, practically the same as before, but that in carbonic acid gas, instead of showing a great decrease, rose to 80. It was then found that the vessel containing the latter slowly admitted air; so the contents were swept out by a fresh stream of carbonic acid gas, and it was made properly air-tight. After connection by a short wire for three days the galvanometer indicated a deflection of 20, that of the cell in the air being 110, temperature 10° C. As this showed a very great reduction of the chemical action, carbonic acid gas was again passed through the vessel for an hour or two; and after a connection of two more days the indication of the galvanometer was only 3, while the other cell gave 115, the temperature being now 10·5° C. The action, therefore, was at last reduced almost to nothing; and the original fault in the experiment brought out, perhaps more clearly than would otherwise be seen, how eagerly the solution will absorb even minute quantities of oxygen from the surrounding gas.

An important point to determine was the best strength of the copper nitrate solution. Six per cent. was generally preferred, for two reasons:—first, it gives about the maximum of effect—a solution four times as strong gives less than half the deflection, and a solution only a quarter as strong gives only two-thirds; secondly, a stronger solution than this 6 per cent. is apt to produce a deposit, not of pure cuprous oxide, but of a subnitrate, which was supposed to clog up the silver crystals to a greater extent.

Another point investigated was the best proportion between the areas of the metallic surfaces. Experiments were made with vertical plates, in which the silver was kept at a uniform size and the copper was diminished by covering it more and more with varnish; and another set was made in which the copper remained the same, while the silver plate was reduced.

The results may be thus exhibited:—

Proportion of surfaces.		Deflection.		
Silver.	Copper.	Expt. I.	Expt. II.	Expt. III.
1	0·25	24	23	—
1	0·50	28	27	—
1	0·75	31	30	—
1	1·00	33	32	28
1	1·33	—	—	28
1	2·00	—	—	32
1	4·00	—	—	30

The increase of the copper surface, therefore, has comparatively little effect.

Proportion of surfaces.		Deflection.		
Copper.	Silver.	Expt. I.	Expt. II.	Expt. III.
1	0·25	—	—	7·5
1	0·50	—	—	16
1	0·75	—	—	21
1	1·00	33	32	28
1	1·33	41	40	—
1	2·00	56	54	—
1	4·00	96	92	—

The increase, therefore, of the silver or negative metal causes an almost proportionate increase in the chemical action. This, doubtless, arises from the necessity of oxygen, and explains the value of the large surface exposed by the silver crystals in the tray.

The effect of heat on the action of this cell was examined; it increases the action greatly: thus an arrangement which gave a deflection of 40 at 20° C. gave one of

250 at 50° C.; and the augmentation was observed to be much more rapid in the higher than in the lower portions of this range of temperature.

If the formula given above for the reaction be a true one, it follows that every atom of copper deposited on the silver in the state of suboxide must be compensated by an atom of copper dissolved from the copper plate. This was proved quantitatively. In a cell that had been in action for a week the loss of the copper plate was 0·391 gram, while the suboxide deposited on the silver was found to be equivalent to 0·398 gram of metallic copper. This deposit of suboxide, though it soon forms apparently a complete covering to the silver, does not greatly diminish the action; it is probably porous, besides being itself a conductor of electricity. In some cases it was deposited in crystals sufficiently large to be seen by the naked eye, shown by a magnifying glass to be regular octahedra. The internal resistance of this battery is small.

The electrolytic power of the current was examined. One cell, the plates of which were about 2 inches in diameter, was found sufficient to decompose such metallic salts as the nitrates of copper, silver, or lead, copper sulphate or stannous chloride, in aqueous solution, when platinum was used for the negative electrode, and for the positive the same metal as existed in the salt experimented on. Six cells were sufficient to decompose dilute sulphuric acid slowly and dilute hydrochloric acid pretty quickly, copper electrodes being employed.

The theoretical interest of this battery lies mainly in the fact that it differs essentially from every other galvanic arrangement, inasmuch as the binary compound in solution is incapable of being decomposed either by the positive metal alone or by the two metals in conjunction; it cannot serve, in fact, as the liquid element of the circuit without the presence of another body ready to combine with one of its constituents when set free. Grove's gas-battery is essentially different if the oxygen and hydrogen condensed on the platinum plates play the part of the two metals; but it closely resembles it if hydrogen acts the part of the positive and platinum that of the negative metal; the dilute sulphuric acid, a hydrogen compound, will then be decomposed on account of the simultaneous presence of the oxygen, which can combine with the liberated hydrogen. Viewed in this manner, Grove's gas-battery is only a special case of the general reaction described in a previous paper; and the formula will be:—Before contact, $m\text{Pt} + \text{O} + \text{H}_2\text{SO}_4 + n\text{H}$; after contact, $m\text{Pt} + \text{H}_2\text{O} + \text{H}_2\text{SO}_4 + (n-2)\text{H}$.

The practical interest of the present arrangement lies in the fact that it is an approximation towards a constant air-battery. Should it ever come into use elsewhere than on the lecture table, it will probably be in the form of a combination of zinc and copper, with an aërated solution of zinc chloride; for that arrangement has an electromotive force six times that of the arrangement more particularly studied, and about three-quarters that of a Daniell's cell. The numbers representing the difference of potential between the two metals, which were actually obtained by means of an electrometer belonging to Sir William Thomson, were—

Silver and copper with deoxygenized copper nitrate	4
Silver and copper with oxygenized copper nitrate	8 to 11
Copper and zinc with chloride of zinc	62
,, ,, water	68
,, ,, Daniell's cell ...	83

Chloride of zinc is preferred to the sulphate, as it offers less internal resistance, and a solution of 20 per cent. is, on the authority of Mr. Herbert MacLeod, recommended as about the best conductor. A single cell of this description is capable of decomposing dilute sulphuric or hydrochloric acid, when copper electrodes are employed. The two metals might be arranged as in a Daniell's battery; the zinc would of course require no amalgamation, and the whole might be left for weeks or months without any attention. The oxide of zinc produced generally falls to the bottom of the vessel, and may be separated whenever it is thought desirable.

The power is thus obtained at a minimum of expense, for the oxygen which combines with the zinc costs nothing. Such a battery would appear to be specially adapted to cases where the galvanic current has to be frequently broken, as in telegraphy; for at each period of rest it renews its strength by the absorption or diffusion of more oxygen from the air.

THE MANUFACTURE OF PEPSIN.*

BY R. ROTHER.

With the important discovery of Mr. E. Scheffer, of Louisville, Ky., a new era was developed in the manufacturing interests of pepsin. The multitude of uncertain and mostly worthless preparations, erroneously called pepsin, have been swept from the market by the *bonâ fide* article, which alone merits the title, and is, in truth, the coveted desideratum, pepsin. This real, active, definite, and always reliable pepsin is most abundantly, easily, and expeditiously obtained by the process of Mr. Scheffer, which consists in precipitating it from its acidulated aqueous solution by saturation with chloride of sodium.

The history of pepsin will record an entire revolution through the agency of this simple method. The commercial interest will suffer a thorough change, as henceforth the exorbitant price of a comparatively worthless substance will be reduced to a very moderate rate, and then purchase a very superior article.

In the preparation of this substance the pharmacist ordinarily imagines an exceedingly unpleasant operation. But the sooner he disabuses his mind of this nauseous idea the greater will be the advantage to him. The process, however, is mere pastime, when compared to many less dreaded duties comprised in the routine of pharmacy.

Pigs' stomachs are the best sources of pepsin, and the yield of such a peculiar principle, exerting such a vast digestive power, is comparatively enormous, if the proper means are employed to secure it. The first consideration which requires attention is, that the stomachs must be fresh. The contents are then immediately removed, and the stomachs well cleaned by a judicious use of fresh water, so as not to waste the mucous membrane in which the digestive principle seems to reside. The second step consists in cutting them into moderately thin shreds by means of scissors. This done, they are macerated for two days in a large volume of acidulated water,—the more the better. However, one gallon of water, acidulated with half an ounce of muriatic acid, is ample for one stomach. At the end of this time the acid liquor is poured off, and the stomachs are again macerated for two days, with a similar quantity of acidulated water. This operation of macerating the stomachs can be performed three times with advantage, and even a fourth maceration will repay the effort. The liquids obtained from each maceration are immediately treated with about one-fourth their weight of common salt, and the precipitated pepsin, which accumulates in curdy flakes upon the surface of the liquid, is skimmed off with a ladle, collected on a muslin strainer and strongly pressed, to separate the most of the adhering water. The cake of yet moist pepsin is then mixed with a weighed quantity of milk sugar, the mixture spread out to dry, then weighed, and sufficient milk sugar added to make the final weight of the mixture equal to ten times the weight of the real pepsin contained in it, which is determined from the difference between the weight of the dried residue and the known quantity of milk sugar at first added. A source of error may, however, occur here, and the finished preparation be under

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* From the *Chicago Pharmacist* for March.

strength, if the presence of a considerable quantity of chloride of sodium is not taken into account. The moist pepsin, after pressing, still retains over three times its weight of water, which can only be separated by evaporation; and as this water contains at least one-fourth of its weight of salt, the amount of this will perhaps equal half the weight of real pepsin present.

Therefore, the strength of the dried residue is best determined by means of an assay, and its final strength adjusted with the addition of milk sugar, so that ten grains of it shall at least dissolve 120 grains of coagulated albumen. In an extensive practice, with the necessary experience, this is not absolutely necessary, because the concentrated brine adhering to the pepsin can, in a great measure, be replaced by a much weaker saline solution, and afterwards pressed and dried. Most of the salty liquid can also be easily removed, by spreading the pressed pepsin upon abundant folds of bibulous paper, and allowing the liquid to be absorbed, and when quite dry mixing with the necessary amount of sugar of milk. Cold weather is the only proper season in which to undertake the manufacture of pepsin, as putrefied material is not at all serviceable, and in warm weather it is nearly impossible to prevent rapid decomposition.

It will amply pay any pharmacist to make his own pepsin, if he has a sufficient demand for it, because the process is so simple and inexpensive and the yield so plentiful. The product in saccharated pepsin, procured from six stomachs by means of four macerations, is as follows:—First maceration, 16 ounces; second maceration, 12½ ounces; third maceration, 8 ounces; fourth maceration, 4 ounces: total, 40½ ounces. The average yield of six stomachs by two macerations is 20 ounces, and where raw material is abundant only two macerations are usually performed, since it is difficult ordinarily to continue the process unaccompanied by putrefactive tendency. Thus it will be seen that, aside from labour, very little outlay is incurred; that the remuneration for extracting pepsin from six stomachs is twenty dollars, at the regular wholesale rates.

Several attempts were made to obtain pepsin in a concentrated liquid form, having the same strength as the saccharated. For this purpose the moist pepsin with adhering salt was dried, and then mixed with sufficient muriatic acid and glycerine to make the liquid weigh ten times as much as the pepsin employed. This did not give satisfactory results. The moist pepsin was then treated at once with acid and glycerine, without being first dried, the strength being adjusted from the data of the usual loss in water that moist pepsin sustains. This mixture, after long standing, did not form a clear solution; it filtered slowly and with great difficulty, and the remarkable fact was ascertained that the filtrate would not dissolve coagulated albumen. But the unfiltered liquid showed an undiminished activity when diluted and tested with albumen. Through this result it was found that if the liquid, be it acidulated water or glycerine, is increased to forty times the weight of the pepsin, a perfect solution can be made, which possesses the required activity, only it is but one-fourth as strong as the saccharated powder. No trial was made whether a pepsin freer from salt would make a more concentrated and perfect solution. But even this weaker solution, containing 2½ per cent. of real pepsin,—equal to 25 per cent. of the saccharated,—is perfectly stable, and for the purpose of making more dilute solutions of pepsin it is far preferable to the powdered.

In referring to a "pulverulent pepsin" met with in the American market, which has attracted considerable attention by its bitterness, the author states, that upon examination he has found this bitterness to be due to the presence of strychnia. An opinion to this effect had previously been expressed by Mr. A. E. Ebert at the meeting of the American Pharmaceutical Conference at Baltimore.

LIEBIG'S FIRST VISIT TO PARIS.

The following personal reminiscence of the late Baron Liebig is from the pen of Dr. Quesneville, and is published in the May number of the *Moniteur Scientifique-Quesneville*:—

"The editor of this journal had the happy privilege of assisting Liebig in his earliest researches—by washing his glasses and running to fetch the articles required by him—when, in 1822 and 1823, he came to Paris to perfect himself in the study of chemistry.

"Gauthier de Claubry, who is still living, and was then a man of considerable reputation and usually waited upon after the grand visit had been made to Thenard, presented Liebig to my father. At that time there was in Paris scarcely any place but the private laboratory in the Rue du Colombier where a chemist could work freely; that is to say, without a protector taking the half of his labour for chemicals used and apparatus borrowed. This laboratory was one of the appurtenances of the manufactory of chemical products which my father had purchased from Vauquelin and the heirs of Fourcroy. Gauthier de Claubry, who was acquainted with this laboratory, where Vauquelin, Chevreul, Serrulas, and himself had laboured and taught, mentioned it to Liebig, and it was in this commodious place that the illustrious chemist, newly arrived in the great city, prepared his first work on the fulminates.

"At this time I was twelve years of age, and it was I that carried to the great German the articles required for his experiments. My mother also conceived a great liking for him and charged herself with his firing. She filled his stove, and even fitted up at his hotel a fireplace *à la prussienne:* for the young chemist was not rich, and was completely without fuel in the middle of a most rigorous winter. Liebig laboured there one entire year, and when his memoir was finished he dedicated it to Thenard. Gay-Lussac was astonished by it, and requested Liebig to communicate to him his ideas: the second investigation was made in conjunction with Gay-Lussac and in his laboratory.

"But Liebig never forgot his early days in Paris and the assistance he received from my father, so that when he learned from Gerhardt, in 1840, that I had founded the *Revue Scientifique*, and that I had engaged the latter to abstract foreign memoirs for its pages, he wrote to me at once as follows:—

"'It will not be necessary to send you my journal by post, for, as I have already promised, you will receive proofs of all original memoirs before the numbers of the journals containing them are printed and published; in this manner you will be able to make these memoirs known to the French public four or six weeks earlier. This winter I have had the good fortune to count among my pupils six very clever young chemists; I have proposed to them to undertake together a thorough investigation of the fat bodies, and this work, commenced eight months since, is now nearly finished.'

"Liebig finished his letter with the following declaration, which it is curious to read in the present day:—

"'You may, my dear Quesneville, give provisional information as to the results, and I will send you the complete memoirs as soon as I can. You will see, though, that while they were occupying themselves at Paris in useless discussions on the theory of substitutions, we cultivated our field with organized forces. To-day we collect the fruit. Can you be astonished that I have taken so little part in these combats fought about theories so ephemeral, and that in my book I have not even spoken of them? It was because I would not draw off the attention of my readers towards matters so purely personal. In a couple of years they will not be spoken of, and the importance attached to them to-day will have vanished like a dream.'"

The Pharmaceutical Journal.

SATURDAY, MAY 31, 1873.

Communications for this Journal, and books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements to Messrs. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE MINOR EXAMINATION BYE-LAW.

THOUGH we had not space last week to comment on the discussion which took place on that most important alteration of the Bye-laws affecting the examinations, we take the earliest opportunity of referring to it, since it is highly desirable no misconception should continue to prevail on the subject.

Mr. HAMPSON'S opposition to clause 16 of section 10 of the amended bye-laws was based upon the ground that its provisions were illegal, and the arguments he brought forward in support of this view had been previously urged by him at the Council meetings on three separate occasions. He contended in regard to the Minor examination, that since the examiners are, by clause 6 of the Pharmacy Act, 1868, "required to examine all such persons as shall tender themselves for examination" under the provisions of the Act, it was not in the power of the Society to approve and confirm a bye-law requiring candidates for examination to satisfy the examiners that for three years they had been either apprenticed to the business, or registered students, or otherwise practically engaged in the translation and dispensing of prescriptions.

In taking this ground Mr. HAMPSON appears altogether to have overlooked the provision of a subsequent passage in the same clause to the effect that "the examination aforesaid shall be such as is provided under the Pharmacy Act (1852) for the purposes of a qualification to be registered as Assistant under that Act, or as the same may be varied from time to time by any bye-law to be made in accordance with the Pharmacy Act as amended by this Act" (1868). He appears to have ignored entirely the power thus given to vary the nature of the Minor examination, and of the requirements to be demanded of candidates by the examiners, and, as it seems to us, it is only by doing this that he has conceived the idea of "illegality" in regard to the new bye-law.

The passage above quoted clearly gives power to alter the Minor examination; and if we seek to ascertain what is to be the ruling principle of such alterations it may be learnt from the preamble of the Act, stating the expediency of chemists and druggists possessing competent practical knowledge of their business, and that they should be duly examined as to their practical knowledge. The object of the Pharmacy Act, 1852, was precisely similar, and the same may be said of the Society's Charter of Incorporation. With these facts before us it seems scarcely possible to comprehend how it can be argued that it is contrary to the intention of those who framed the Acts of Parliament for the examiners to require from candidates such evidence of their practical knowledge as would be reasonably afforded by the fact of their having been engaged in the business. This would be demanded by any one engaging an assistant; and surely it is not too much to ask before conferring a qualification to carry on business independently.

Taking into consideration these facts therefore, the groundwork of Mr. HAMPSON'S opposition vanishes, and the reason for it is entirely removed when it is remembered that the alteration he disputes was recommended to the Council by the Board of Examiners as a result of their experience, and as being necessary to render the examination more efficient as a test of practical knowledge.

Acting upon this recommendation the Council, after a long discussion, provided for the framing of amended bye-laws as to the examination, and instructed the Parliamentary Committee to consider the bye-laws in regard to the legal power they conferred. On the report of this Committee the alteration here more especially referred to was adopted, together with others. The bye-laws embodying these alterations were approved, in accordance with the provisions of the charter, at three meetings of Council, also by a Special General Meeting called for the purpose; lastly, in conformity with the statute, 1852, as amended by the Act, 1868, they are now in course of being submitted to the Privy Council for final confirmation, and in the event of their being so confirmed, they will have the same force as any portion of the original statutes themselves.

In the course of discussion on this subject several collateral issues have been raised, to which it is barely necessary to refer again here, excepting in the case of the argument Mr. HAMPSON founded on a supposed inconsistency in the opinion expressed by the Society's solicitor while the amendment of the Minor examination was before the Parliamentary Committee. Mr. HAMPSON'S letter, at p. 819 of this Journal, gives all the details, and we may confine ourselves to pointing out that the difficulty he there speaks of arose entirely from his own misconception. The distinction between the originally-proposed bye-law and the one now adopted is in no way subtle, but palpable and positive. The former—objected to by Mr. FLUX—proposed to require that every one admitted to the Minor examination should have been "registered or employed as an apprentice or student for at least three years previously," and in this form the bye-law would, as pointed out by Mr. FLUX, have varied from the intention of the Act that the examination should be freely open to all the world. However, in the bye-law as now confirmed, admissibility to the Minor examination is not thus specially limited, but is accorded also to those who have been *otherwise* for three years practically engaged in the translation and dispensing of prescriptions. A wider or more marked difference can scarcely be imagined; and Mr. HAMPSON'S confessed inability to comprehend it amply justifies the satisfaction he has expressed that his vocation is not that of expounding law.

The importance of a clear understanding on these points must be our excuse for dealing with them at such length; and before concluding we must add that while we feel sure those who have taken part in the consideration of this subject have freely given credit to Mr. HAMPSON for the sense of duty which compelled him to fight the question he raised as to the legality of the Council's proceeding, we cannot shut our eyes to the fact that, beyond the observance of courteous tolerance for opposite opinions, there has long since been no real occasion for continuing the discussion on the point.

The question has been thoroughly fought out, having been thrice decided in Council, and subsequently at a Special General Meeting of the Society. Discreet submission is therefore now the only loyal relation possible for the minority to assume towards the majority. It would indeed be an eminently unfortunate circumstance if the efforts of the Society towards improvement of the trade were to be hindered by the action of an irrepressible minority.

PHARMACY IN VICTORIA.

FOR some time past the pharmacists of Melbourne have been endeavouring to secure the passage of a Bill regulating the practice of pharmacy in the colony of Victoria, but hitherto their efforts have been rendered fruitless by changes in the Government. A vigorous effort is now, however, being made to pass the Bill during the present session. A deputation representing the Council of the Pharmaceutical Society of Victoria has waited upon the Chief Secretary to ask that the Government should take charge of a Bill prepared by that Society, and approved by the Medical Society of Victoria. Mr. W. JOHNSON, formerly, we believe, a student in the School at Bloomsbury Square, and now Government Analyst and President of the Victoria Pharmaceutical Society, explained the provisions of the Bill prepared by the Society, which is based upon the English Pharmacy Act, adapted as far as possible to meet the special requirements of the colony. The principal aim is to make it compulsory in future that all persons retailing poisons or dispensing prescriptions should possess a competent practical knowledge of their business. It provides that registered chemists and druggists only shall retail poisons, except in certain cases where, there being no registered chemist within four miles, a licence may be granted to a storekeeper. But all pharmacopœia preparations are to be of the B. P. standard, and such storekeepers are only to sell these preparations when they have obtained them from a registered chemist and druggist, whose signature the bottles or packages are to bear. The Bill also proposes to establish a board of pharmacy—consisting of five members of the Society (appointed by the Governor in Council) and the chief medical officer—to control all examinations and grant certificates of competency. Mr. FRANCIS, in reply, said that he had not had time to master the details of the Bill, but that it appeared to him to be of too sweeping a character. It might perhaps be advantageously applied to centres of population, such as cities, towns, or boroughs, but should not hastily be extended to the more thinly-populated districts. He promised, however, to give the subject careful consideration and communicate his decision to the Society.

We are informed that almost all the pharmacists in business in Melbourne have been educated in England; and it is hoped that the passing of such a law as that sketched out would give a great impetus to pharmaceutical education in the colony. The Pharmaceutical Society of Victoria has now been established fifteen years, and it numbers 71 members, 13 associates, and 1 registered apprentice.

MUSIC AND PHARMACY.

WE have been favoured with a programme of the "*Annual Commencement*" of the Massachusetts College of Pharmacy, Seventh Session, 1873–74, which is of so remarkable a character that we cannot do less than commend it to the notice of the schools of pharmacy of Europe.

The proceedings or as the programme terms them "*Exercises,*" commence with a musical overture, whereupon follows the VICE-PRESIDENT'S address, immediately succeeded by a "*Grand Pot-pourri from Robert le Diable.*" A statement of the progress of the College is followed by a "*Concert Waltz,*" and the *Conferring of Degrees* by a "*Polka Brilliante.*" The ceremony winds up with discourses on pepsine, liquorice, and mercurial ointment!

But are we not the victims of a hoax? The whole thing smacks of the last scene in the *Malade Imaginaire*, and we can fancy we hear the successful candidate returning thanks in the words of Molière,—

"Grandes doctores doctrinæ
De la rhubarbe et du séné,
Ce seroit sans douta à moi chosa folla,
Inepta et ridicula,
Si j'alloibam m'engageare
Vobis louangeas donare.
Et entreprenoibam adjoutare
Des lumieras au soleillo,
Et des etoilas au cielo,
Des ondas à l'oceano,
Et des rosas au printano.
Agreate qu' avec uno moto
Pro toto remercimento
Rendam gratiam corpori tam docto."

REGULATION OF THE SALE OF INTOXICATING DRUGS IN INDIA.

THE Calcutta correspondent of the *Times*, in a recent letter, says that the spread of habits of intemperance among educated native Indians has alarmed both the orthodox and reforming parties of Hindoos. Brandy kills off the rich absentee Hindoo zemindars in Calcutta at a rate which the native papers lament, while the Mussulman seems to prefer opium and other drugs. The Bengal Legislature has just passed an Act to bring the cultivation and preparation, as well as the sale, of intoxicating drugs under the Board of Revenue, and to enable it to make more stringent rules for licences. It is further stated that the dispensaries kept by natives in and around Calcutta are frequently used as places of carousal, brandy being supplied on the premises during the night. So frequently are the police in league with the liquor sellers, that an order has been issued upon the subject.

With such a questionable association of dram drinking and drug selling in vogue it is not surprising that some of the natives are not altogether satisfied as to the superiority of European physic, and we learn from the *Pall Mall Gazette* that the Hakims, or practitioners of the old Indian system of medicine, have made a stand against the supersession of it by the European pharmocopœia which has of late years been rapidly taking place, and that a company of them lately opened an "Indo-European Medical Hall," where only native drugs are to be sold.

It is not quite fair, however, to credit the Europeans with the introduction of drinking customs into India. Baboo Rajendra Lal Mittra has recently shown by numerous quotations that the practice of drinking ardent spirits has been common in India from the earliest ages, though denounced by Menu and other sages. We reproduce one of these quotations as an illustration :—

"In the time of Kálidâsa drinking seems to have been very common, for we find in the 'Sakuntalâ,' the superintendent of police, who was no other than the king's brother-in-law, proposing, like an English policeman, or cabby, to spend the present offered him by the fisherman who recovered the lost ring, at the nearest grog-shop.

"*Fisherman.*—'Here's half the money for you, my masters. It will serve to purchase the flowers you spoke of, if not to buy me your goodwill.'

"*Januka.*—'Well, now, that's just as it should be.'

"*Superintendent.*—'My good fisherman, you are an excellent fellow, and I begin to feel quite a regard for you. Let us seal our first friendship over a glass of good liquor. Come along to the next wineshop, and we'll drink your health.'"

As the date of Kalidasa's drama of 'Sakuntalá' is variously attributed to the three or four centuries nearest the commencement of the Christian era, the custom may fairly by this time be looked upon as a native one.

ALUM AND NITRE AS POISONS.

Some unusual cases of poisoning are reported from the Continent. In one case, which occurred at Liége, a man, aged 57 years, being troubled with gastric pains, sent to purchase some Epsom salts, and took about thirty grams of the substance supplied in a glass of cold water; eight hours afterwards he died in great suffering. Under the supposition that the pain was caused by the action of the salts, no medical assistance was obtained until shortly before death. At first it was thought that salts of sorrel, delivered by the pharmacien in mistake, had been the cause of death, and in the chemical examination of the contents of the stomach oxalic acid was consequently first sought for, but was not found. After a long and tedious operation, the analyist came to the conclusion that death had resulted from the swallowing of a large quantity of alum (sulphate of alumina and potash), probably in the calcined state. In the other case a Zouave who had obtained some nitre, which he had taken in water, was found in a state of violent delirium. Pacified and put to bed in the hospital, he shortly afterwards became insensible, the pulse grew weaker and weaker, and he died within two hours of his removal to the hospital. At the *post mortem* examination, the potash salt was found in the blood and the urine. The quantity of nitre delivered by the pharmacien he estimated to be about thirty grams, quite a harmless dose, in his opinion, and one that he expressed himself ready to take at any time.

USES OF THE GENUS VINCA.

The two species of periwinkle (*Vinca major* and *V. minor*) which grow in the woods and thickets of this country are not valued for any medicinal or economic properties, though they are known to be bitter and astringent. The last named species, however, is, in some parts of Continental Europe, used as a vulnerary, to stop hæmorrhage and in other branches of medicine. From a correspondent in Mauritius we learn that a kind of tea, made from the leaves of *V. rosea*, L., acts like a charm in the cure of indigestion and dyspepsia; and further, that a decoction made from the roots is invaluable for the cure of dysentery. In Bourbon the plant is known as saponaire, and is grown in gardens. We are told that fever is still raging over the whole of the Mauritius, which is not to be wondered at, considering the filthy state of Port Louis, and the general neglect of proper sanitary measures.

Mr. C. H. Wood, F.C.S., Editor of the 'Year-Book of Pharmacy' issued by the British Pharmaceutical Conference, has been appointed Quinologist to the Government of India on the Sikkim Cinchona Plantations.

The Leeds Local Government Board have appointed Mr. Thomas Fairley, F.C.S., Public Analyst for the Borough of Leeds, subject to the approval of the Local Government Board. Mr. Fairley is also analyst to the Yorkshire Agricultural Society, and was recently Chemical Lecturer to the Leeds School of Medicine.

Transactions of the Pharmaceutical Society.

BENEVOLENT FUND.

Subscriptions Received during May, 1873.

London.

	£	s.	d.
Marston, John Thomas, 105, London Wall, E.C.	0	10	6
White, George, 130, Camden Road, N.W.	1	1	0

Country.

Bangor, Roberts, Meshach	1	1	0
Bideford, Hogg, Thomas	0	5	0
Bridgend, Lloyd, John	0	5	0
Brighton, Billing, Thomas	0	10	6
Carlisle, Sawyer, James	0	5	0
Deal, Green, John	0	10	0
Langholm, Rome, George William	0	2	0
,, Rome, Robert Moncrieff	0	2	6
Melton Mowbray, Leadbetter, William Austin	0	5	0
Mexborough, Greaves, Eccles	0	10	6
New Radford, Jenkins, John Thomas	0	5	0
Peterborough, Bright, Richard	0	10	6
Pontypool, Bassett, Charles	1	1	0
Staines, Jones, Edward George	0	5	0
Torpoint, Down, Richard Haydon	0	10	6
Wolverhampton, Cookson, George	0	10	0
A Friend	2	0	0

Donations.

Bailey, Delamore Jubilee, Halnaker (4th donation)	5	5	0
Manley, William Frederick, 35, Camden Grove, Peckham, S.E.	1	1	0
Muter, Dr., Kennington Park Road, S.E.	3	3	0
Pratt, Henry, Warwick	5	5	0

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, 15th May, 1873; Dr. Odling, F.R.S., President, in the chair.

When the formal business of the Society was terminated, Dr. H. S. Armstrong, delivered a most able and comprehensive lecture on "Isomerism," pointing out that the generally received position theory was incompetent to explain many reactions which took place in the formation of metameric and isomeric substances. He suggested that the investigation of the thermal properties of compounds would establish facts which might ultimately enable us to obtain some insight into the matter.

After a lengthened and animated discussion the meeting was adjourned until Thursday, 5th June, when papers will be read "On the Dioxides of Calcium and Strontium," by Sir John Conroy, Bart., and "On Iodine Monochloride," by J. B. Hannay; and a new ozone generator will be exhibited by Mr. T. Wills.

PHARMACEUTICAL SOCIETY OF VICTORIA.

The fifteenth annual meeting of the members of the above society was held in the Melbourne Athenæum on Friday, March 21, Mr. W. Johnson, President, in the chair. About twenty members were present.

The President said that the Society had been going along very quietly during the past year—almost too quietly. Its financial position, however, was most satisfactory.

Mr. Bosisto, honorary secretary, read the annual report of the Council of the Society, from which the following passages are extracted:—"It will be in the recollection of members that in last year's report it was stated that a Pharmacy Bill had been prepared by your Council, and that conferences and correspondence with the Medical Society had made it alike satisfactory to both societies; also, that the Bill so prepared had been presented to the then Attorney-General, who promised that it should receive his careful consideration. A change of Government occurring since then, your Council last July wrote to the present Attorney-General, inquiring whether the Pharmacy Bill would be introduced during that session of Parliament, and received the following reply:—That 'the Attorney-General will give the matter his attention at the earliest moment on which the state of public business will permit.' The last busy session having terminated, your Council count fully on its early introduction during the forthcoming one. In consequence of the Pharmacy Bill having been delayed in its progress, the Society's operations have not been extended. Your Council have been desirous to commence the republishing of the 'Transactions,' but, not knowing to what extent the funds would be required for a private bill should the Parliament refuse to take up this subject of legislation upon public grounds, deem it prudent to defer this matter. It has been suggested by your President that for the time being a copy of the English *Chemist and Druggist* should be forwarded monthly gratuitously to each member, having an addendum of your Society's proceedings and other matters of interest. Should this meet with a favourable response from members, it will be carried out forthwith. During the past year the roll of members and associates has been extended. Your Council regret that they have been compelled to refuse some of the applications, but, exercising care in the granting of the Society's diploma, they hope it will give some guarantee to the profession and to the public of competency on the part of those who hold it. The subject of early closing having been brought before your Council during the year, both by members and non-members, they took the initiative, and called two meetings of chemists and druggists. The attendance was not so great as was expected, but those present entered into its consideration with due regard to the employers, *employés*, and the demands of the public. It was shown that the special peculiarities of a chemist's business, together with the demands upon it being different in each district, placed the subject of final closing at a given hour each day out of the question; but your Council earnestly advise the adoption of a liberal consideration by employers to the employed, and also by the public to those engaged in the calling of a chemist and druggist."

The financial statement showed—Receipts during the year, £112 19*s.*; balance at the end of 1871, £78 4*s.* 5*d.*: total, £191 3*s.* 5*d.* Expenditure during the year, £51 16*s.* 2*d.* Balance in bank and in hand at end of 1872, £139 7*s.* 3*d.*

Mr. Wragge disapproved of the suggestion in the Report as to the *Chemist and Druggist*. The financial resources should be husbanded, as they might have to push the Pharmacy Bill through Parliament as a private measure.

Mr. Bosisto said it was well known that a Pharmacy Bill was required. Chemists had the lives of the public in their hands almost as much as the medical profession had. The rising pharmacists of the colony should be compelled to be educated up to a certain standard.

It was decided not to adopt the President's suggestion comprised in the Report as to the *Chemist and Druggist*.

On the motion of Mr. Blackett, seconded by Mr. Wragge, the Report and balance-sheet were adopted.

Mr. G. Lewis moved, "That it is desirable that a Benevolent Fund should be established in connection with the Pharmaceutical Society."

Mr. W. Ford seconded and Mr. C. R. Blackett supported the motion, which was adopted unanimously.

The Council were instructed to prepare rules for the management of the fund, and submit them to the next annual meeting.

Mr. Lewis moved that the Council be authorized to direct the treasurer to pay £25 to the credit of the Benevolent Fund.

Mr. J. C. Jones seconded the motion.

Mr. Bosisto moved the addition of the following proviso to the motion:—"Provided that the funds of the Society are not required during the year for the purpose of a private Pharmacy Bill." The cost of the Bill, if passed through Parliament as a private measure, would be £300.

The motion, with the amendment added, was carried.

It was also resolved that the trusteeship of the funds be left in the hands of the officers of the Society for the current year.

Mr. Wragge moved that a special meeting be called to consider the desirability of increasing the number of the members of the Council.

Agreed to.

The following members of the Council retired by effluxion of time:—Messrs. Bosisto, Ford, Wragge, and Irvine. They were now candidates for re-election, and Messrs. Guthrie and Plunkett were also candidates. A ballot was taken in connection with the four vacancies, and the retiring members were re-elected.

Messrs. Kingsland and Long were re-elected auditors.

A vote of thanks was passed to the President for his services during the past year.

AMERICAN NATIONAL ACADEMY OF SCIENCES.

At the tenth annual session of the American National Academy of Sciences, recently held in Washington, the President, Professor Henry, who is also executive head of the Smithsonian Institution, called attention to the fact that there is a rapidly increasing appreciation of abstract science in the United States, in proof of which he mentioned that in supplying vacancies in the learned institutions of the country effort is made to obtain men who to skill in teaching join talents for original research. He also alluded to a liberal grant made last session by Congress ostensibly for practical results, but which will nevertheless tend to advance knowledge. Besides these illustrations, he recounted the following instances of individuals who had sought to promote the progress of science by generous gifts. A gentleman of Massachusetts, Mr. John Anderson, has presented to Professor Agassiz an island off the coast of New England, valued at 100,000 dollars, besides 50,000 dollars in money, for the establishment of a school of investigation in natural history. Mr. James Hamilton, of Pennsylvania, lately left a bequest to the Smithsonian Institution for the promotion of science. Dr. J. M. Toner, of Washington, has devoted his fortune to the establishment of a series of lectures to encourage "the discovery of new truths" for the "advancement of medicine." Professor Tyndall, before leaving America, placed in the hands of trustees the sum of 13,000 dollars to advance science in that country by assisting students in prosecuting their studies in Europe. A citizen of San Francisco has given land valued at 140,000 dollars to the Academy of Natural Sciences of that city. Part of the income derived from the bequest of the whole of his property by the late Alexander D. Bache to the cause of science has been devoted to a series of observations to obtain data for the preparation of a magnetic map of the United States, and another portion to the delineation of sun spots, lunar prominences, and the lunar surface. The results of these expenditures are to be published in a series of memoirs.

The members of the Academy removed by death during the past year were five:—Professor John Frazer, of the University of Pennsylvania, a successful teacher in the chairs of natural philosophy and chemistry, and many years editor of the *Franklin Journal;* Professor James Coffin, of Lafayette College, in Pennsylvania, who acquired an extended reputation by his labours in the line of meteorological computation, mathematics, astronomy, and physics; Dr. John Torrey, a celebrated botanist, and for many years Professor of Chemistry and Botany in the New York College of Physicians and Surgeons, and Professor of Natural History in the College of New Jersey; Dr. William Stimpson, of Chicago, a naturalist of high standing; and Professor Hadley, of Yale College, philologist.—*Abstracted from the Athenæum.*

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

Thursday, May 22nd.

The Adulteration Act.

Lord E. Cecil asked the Attorney-General whether, having reference to a paragraph which appeared in the *Pall Mall Gazette* on the 17th May, inspectors of markets nuisances, or weights and measures, as the local authority may appoint, are not bound to prosecute under the terms of the Adulteration Act, 1872, upon receiving a certificate from the local analyst; and, whether under such circumstances an analyst was not abusing the confidential nature of his position in sending notice of the adulteration to the seller. The paragraph to which he referred was as follows:—

"Dr. Corfield has just presented his first report as Food Analyst to the Vestry of St. George's, Hanover Square. Of fifteen samples of ground coffee only four were genuine, while nine were adulterated with chicory, caramel, etc. He had analyzed twenty samples of milk, and found five only genuine. Two or three were deteriorated, some were adulterated with water, besides having been skimmed. He proposed to send notice of the adulteration to the seller. The report was ordered to be printed."

The Attorney-General said the Act seemed clearly to lay down that when an analyst had cases of adulteration brought before him it was his duty to lay them before the magistrate, who would issue a summons, and with whom the matter would then rest. As to the other part of the question, he was sure the noble lord would see that he could give no authoritative answer. Nothing in the Act of Parliament forbade an analyst from sending notice of the adulteration to the seller; he could only say that if he were the analyst, he should not do it.

Snake Bites in India.

In reply to a question by Sir J. Hay as to the number of persons killed annually in India by snake bites, and whether any more active steps were about to be taken for the destruction of poisonous reptiles as well as for ascertaining methods of cure,—

Mr. Grant Duff said that it would appear that 14,529 persons had lost their lives by snake bites alone in the year 1869. Later returns had not distinguished deaths caused by snakes from deaths caused by other dangerous animals, but in 1871 the total deaths caused by dangerous animals amounted to 18,078. The subject of the destruction of snakes and of the medical measures to be adopted in consequence of snake bites is occupying much attention in India, and he thought Dr. Fayrer's remarkable book, of which 340 copies have been sent to India for distribution, is likely to produce excellent results.

Juries Bill.

The Committee on the Juries Bill is fixed for Thursday next, June 5, and is placed first in the orders of the day.

Trade Marks' Registration Bill.

The Second Reading of the Trade Marks' Registration Bill is deferred until Monday, June 9.

Shop Hours' Regulation Bill.

The Second Reading of the Shop Hours' Regulation Bill is fixed for Tuesday, June 24.

Weights and Measures (Metric System) Bill.

The Second Reading of the Weights and Measures (Metric System) Bill is fixed for Wednesday, July 16.

Death from an Overdose of Laudanum.

An inquest was held at Amble on Monday, May 19, to inquire respecting the death of W. E. Melrose, who had been found dead in his bed, and a bottle labelled "laudanum, poison," near him.

After evidence as to the finding of the body had been given, Mr. Thomas Brewis deposed that he was a chemist and druggist, and resided at Amble. Deceased went to his shop on the previous Thursday evening and asked for a small quantity of laudanum. Witness inquired what he was going to do with it. Deceased replied that witness need not be afraid to let him have it, as he had been in the habit of taking laudanum which he had obtained from a medical man, but that he had come away and left his bottle. To a question how much he took for a dose deceased replied "twenty drops." He also said that he took it because be could not sleep on account of pain in his leg. Witness gave him an ounce in a bottle bearing a similar label to that on the bottle produced. The laudanum was his own preparation, and was of the usual strength.

Dr. R. Wilson, who had made a *post mortem* examination of the body, stated his opinion that death had been caused by a narcotic poison like opium, and the jury returned a verdict "Died from the effects of an overdose of laudanum accidentally taken.—*From the Alnwick Mercury.*

Adulteration of Milk.

At Liverpool, Charles Edward Shakeshaft, milk-dealer, was charged before Mr. Raffles with having sold a mixture purporting to be milk, which, on being analysed, was found to be mixed with water. Mr. Atkinson, deputy borough solicitor, conducted the prosecution. William Goodier, clerk in the office of the Inspector of Nuisances, gave evidence to the effect that on the 20th ult. he had gone to the defendant's shop, where he purchased a pennyworth of milk. This milk had been handed over to the borough analyst, who certified that it contained 6 per cent. of water. The defendant stated that he did not keep cows himself, but was supplied with milk by farmers who lived at a distance. No adulteration had taken place to his knowledge. Mr. Raffles, remarking that mixture of water with milk to the extent of 6 per cent. must be apparent to anyone, fined the defendant 20*s.* and costs. When called upon to pay the fine, the defendant emphatically declared that such a penalty was worse than a highway robbery, a remark which drew from Mr. Raffles the intimation that if it was repeated the defendant would be committed to prison.—*Liverpool Albion.*

Charge of Selling Adulterated Cocoa.

At the Richmond petty sessions, Mr. Cave, a grocer, was summoned for having sold "Fry's Soluble Cocoa" as an unadulterated substance. The article had been analysed by the county analyst, who stated that it was adulterated, as it contained a mixture of sago and sugar, though nothing injurious to health. But it was shown that the label attached to each packet distinctly stated the cocoa to be "manufactured," being "combined with other perfectly pure and wholesome ingredients." It was further alleged that an Act of George IV. sanctioned such mixtures, especially with reference to cocoa, and that there was no attempt at concealment or deception, no selling of a positively hurtful commodity, and no breach of the law so far as either manufacturer or retailer understood it. The magistrate dismissed the case, with the remark, that when a customer could not read his attention should be drawn to the nature of the statement on the label.—*Daily Telegraph.*

Reviews.

Lessons in Elementary Physiology. By Thomas H. Huxley, L.L.D., F.R.S. Sixth Edition. London: Macmillan and Co. 1872.

First Principles of Human Physiology, and a few Applications of them; with Suggestions for Practical Work. By W. T. Pilter, Certificated Teacher of the Science and Art Department. London: John Kempster and Co.

The study of physiology is not only of surpassing interest, but it is of great practical importance. It teaches us how we live and how we move; it tells us the use of each part of those wondrous pieces of mechanism which we call our bodies; and it shows us the complicated arrangements by which they are all made to work harmoniously together. It is hardly possible to conceive of any pursuit more enticing than the endeavour to gain such knowledge as this, and we are inclined to wonder that everyone does not try to learn something regarding his corporeal being, even supposing that he should thereby do nothing more than gratify his curiosity. But interest is not the only recommendation which a study of physiology possesses. An acquaintance with the conditions requisite for life and health must necessarily involve more or less knowledge of those which induce disease or encourage it to spread, and its possessors are thus induced to seek for the former and avoid the latter. Such being the recommendations of physiology, it is astonishing that it has been so long neglected in schools; but it is now being very generally taught throughout the country, thanks to the exertions of Professor Huxley. Indeed, one of the great hindrances to the teaching of physiology in schools was the want of a proper text-book, as most of the treatises on the subject before the appearance of Professor Huxley's were either so meagre as to be of little service, or so technical as to be adapted rather for the use of university students than of school boys. In the present volume the author's extraordinary powers of exposition are displayed to a remarkable extent, every fact being stated with such clearness that it cannot fail to be apprehended by the meanest capacity. The admirable arrangement also assists the memory so much that the contents of the book are retained with ease, and it is only after comparison with other works that one fairly comprehends the immense amount of information it contains. Although it only bears the modest title of 'Elementary Lessons in Physiology,' it might well be called the Essentials of Physiology, for there is hardly anything of importance which has been entirely omitted. On comparing the present edition with the second, we do not observe any great alteration in the text. The absence of valves in certain veins is noticed, and a much fuller explanation is given of the nature of the pulse and of the conversion of the jerking flow of blood in the arteries into a quiet stream in the veins. Some additions are made to the account of the physiology of the liver and of digestion in the intestines. A fuller description is given of the anatomy of the eye-ball, and the necessity of some parts of it for distinct vision is more clearly explained. With the view of impressing the nature of reflex actions more strongly on the memory, an account is given of the method of showing them upon a frog. The notice of epithelium has been somewhat extended. In the preparation of this edition, as in former ones, the author has been assisted by Dr. Michael Foster. The chief alterations are in the woodcuts, which number 103 in the present edition, instead of 86 as in the second. Many of these are, of course, new, but several of those which were also found in the second edition have been enlarged and rendered more distinct. In some instances, also, representations of parts of the human body have been replaced by drawings of the same parts in the dog, rabbit, sheep, or frog. This has been done, as the author explains in the preface, with the view of aiding those who attempt to gain something more than a mere book-knowledge of the subject, by studying the organs themselves. The new woodcuts are good, and most of the old ones are still fair; but some of the blocks are beginning to show signs of wear from the numerous impressions which have been taken from them. This is especially evident in fig. 41. The type is not nearly so clear, nor the paper so good, in this edition as in the second, and the page is so much broader, that the eye cannot take in the whole of a line at a glance, as was the case in the other. We hope that in the next edition the publishers will return to the old type, size of page, and quality of paper, as they will thereby add greatly to the comfort, and, we believe, also to the profit of the readers.

Mr. Pilter's work is in the main an abstract of Professor Huxley's, and like most abstracts is rather dry. It contains, however, some notes of the methods of performing certain experiments, such as dissecting the eye, etc., which may prove useful to those who are trying to become practically acquainted with the elements of physiology.

Report on the Caoutchouc of Commerce; being Information on the Plants yielding it, their Geographical Distribution, Climatic Conditions, and the Possibility of their Cultivation and Acclimatization in India. By James Collins, F.B.S. Ed., etc. With a Memorandum on the same subject by Dr. Brandis, Inspector-General of Forests to the Government of India. Printed by order of Her Majesty's Secretary of State for India in Council. London. 1872. (Pp. xii. 55; 2 maps and 4 plates.)

A milky latex, which, when dried, possesses the peculiar elasticity of india-rubber, is a somewhat scarce production, at all events in sufficient abundance to render its collection profitable. It occurs only in the bark of certain trees and shrubs in the tropics, each great tropical region having some caoutchouc-producing species. It is very remarkable that a substance apparently identical in properties, if not in chemical composition, should be afforded by, so far as is known, a few isolated plants, all included in the three natural orders *Euphorbiaceæ*, *Apocynaceæ*, and *Artocarpaceæ*, groups the structural affinities of which are of the slightest kind.

The author of this 'Report' is well known to have paid considerable attention to both the commercial and botanical relationships of caoutchouc. In 1868 he published a useful paper in the 'Journal of Botany,' then conducted by the late Dr. Seemann, who was greatly interested in the economic value of plants, and this was extended in the next year into an elaborate account of the whole subject read before the Society of Arts. The Indian Government have therefore been well advised in their selection, and have indeed secured a very comprehensive and suggestive Report, forming, probably, the best single account of the subject yet published.

The chief, if not the only, source of the caoutchouc at present obtained from our Indian possessions is the *Ficus elastica*, Roxb. This tree grows wild in the Himalayas, especially in the rich, moist valleys of the Assam district whence it is exported: the distribution of the tree in this district is well exhibited on one of the maps accompanying the 'Report.' "Assam rubber," however, fetches but a low price in the market compared with the South American kinds yielded by various species of *Hevea*. This is largely due to the very faulty method of collecting, which allows the juice to become mingled with much bark, sand, and clay. Little or no control has been exercised over the collectors, and the result of the reckless and improvident way in which the cutting or tapping of the trees has been practised is, that they have been destroyed in thousands, and, unless artificial planting be carried out, will become exterminated in large districts. Systematic cultivation has been already recommended by Mr. Gustav Mann in the 'Report of Forest Administration in Bengal for 1868–69,' and is strongly insisted upon by the author, who also here gives various useful directions as regards the best methods of tapping the trees. To obtain a full flow of juice it is not necessary to cut deeper than into the middle layer of the bark, where the laticiferous canals ramify; deeper cutting injures the trees.

In addition to *Ficus elastica*, the introduction of as many other caoutchouc-producing trees as possible is recommended, so that it may be determined which are most suitable for cultivation in the Indian climate. As bearing upon this point, the 'Report' contains a full account of all the important sources of the substance, arranged under the three natural orders above mentioned. The botanical synonymy and the distribution of each are given, as well as details of the climate of the districts in which the best sorts are found. The distribution of the trees over the globe is clearly exhibited by a coloured map, and the 'Report' is further adorned by four plates by Mr. Blair, representing *Hevea brasiliensis*, the chief source of "Pará" caoutchouc; *Castilloa elastica*, which yields the "Guayaquil" or Ecuador sort; *Landolphia ovariensis*, whence the "West Coast" (Angola) kind is procured; and *Castilloa Markhamiana*, a new species, found by Hayes in Panama, and appropriately dedicated by the author to Mr. C. B. Markham, of the India Office. The plates have had the advantage of the supervision of Mr. Carruthers, of the British Museum. The Madagascar variety, which has taken a good position in the market, is afforded by species of *Vahea*, and the same natural family (*Apocynaceæ*) gives caoutchouc in America from *Hancornia speciosa*, etc., and in Asia from *Urceola elastica* and *Willoughbeia edulis*.

Mr. Collins's 'Report' is supplemented by a memorandum by Dr. Brandis, which thoroughly seconds all his recommendations.

The Expression of the Emotions in Man and Animals. By Charles Darwin, M.A., F.R.S., etc. London: John Murray.

In this literary age, when books are produced in shoals by a process which seems to be growing ever more mechanical and less personal, so as to require a minimum of thinking and a maximum of writing, it is very delightful to meet with a work which is based upon thirty-four years' more or less active observation and thought by a man of singular mental power. One of the most striking characteristics of Mr. Darwin's book is the wonderful wealth of data collected from the most varied sources. A catalogue of the authorities quoted would be a formidable list, as there is hardly a page which has not at its foot several references to the writings and observations of others.

Mr. Darwin's plan of study was, as stated in his introductory chapter, firstly, to observe the emotions as exhibited by infants; secondly, by the insane, because in these cases conventional restraint does not interfere; thirdly, to exhibit photographs of *artificial* expressions, obtained by acting upon the various muscles by galvanism, to a number of persons without explanation, and obtain their unbiassed opinion as to the emotions expressed; fourthly, to study pictures and sculpture; fifthly, to obtain replies to a number of queries from observers living amidst isolated races of men; and lastly, to closely watch the lower animals.

He enunciates as the result of his inquiry, three general principles of expression which he considers fundamental. These are, first, "that movements which are serviceable in gratifying some desire, or in relieving some sensation, if often repeated, become so habitual that they are performed, whether or not of any service, whenever the same desire or sensation is felt, even in a very weak degree;" second, "if certain actions have been regularly performed . . . . under a certain frame of mind, there will be a strong and involuntary tendency to the performance of directly opposite actions . . . . under the excitement of an opposite frame of mind;" third, "that certain actions, which we recognize as expressive of certain states of the mind, are the direct result of the constitution of the nervous system . . . ."

The first of these is generally admitted by psychologists and the third by physiologists. In the consideration of the second, Mr. Darwin gives some exceedingly interesting illustrations, the various moods of dogs and cats being described with a fidelity which must strike every reader.

Having given some considerable attention to these three principles, he proceeds to consider the expression of the various emotions in detail, treating of suffering, anxiety, despair, joy, reflection, ill-temper, determination, anger, disdain, helplessness, surprise, fear, blushing, etc., etc.

The chapter on suffering and weeping is illustrated by six photographs of children, which are well chosen for the purpose, although it must be admitted that they are for the most part far from handsome. Indeed, if we do not mistake, enlarged copies of the first are now to be seen for sale in London, with the title of "Ginx's Baby," perhaps bewailing his "birth and other misfortunes."

In this and the next chapter on the more passive forms of suffering, the minuteness with which the anatomy of the subject is treated is especially noteworthy, the action of each muscle concerned being carefully considered and ascertained. The author appears to have perfectly succeeded in confining his attention to one detail after another without being distracted by the general effect. The difficulty of this will be seen from the statement which he makes in his introduction—that his study of the works of painters and sculptors gave him little information, because the emotions were almost wholly expressed by skilfully given accessories; and yet everyone will admit that the absence of expression by means of the muscles in pictures and sculpture is not noticed, the attention being rivetted on these accessories.

While feeling great diffidence in differing from the opinion of one who has given so much attention to the subject as Mr. Darwin, we cannot avoid the impression that the photograph No. 1 on plate vii. does not express the emotion of pure astonishment, but rather a mixture of that with a sort of unconscious fear. It is that of a man who is astonished at something *in motion* near him, or at something which has come rapidly within sight, and the hands are raised unconsciously as a protection. The face also conveys to us the notion of fear as well as astonishment. Unmixed astonishment, we should rather say, was expressed by the whole body becoming fixed, motionless, in or nearly in the attitude in which it happened to be when the attention was first aroused. As, for example, when one is astonished at something easily within sight, but not in rapid motion, and not causing any sense of fear. Then the mouth is opened slightly, as Mr. Darwin says, for silent breathing, and the eyes widely in order to obtain a clear view; but the body and limbs remain "forgotten and neglected."

The chapter on self-attention and blushing contains an anecdote which is so good that we cannot refrain from extracting it:—"A small dinner-party was given in honour of an extremely shy man, who, when he rose to return thanks, rehearsed the speech, which he had evidently learnt by heart, in absolute silence, and did not utter a single word; but he acted as if he were speaking with much emphasis. His friends, perceiving how the case stood, loudly applauded the imaginary bursts of eloquence whenever his gestures indicated a pause; and the man never discovered that he had remained the whole time completely silent. On the contrary, he afterwards remarked to a friend, with much satisfaction, that he thought he had succeeded uncommonly well."

The same chapter is especially interesting on account of the important evidence brought forward to show the direct action of the mind upon the various organs of the body.

Taking the book as a whole, we can speak of it only in commendation as regards the department of observation; but when Mr. Darwin proceeds to draw inferences from his facts, it is at once felt that the solid foundation has been left. Much would have been clearer if distinct and accurate definitions had been given of terms such as "*instinct*," "*innate*," etc. But the prominent feeling left in the mind of the reader is, that in this book, as in the author's former one, 'On the Descent of Man,' the conclusions with reference to the evolution hypothesis are too large for the premises. Perhaps even so cautious a thinker as Mr. Darwin may have a fixed idea, and bring observation afterwards to support it. To say the least of it, many readers will probably think with the writer of this notice, that the lowest type of man is still removed from all other animals by a large space in the scale of creation, which is not lessened by this book, and is not very satisfactorily accounted for by the evolution hypothesis as at present propounded; and that the problem of the origin of man cannot be discussed with any chance of a successful solution while the lower, animal, portion of his nature is alone considered, to the exclusion of the higher and vastly more important part, his mind.

"To matter or to force
The all is not confined;
Beside the law of things
Is set the law of mind."

BOOK RECEIVED.

Les Plantes Médicinales et Usuelles de nos Champs —Jardins,—Forêts. Par H. Rodin. Ordré de 117 Gravures. Paris: J. Rothschild. 1872. From the Publisher.

Obituary.

Notice has been received of the death of the following:—

On the 11th May, 1873, Mr. Gabriel French, Pharmaceutical Chemist, of Chatham. Mr. French had been a member of the Pharmaceutical Society from its foundation in 1841.

On the 10th May, 1873, Mr. John Hudson Lewis, Chemist and Druggist, of South Street, Cockermouth.

Notes and Queries.

AERATED WATERS.—After being engaged in the aerated water trade some years, *W. Chamberlin* has met with a difficulty which completely baffles him, and concerning which he would be glad to receive any suggestions. When first made the waters appear all that could be desired, but after a few days small particles of a white flocculent matter are to be seen which gradually increase, and especially in the lemon and soda appear like bread crumbs. When opened all the aroma of either lemon or ginger is entirely gone, and after standing a short time, the water becomes fetid. The machine is certified to be in perfect working order, and the water is filtered through one of the London Water Purifying Company's filters.

[Probably the water used is not free from organic contamination.—Ed. Pharm. Journ.]

DISCOLOURED PRINTS.—*G. C.* would be glad to hear of a method by which the brown tint acquired by prints and books through age can be removed.

PRESERVATION OF HYPODERMIC SOLUTIONS.—Professor C. Johnston, of Baltimore, suggests (*Amer. Journ. Pharm.* May, 1873) the use of sulphurous acid in preparing solution of morphia for hypodermic use. He states that he has carried in his pocket for a month a half-ounce vial of a solution (1 in 30), to which sulphurous acid had been added in the proportion of from three to five drops to the fluid ounce, and at the end of that time the fluid was clear and free from any fungous formation. Professor Johnston also says that in use he has found such a solution to be as little painful as the ordinary one of Magendie, and but very little more so than the simple aqueous solution.

Correspondence.

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

Pharmaceutical Progress.

Sir,—Sometimes those stationed at a little distance from a battle-field can tell better how the fight is going than those immediately engaged in it; those on the look-out at sea generally mark the distant breakers or a coming storm before those guiding the ship's course. It is from this point of view that I trouble you with a few remarks on the position of the Pharmaceutical Society at the present time.

On opening a recent number of the Journal I was sorry to find that "the admission of women as members of the Society" was to form a prominent subject of discussion at the approaching General Meeting. That our "potent, grave, and reverend seigniors" should have no better subject than this to talk about, or that it should occupy any considerable portion of their time, seems to me a woful pity, when there are so many urgent practical questions affecting the interests of chemists pressing for solution. Without any disrespect for the ladies, I think questions of this nature are best dealt with somewhat after the method recommended to "Little Bo-Peep" in the old nursery ditty for recovering his missing flock,—

"Let them alone, and they'll come home
And bring their tails behind them."

If, as a matter of business, "the admission of women" must be brought forward, by all means let it be disposed of as speedily as possible. Women may, doubtless, make good dispensers, but that is no reason why they should be admitted to the Society so as to hold office and rank with men, which, on the face of it, is absurd. Nominally, in order that, as in the case of widows, they may carry on businesses by the help of a qualified assistant, there is, of course, no objection to membership. As to ladies joining the Society with the view of competing with men in business —carrying on business except by proxy,—the thing is a chimera. Two or three will be sacrificed and be left as scarecrows to frighten away the rest.

The "Correspondence" columns of the Journal teem with matters of far greater interest and importance to the trade in general than that above mentioned. Besides the sale of drugs by hucksters, the cooperative store grievance, the unsatisfactory state of the patent medicine licence and stamp duties, and the oppressive operation of the excise, there is the Benevolent Fund and the general constitution of the Society, in addition to a host of minor subjects "too numerous to mention," all of which more or less demand the attention of the executive, assisted by the general expression of opinion on the part of the members. Not to trespass too much on your space, permit me to say a few words on two of the topics here alluded to, viz., the Benevolent Fund and the constitution of the Society.

The Benevolent Fund has been pressed upon the notice of the members lately (I believe with good effect), and quite rightly so. More money ought to be contributed for this object, and more also *distributed* on account of it. In the Journal for April 19, *J. B. B.* ironically congratulates the trade on the presumption that "there are only thirteen needy druggists or druggists' widows." Alas, alas! who does not know that many who never come before the Society as annuitants, are yet only dragging out a struggling existence behind the counter? The number of annuitants is no criterion of the actual "state of trade" amongst us. Many doubtless contribute to the Fund because others do, whose "small returns" barely warrant it, and who ought almost to be recipients rather than contributors. Might not some means be devised of rendering this Fund more generally available for those who, through illness or misfortune, had become so depressed as to have no hope of again rising into that commercial independence which perhaps they once enjoyed, and yet who had too much delicacy of feeling, and were not precisely in the condition, to come before the Society *in formâ pauperis?* Are there not cases in which seasonable and needed help might be thus quietly rendered without the appearance or sense of gratuity? If the annuitants are no criterion of our prosperity, certainly the number of subscribers to the Benevolent Fund is no index to our generosity. If many give who barely can, many more do not give who long to and dare not. Were the annual subscription (as I shall presently suggest) done away with, we should all have more for benevolent purposes.

The constitution of the Pharmaceutical Society is a topic of vital interest to all the members, and indeed to the trade generally. A short time since Mr. Sandford (whose remarks are always worth listening to), speaking, I believe, on this very subject,—the admission of women, —observed that our Society was a "*private* society." In saying this I think he hit unintentionally its main defect. It *is* a "private society," and as such has done good service, but it ought to be such no longer. The time is come, or at least approaches, when it should expand into a public body, a national corporation, similar to the medical faculties, the colleges of physicians, surgeons, etc. Allow me briefly to indicate one or two changes and some advantages which, presuming this transformation possible, would thereupon ensue. First, we should have a change of name. Instead of "Pharmaceutical Society of Great Britain" (Royal or British or—) "College of Pharmacists or Pharmaceutists" (not "of Pharmacy," which, with all due deference to our American cousins, is a misnomer). Then, in lieu of being a joint examining and educational body, the Society would become simply an examining and protective one, the educational part being left to private enterprise, or, if carried on by a society, officially disconnected from the examining body. The basis of membership, again, instead of resting on due payment of subscription *plus* examination, would rest on examination alone, the fees being so regulated as to cover the working, parliamentary, and other outgoings, which, with no educational expenses, would be considerably reduced. Conjointly with these changes some modification of the present legal status might seem desirable. For example, the present Major qualification (M.R. [or B.] C.Ph.) should be compulsory in cities and larger towns; the Minor qualification (A.R.C.Ph.), in order to meet the requirements of country places, being sufficient for smaller towns and villages. A higher *optional* status of "Fellow" might be created, and the present scholarships and medals retained, with such modifications as would render them consistent with a purely examining body.

I have no room left to enumerate the advantages which might result from such a change. Many disadvantages of the present state of things would, at any rate, disappear. The educational department would no longer fetter the resources of the Society, whose whole energies would then be directed solely to the registration of duly qualified pharmacists, and to the protection of their professional interests. A "College," being a national and public body, would obtain a general recognition, and possess a parliamentary influence which no "private society" ever can. Thirty or forty years ago education was a necessary part of the Society's operations, but of late the facilities for acquiring knowledge have so much increased, that this may safely be left to private enterprise, or form a distinct social one. On the other hand, the requirements of examination, protection, benevolence, and so forth, have also increased, so that these may now well form an object in themselves. The examinations would, in such case, doubtless rise in public estimation; there could be no suspicion of partiality, cramming might be better guarded against, and a somewhat higher standard introduced. With no educational duties (on the whole, I believe, rather a loss than a profit to the Society) and with compulsory examinations, probably little, if any, increase on the present scale of examination fees would be needed to meet the expenses of an examining and protective body, especially if the number of Major candidates were increased. The discontinuance of the subscription would be a boon which requires no comment, its natural influence on the Benevolent Fund is self-evident. A further advantage arising from this change in the organization of the Society, would consist in opportunities for exerting influence in Parliament. The Society has done, and is doing, much in this way. Could it not do more? Has it reached the limit, the ultimatum, of its power in this direction? Would Jacob Bell say so if he were now amongst us? Would it not be possible, under a superior organization, to exert a greatly increased pressure on the Legislature in the interests of our body and of the public thereby? There is plenty of need for this—but where are our advocates? Have we any in the great council of the nation? We have been congratulated of late in the Journal because some pharmaceutical chemists have been, here and there, elected to the office of mayor, and one (who was a P. C.) has received the honour of knighthood. Why should not chemists go a step higher, or at least get a broader footing? Is Jacob Bell to be the last of the pharmaceutical M.P.'s, as, I believe, he was the first? It might be one of the avowed objects of a representative and examining pharmaceutical body to secure the election to Parliament of wealthy and aspiring pharmacists, who might thus do good service to their community when any question arose affecting its interests. At any rate, a change of this sort would prevent our drifting into a mere *dilettante* society, which, with our dinners, balls, conversaziones, and so forth, we run some chance of doing, or at least of being "content with things as they are." After all, it is not so much for our own good as for that of those who will come after us that we are pharmaceutical chemists at all.

I have thus attempted, in a few moments snatched from many other occupations, to sketch a rough outline of pharmaceutical progress. My ideas will doubtless be generally regarded as Utopian and impracticable; but those who may think they possess any value, are welcome to the use of them.

AN ON-LOOKER.

P.S.—By the report of the Council I see twelve persons received grants from the Benevolent Fund last year, besides the annuitants. Probably many more (judging from letters in the Journal) needed help, whose cases the present regulations of the Fund would not meet. The report, in other respects, shows "something attempted, something done:" however, I send my letter (which was written before I saw it), as there is always room for improvement, even in the "best-regulated family."

Admission of Women as Members of the Pharmaceutical Society.

Sir,—Mr. Sandford was wrong in his assertions on the 21st inst., when he said, "I had been on the register because my father had been a chemist and druggist, and that I was manager or housekeeper in an asylum."

The ground upon which I based my application for membership, was the fact of my registration on the 21st December, 1868, and in compliance with clause 18 of sec. 10 of the Society's bye-laws.

I never have been manager or housekeeper in *any* establishment; for nine years and a half I have held the appointment of secretary and dispenser in a private asylum, which appointment has nothing whatever to do with my claim upon the Society; I consider that my having been in business (on my own account) upwards of nine years, before the passing of the Act of 1868, proves the legality of what I maintain.

ELIZABETH LEECH.

Effra Hall, Brixton, 28th May, 1873.

The Shop Hours' Regulation Bill.

Sir,—Having read the remarkably well-pointed letter of your correspondent "Audi Alteram Partem," I think he has expressed the opinions of a very large number of your readers in a most comprehensive manner.

The "Shop Hours' Regulation Bill," if passed, will confer an immense boon on pharmacists in general. I am sure that no druggist will object to it, as it will give a good ground for even those most obsequious to the wants of the public, to close their establishments at a proper hour. It is only reasonable that those who have examinations to pass should have time to prepare for passing them; but this consideration seems to be overlooked at present.

I was very much surprised to read in page 924 of last week's number of the Journal, that a meeting of the Pharmaceutical Society had been held in London, and after passing more stringent bye-laws in regard to the examinations, the Vice-President said, in regard to the above Bill, that it was hardly possible for such a Bill to pass the House of Commons, but that the Parliamentary Committee would give it their attention. If by this an opposition to the Bill is meant, it is surely not in concurrence with the opinions of the profession at large.

EXCELSIOR.

Colouration of Glass by the Solar Ray.

Sir,—During the memorable cyclone that visited our southern coasts during twelve or fourteen hours on the 16th December, 1869, the Longship lighthouse, Land's End, suffered considerable damage.

By the courtesy of a gentleman residing in that part of the country, I am favoured with a specimen of plate-glass (enclosed) which, although half an inch thick, was entirely smashed by the force of the waves in that terrible storm.

The remarkable change in the colour of the glass from pure white to an amethystine hue must be ascribed to the action of the actinic solar rays upon the binoxide of manganese employed in the manufacture of the glass to increase its brilliancy. The proportion of oxide used may have been larger than usual.

Wherever the glass was protected from the sun's influence—as at the edges, where covered with putty—it retains its original purity of appearance.

A change has probably been wrought in the molecules of the glass, by reason of which it reflects purple only, instead of all colours, as it would naturally do,—the colorific rays may have also had a share in producing the change.

It is observable that the windows of the Hand-in-Hand Insurance Company, Blackfriars, have been similarly affected.

Visitors to Richmond often notice the purple glass in the windows of a house situated at the Park entrance; it is said by some to have been chosen by the original possessor of the old mansion, who died long ago, but it is more likely that the exposed position of the windows to a full blaze of light and heat may have conduced to the result.

R. GOODWIN MUMBRAY.

Richmond, S.W., May 18th, 1873.

The Minor Examination Bye-Law.—We have received from Mr. Hampson a copy of a letter addressed by him to Mr. Carteighe, with a request that it should be published, but since the letter deals chiefly with personal matters, we do not think this desirable. Moreover, it contains incidentally reiterations of the opinion that the Minor Examination bye-law is illegal, and of the charge that a proper report has not been given in this Journal of the proceedings of the Council. Both have, we believe, been so fully disposed of as not to require further discussion.

H. G. R.—Only the "tincture and all vesicating liquid preparations of cantharides" are included in the poison schedule.

"*Taraxacum.*"—You were elected an "Associate" at the February meeting of the Council, and your name appears in the "Transactions of the Pharmaceutical Society," printed in the PHARMACEUTICAL JOURNAL, p. 629. No certificates of associateship are issued by the Society.

J. Houlton.—We are obliged for the expression of your opinion and will bear it in mind.

"*Analyst.*"—In all probability the use of such a preparation as you refer to would be considered within the provisions of the Act.

E. H. Storey.—Your letter has been handed to the Secretary.

E. Brown.—We are obliged to you for the information in your letter.

Mr. Ford.—The receipt of your letter was acknowledged on p. 920, but we have not hitherto been able to insert it.

J. M. Fairlie.—Your letter with inclosure has been received and shall have early attention.

"*Hypo.*"—Your question is rather legal than pharmaceutical and you would find a lawyer best able to answer it.

"*A Student.*"—The word "zoological" refers to the animals yielding substances used in medicine.

J. J. Matthias.—Your price was moderate enough. We cannot understand how less could be charged.

Errata.—On page 862, col. ii., line 50, *for* "aceti" *read* "aceta;" line 55, *for* "vini" *read* "vina;" page 925, col. i., line 12 from bottom, *for* "Mr. James Garle" *read* "Mr. John Garle."

We are requested to state that the rejected candidate for Council was not Mr. W. V. Wright of the firm of Wright, Sellers, and Layman, but Mr. G. H. Wright.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. H. Arundell, J. Askew, J. Hallawell, J. Abraham, W. Oxford, J. Leay, H. W. Breton, E. W. Jackson, Dr. Nichols (Boston, U.S.), G. C. Druce, E. S. Balchin, G. W., J. A., C. E. G.

SOME RECENT PROPOSALS RELATING TO HEATING AND LIGHTING.

Whatever may be the position of our country as regards the study of the sciences, there can be no question as to the activity of the British inventor. The philanthropist and the commercial man, the amateur and the professional, are all busily working their brains to devise new plans, and for the most part their fingers, to make their schemes known to the public. We seem, like the Athenians of old, to "spend our time in nothing else but either to tell or to hear some new thing." The inventors proceed in very various ways. One will, after much thought and many experiments, bring out his method carefully elaborated and supported by a strong mass of evidence. Another is fired by an idea, and without apparently thinking about it at all, or trying a single experiment, snatches up a pen and "writes to the *Times*" or other paper, leaving the details to be arranged by men of less genius but more practice.

We propose to examine a few of the plans which have recently been suggested as improvements in heating and lighting, with especial reference to the scientific laws affecting them.

The first was made known in a letter to the *Times* of October 18th, 1872, under the heading "Supplementary Fuel," by the Rev. Henry Moule, so well known for his labours in the sanitary field. He proposes to cover the bottom of an ordinary grate with lumps of chalk to a depth of from two to six inches, and light the fire as usual on the top. Whilst sympathizing with him in his desire to benefit his fellow-man, and not doubting for a moment his accuracy in reporting the results of his experiments, we are bound to say that he appears to have entirely misunderstood the real bearing of the question, and that his letter exhibits a lamentable want of acquaintance with elementary chemical facts. Take the following passage as an example:—"With those who have ever noticed or read of the great specific heat of chalk, or the large amount of carbonic acid contained in it, and the convertibility of that acid by means of heat into carbonic oxide (a combustible form or substance) . . . or the effect in smelting ore of a few hundred-weight of limestone or chalk, it has long been a matter of strong persuasion that the time must come when, at least for domestic purposes, chalk, if not limestone, shall be made subservient to the increase of warmth and heat and to the diminution of the consumption of coal." Now, passing over the ambiguous use of the term "specific heat," there are in these few lines two errors of the first magnitude. Taking the latter first; chalk or limestone is not used in smelting as supplementary fuel, but merely as a flux; that is to say, in order to obtain a readily fusible slag. But for its use in this capacity, the smelter would gladly dispense with the limestone, which, far from serving as fuel, actually appropriates a considerable quantity of heat. But the first error is perhaps more important. Carbonic acid is *not* convertible into carbonic oxide by means of heat. A reducing agent is also necessary, and since ordinary combustion is a process of oxidation, reduction, the reverse of this, may be called *unburning*. Taking carbon as the reducing agent, the change may be represented in chemical symbols, thus,—

$$CO_2 + C = 2CO,$$

so that every forty-four parts of carbonic acid require

twelve parts of carbon to reduce them to carbonic oxide. Mr. Moule seems to have been misled by confining his attention to the bare fact of the combustibility of the carbonic oxide thus obtained, neglecting the consideration of the quantities concerned. It is true that the carbonic oxide will burn and thus give out a large amount of heat, but this is due entirely to the carbon employed in reduction, as we have seen above. The combustion of the carbonic oxide would be represented by the symbols

$$2CO + O_2 = 2CO_2.$$

Now if these two sets of symbols be put together we have,—

$$(1)\ CO_2 + C = 2CO,$$
$$(2)\ 2CO + O_2 = 2CO_2,$$

or combining them,—

$$CO_2 + C + O_2 = 2CO_2,$$

from which it is evident that no heat is derived from the carbonic acid, or, which is the same thing, from the *chalk* employed. Indeed, heat is actually required to be expended in tearing asunder the chalk into its constituents, carbonic acid and lime, besides a considerable quantity employed in volatilizing the water always present in chalk. Mr. Moule seems to have been aware of this without really apprehending its import, for he says in a subsequent part of his letter, "the only thing to be guarded against is that of allowing the fire to sink so low that there shall not be sufficient heat in the coal to continue to extract carbonic acid from the chalk, in which case the fire becomes dull." A statement towards the end of his letter that chalk thus used "of necessity saves fourteen times its bulk of coal," is to us utterly incomprehensible and no explanation is given.

But although Mr. Moule's theory appears to be erroneous, his observed facts may be accounted for in another way, as indeed was indicated by Dr. Attfield in the *Times* of the next day. The heat evolved by burning fuel in a common grate passes off by three channels, by conduction through the walls and surroundings of the grate, by convection with the products of combustion, and by radiation. The proportion passing by the first of these cannot be materially changed except by a radical alteration of the principle of construction and fixing of the grate, and does not concern us at present. The heat taking the second course goes, or should go, wholly up the chimney, and is manifestly wasted, except that it may warm the walls through which the chimney passes, and is serviceable in maintaining ventilation. The third portion of the heat, that radiated, is principally concerned in warming our apartments, and any device which will transfer heat from the second to the third channel, will effect a corresponding economy. Mr. Moule's plan does this in two ways: by increasing the radiating surface, and also by diminishing the draught, and in consequence the quantity of heated air passing up the chimney. The lessened draught gives us a lower temperature in the grate which must be compensated by a larger mass of incandescent fuel, but the proportion of heat radiated is greatly increased, effecting a saving of fuel which may amount to 40 or 50 per cent. Of course there is a limit to the reduction which can be made in the draught, for, if too much diminished, the products of combustion would not be efficiently removed, and the fire would not be properly supplied with air. The only question we have now to ask, before quitting this part of our subject, is whether chalk is the best material for this purpose. The result of calcining chalk is lime, and this seems to be a very objectionable substance to form in a domestic grate, as it readily breaks up into a light powder which would be rapidly distributed about the room, and by its corrosive action do much mischief. Ordinary ashes are sufficiently unpleasant in that way, and lime would probably be much worse. On the other hand the same result may be attained by other means. The draught may be effectually and without trouble controlled by means of an iron plate at the bottom of the grate in place of, or upon, the usual grating, and radiating surface may be supplied by fireclay balls, etc., or by adjusting the draught so that the mass of fuel may itself be sufficiently large, without an unnecessary consumption.

The next scheme which we would consider is, like the preceding, a proposal to employ something which has already been burnt—an ash—as a source of heat, ignoring the real fuel employed. In a letter to a Manchester newspaper, a gentleman propounds a method "by which heat may be obtained at probably a cheap rate, and certainly, to an inexhaustible extent," namely, by the electrolysis of water, and subsequent combustion of the resulting oxygen and hydrogen. He is extremely candid, and says that he is "aware that the method has been in use for some time in chemical laboratories," and that his "project is purely a theoretical one, requiring, no doubt, alterations before it can become of practical value." The plan is described in considerable detail; the collection of the gases in separate receivers, their conveyance by pipes to the place to be heated, the arrangement of the jets at an acute angle, and the combination of the gases "producing a most intense heat, with a blue flame and an impalpable" (!!) "amount of steam." The flame is to heat a fireclay ball in order to facilitate radiation, and the whole is to be protected by a perforated earthenware cover. The author says that the advantages of this method over our present system of fires, "besides its cheapness," (!) are twofold—firstly, that no oxygen is removed from, or carbonic acid added to, the atmosphere; and secondly, that that desperately expensive luxury—an English fireplace and chimney—may be dispensed with. The last sentence contains a somewhat mysterious statement, namely, "that the two gases in question never explode so long as they are present in proper proportions."

Now, the author of this scheme apparently does not see that the real source of his heat is not the water decomposed and again formed, but the fuel employed in obtaining the zinc or other material used in the battery; and that the question does not turn, as he thinks, on "whether the intense heat of the oxy-hydrogen flame can be so placed as to render incandescent the whole surface of the fire-balls," but on whether his circuitous method of applying the fuel above mentioned admits of less waste of energy than other modes.

The third proposal which we will consider is primarily directed to lighting, although it is said to be also available for heating. We refer to the air gas introduced by the "Air Gas Light Company, Limited." Several schemes have at various times been brought forward for charging ordinary atmospheric air with some volatile hydrocarbon, so as to produce an inflammable mixture which shall serve as a substitute for coal gas. In the plan we are now considering, air is driven through a light hydrocarbon spirit, which has been subjected to a process (not made public) by which its proportion of carbon has been increased, as the light petroleum oil alone would hardly give sufficient illuminating power. There are four questions which at once suggest themselves in regard to this process. Can these light petroleum oils be always obtained at their present low price? The directors of the Air Gas Light Company seem to expect to obtain them at a still cheaper rate; but if their process were to come into general use it is very likely that the price would rise considerably, for its present lowness is probably due only to the absence of demand. Once find a use for large quantities of the material and the price must rise, just as did that of coal-tar and gas-liquor.

Next, is the "gasogen" a substance which can be safely stored in quantity? This may not be a matter of much difficulty if large public gasworks only are considered, where it would be kept and used under proper skilled superintendence; but the Company proposes to light private residences, churches, hospitals, etc.; and considering the class of persons in whose care it would probably be placed for such purposes, we can hardly think its use other than dangerous. We may mention that the Company apparently recommends the "generator" to be placed outside the building.

Further, can the illuminating power always be kept to the same standard? It must be remembered that the quantity of hydrocarbon taken up by the air depends on the temperature and on the time during which the air is in contact with the liquid. If it is allowed to stand for some time over the hydrocarbon, or is passed very slowly through it, it would become saturated, and the quantity of hydrocarbon volatilized would depend solely on the temperature; but if the current is too rapid the saturation would not be complete, and the amount volatilized would depend both on the temperature and on the rate of passage of the air. Therefore, to ensure a gas of constant illuminating power, the temperature and velocity must be uniform, or must vary proportionately.

Our fourth question is, can the gas be distributed through long services of pipes without deterioration, that is, without depositing the hydrocarbon with which it has been charged? The answer to this will depend on whether in its course it will at any point be reduced to a temperature below that at which the hydrocarbon which it contains would be sufficient to *saturate* the air. If this be the case, the excess of hydrocarbon must of course be deposited at that point, and the practical result would be a more or less rapid transfer of the "gasogen" from the "generator" to the cold region by a process of distillation. This is precisely the way in which it happens that we are so often troubled with "jumping" gas-lights, due to "water in the pipes;" and we need hardly point out that "*petroleum* in the pipes" would be far more objectionable, and, indeed, dangerous. This can be prevented, either by giving the air a charge of hydrocarbon so small that it would not be sufficient to saturate it at the lowest temperature to which it will be subjected, or by keeping the temperature of the generator below such a point. In fact, this latter would probably happen in any case, for the volatilization of the hydrocarbon renders latent a large amount of heat; and we are informed that the temperature of the generator is so reduced, that its exterior becomes covered with ice from the condensation and freezing of moisture from the surrounding air.

The last process to be mentioned is patented by Mr. Ruck, and is to be worked by "The New Gas Company, Limited." Superheated steam is passed over a mixture of coke and metallic iron at a high temperature. A mixture of hydrogen, carbonic oxide, and carbonic anhydride is thus obtained, which is called "heating gas," and is intended to be used for heating purposes without further treatment, except passing over oxide of iron to remove traces of sulphuretted hydrogen. In this state it is said to consist of about 58 per cent. of hydrogen, 30 per cent. of carbonic oxide, and 12 per cent. of carbonic anhydride. To convert it into illuminating gas it is made to bubble through light petroleum spirit of a specific gravity of about 0·680, in a similar manner to the "air gas."

This process has been advocated by some persons as utilizing what is called "the exhaustless store of heating power that lies ready to hand in water." But it will be clearly seen that this involves the same mistake as that in the first two processes which we have considered. For, although the hydrogen in the gas does come from the water introduced into the retort as steam, yet it is obtained at the expense of the coke and iron over which it passes. So that the heat is not derived from the water, but from the coke or iron; and the real question at issue is again, whether this is an economical method of obtaining heat from coal or coke.

It has been stated that the combustion of one ton of coke in the retorts, and of two tons externally in the furnace, will yield 133,000 cubic feet of gas, and that this will be increased in volume to 165,000 cubic feet by passing through the petroleum; the cost of the heating gas being estimated at 7*d.* per 1000 cubic feet, and of the illuminating variety 1*s.* 8*d.* In this estimate there is apparently no account taken of the cost of the iron oxidized (*i. e. consumed*) in the retorts, although this must be a point of some importance, especially as scrap iron is used, which is rather costly.

The four questions as to cost and storage of petroleum, uniformity of illuminating power, and practicability of distribution through pipes, all apply again here. It is true that certain advantages are claimed for this gas in regard to the last particular, but we fear these will not, for the most part, bear investigation. It is said that this product is a *true gas*, and that therefore it forms a more intimate union with the petroleum than air does. But it is evident that this is using the word "gas" ambiguously; for although air is not in the ordinary sense a *combustible* gas, yet it is quite as truly *a gas* as the mixture of hydrogen, carbonic oxide, and carbonic anhydride in question. The petroleum vapour forms precisely similar mixtures in both cases; and although the mixture would become homogeneous rather more rapidly in the "new gas" process than in the "air gas," yet the difference of time would be very slight, and, the mixture once made, the result would be as permanent in the one case as in the other. A real advantage in favour of the new gas is its low specific gravity—little more than half that of air—so that its passage through pipes would be effected with less mechanical difficulty.

On the other hand, we must point out two disadvantages. The first of these seems to be inseparable from the process, namely, the large percentage of carbonic oxide which the gas contains. It is a very serious matter to introduce into our dwelling-houses a gas containing 30 per cent. of so active and well known a poison as carbonic oxide. Of course, if we could be sure that it would all be burnt, no objection could be raised, but gas fittings are by no means always perfect, and serious escapes frequently occur. As this gas has decidedly less odour than common coal gas, the facility for detection in such cases would be proportionally diminished. The other disadvantage is the presence of so much as 12 per cent. of carbonic anhydride As this could be removed with little difficulty, we are rather surprised to see that the directors do not propose to do so; for it has a powerfully deteriorating effect upon the illuminating power. Mr. Barlow found that 1 per cent. of it in common coal gas caused a loss of 7 per cent. of light, and even if the New Gas Company is able by an increased quantity of petroleum to overcome this, it is likely that the removal of the carbonic anhydride would be much cheaper, and the purified gas would be less injurious to the atmosphere of the rooms in which it was burnt.

CHERRY-LAUREL WATER.*

BY M. LEGER.

The leaves of the cherry-laurel yield to distillation a volatile oil and prussic acid in variable proportions, dependent upon the time of year at which they are gathered. According to Brugnatelli, the most is obtained in the spring-time. Soubeiran, on the other hand, affirms that in the neighbourhood of Paris the leaves afford the richest yield in July and August. Garot states that in the month of April the leaves give, upon boiling them with water, a large quantity of vegetable wax and no volatile oil, whilst in August the contrary is the case. This observation the author has found to be completely erroneous, as he has obtained both products simultaneously at all seasons of the year. There being therefore considerable discrepancy between various authorities upon this subject, the author, in an investigation lasting more than a year, has sought to elucidate it, by ascertaining what period of the year corresponded with the largest quantity of hydrocyanic acid, leaving for future inquiry the estimation of the volatile oil. The method employed was that of Buignet.

The essence and the prussic acid, as has been shown by Lepage, preexist in the leaves of the cherry-laurel, being developed there during vegetation by the action of synaptase upon amygdalin, two substances which Robiquet had already found in almonds, and of which Wicke and Lepage had demonstrated the existence in the cherry-laurel. When, therefore, the leaves are distilled with water there is no chemical action produced, as in the case of almonds; the object of the distillation is simply to separate the products already elaborated by Nature. The author distilled each month 1 kilogram of leaves with sufficient water to obtain 1500 grams of product ('Codex'); the various distillates, containing all the essence and acid, were immediately titrated, and the following table indicates the results obtained during one year:—

January	76 milligrams.
February	96 „
March...	100 „

* Abstracted from the 'Répertoire de Pharmacie,' vol. i. new series, p. 369.

April	Old leaves	76 milligrams.
	Buds	100 „
May	Old leaves	44 „
	New leaves	110 „
June, Old and new leaves		84 „
July		125 „
August		116 „
September		110 „
October		106 „
November		100 „
December		66 „

The leaves were collected at the same period in every month from the same bushes, which were very vigorous, and had been grown near Paris under the best possible conditions, so that the numbers obtained are comparable with each other. The experiments being made at the end of each month, the figures indicate the maximum quantity of prussic acid produced during that lapse of time.

Examining attentively the preceding table, it will be remarked that the richness of the yield, instead of progressively increasing until the month of July, when it attains its maximum, presents in April and May a remarkable irregularity. In fact, the figures fall from 100 to 76; but, on the other hand, having gathered the buds which appear just then and distilled them, a distillate was obtained containing 100 milligrams of acid. The question arises, What is the origin of so enormous a quantity of acid in organs which have only been a fortnight in existence? It is not probable that the roots alone have contributed to its production: might it not be that the old leaves part with a portion of their elements to the new ones?

In May we see the same peculiarity renewed; the proportion of acid is lower in the old leaves and higher in the new ones, which are then half developed. In June a fresh anomaly presents itself; the proportion of 84 milligrams appears at first surprising, but this is explained if it be remembered that this product is obtained by distilling a mixture of equal parts of new and old leaves, and that the 84 milligrams expresses nearly the mean between the numbers 110 and 44 obtained in the preceding month. In July the hydrocyanic acid amounts to 125; from that time the proportion decreases, until at the end of December, after a cold of 20° C., it falls to 66.

These experiments show the extreme variability of cherry-laurel water, according as it is prepared at different periods of the year; they also explain the different results obtained with the similar doses, to remedy which inconvenience the 'Codex' prescribes a strength of 50 milligrams.

Cherry-laurel water, however, contains not only prussic acid in varying proportions, but also a volatile oil, which is a powerful poison, and of which the 'Codex' takes no account.

The titrated water does not remain long unaltered; it is known that it loses gradually part of its acid. To ascertain the rate and proportion of this loss, a portion of each monthly distillation was put into a well-filled glass-stoppered bottle, and examined after keeping for six months, with the following results:—

First titration. Immediately after distillation.	millig.	Second titration. After six months.	millig.
28 January, 1871	76	28 July, 1871	68
28 February	96	28 August	80
28 March	100	28 September	86
28 April (old leaves)	76	28 October	68
28 May (new leaves)	110	28 November	108
28 June	84	28 December	82
28 July	125	28 January, 1872	118
28 August	116	28 February	110
28 September	110	28 March	110
28 October	106	28 April	98
28 November	100	28 May	92
28 December	66	28 June	50

The loss of acid is much more considerable when the distilled water is kept in bottles stopped with cork and not full. In order to ascertain these alterations, water distilled in February, 1871, and then containing 96 milligrams of acid, was examined during fifteen consecutive months, with the following results:—

	millig.		millig.
March 28, 1871	86	November 28	74
April 28	84	December 28	72
May 28	80	January 28, 1872	72
June	80	February 28	72
July	80	March 28	72
August	76	April 28	72
September	74	May 28	72
October	74		

These figures show that from water kept in corked and only partially-filled bottles the loss of acid was at first very rapid, and afterwards became very slow, the strength remaining at 72 milligrams during six months.

NOTES ON THE CULTIVATION AND PREPARATION OF LACTUCARIUM.*

BY THOMAS FAIRGRIEVE.

Lactucarium—a substance allied to opium in appearance and in physical and physiological properties—is prepared from the milky juice of various species of *Lactuca*. It was introduced into the pharmacy of this country by Dr. Duncan, Professor of Materia Medica, Edinburgh, in the early part of this century; but it had been in use for some time previously in America, on the recommendation of Dr. Coxe, of Philadelphia. Professor Duncan employed the garden lettuce as his source of lactucarium, and his process of preparation was as follows:—When the plant reached the flowering period, a portion of the stalk was cut off, and the milky juice which exuded was permitted to harden in the sun. On the following day this hardened juice was secured by cutting a thin slice off the stalk, and to this fresh wound a further quantity of juice flowed and again hardened, and so the process continued from day to day till the plant was exhausted. The thin slices which bore the thickened juice were digested in spirit of wine till a solution of a certain degree of concentration was obtained, which was then evaporated to a thick extract.

Among later local cultivators were the late Dr. Young of Canonmills, and Mr. John Duncan, of Duncan, Flockhart, and Co., who used the wild lettuce, *Lactuca virosa*, as the source from which they drew lactucarium. This plant is still found sparingly on Arthur's Seat, near Duddingston, and is abundant on the rocks of Stirling castle and elsewhere.

For the last sixteen years I have had from one to two acres under cultivation for the preparation of lactucarium. The plant employed is *Lactuca virosa*, var. *montana*, the seeds being sown in autumn, and the young plants planted out early in the following spring. The plant, under favourable circumstances, grows to a height of from 10

* 'Transactions and Proceedings of the Botanical Society of Edinburgh,' vol. xi. part 2.

to 12 feet, with a stalk of from 1 to $1\frac{1}{2}$ inch in diameter. The flowers appear about the end of July and continue throughout August. The capitulum only expands during sunshine, and as when in fruit the least breath of air wafts away the pappose achenes, the collection of seed is a matter of constant anxiety and attention. In one wet and sunless autumn I was unable to secure a single seed, none having ripened.

In favourable seasons the collection of the juice may commence about the middle of July, but it more commonly is the beginning of August before anything is done. The plants are then 3 to 5 feet high, with thick succulent stalks, and the flower-buds just appearing. The collectors proceed over the field, cutting the head of each stalk, and scraping the flow of juice into their vessels—one person cutting being followed by two collecting the juice. This process they repeat six or seven times a day, each time a new cut being made a little lower down the stalk. The period of collection generally lasts from six weeks to two months, closing usually about the third week in September; but for the last two years I collected up to the end of September. Towards the close of the season the plants become so woody and hard that it is with great difficulty new cuts can be made for the flow of the juice. About this time the frosty nights seriously influence the flow of the juice, and determine the cessation of the year's collection. The juice after frost usually becomes of a watery consistence, and when it remains thick, as it sometimes does, it is so deteriorated in quality as to be worthless.

The amount collected during the day is by the evening changed into a thick viscous mass. It is then turned out of the vessels, divided into pieces suitable for drying, and spread out to the influence of a fire, as the sun heat in our climate is not sufficiently strong for the drying process. The time occupied in drying varies according to the heat applied, but I obtain the best results in about five days.

As regards the yield of lactucarium much depends upon the season. In rainy weather no collection can be made; moist warm weather causes the greatest flow of juice, while in dry, hot seasons the stalks are slender, the yield of juice small, but usually of very superior quality. So much does the yield vary that in some seasons the collecting vessel of 8 or 9 oz. capacity is not more than half filled daily, and in other years three such measures-full are gathered each day. Generally six such measures, equal to a little more than 4 lb. of thickened juice, yield 1 lb. of solid lactucarium. On an average I calculate each plant yields 40 or 50 grains of lactucarium, but this estimate includes plants of all descriptions. Were the really healthy and productive plants only taken into account, the average yield would be much greater.

A very small quantity of lactucarium is now used in the medical practice of this country, and I do not know the source of the demand which I am annually called on to supply.

For many reasons lactucarium cultivation is a precarious industry. Besides its dependence on rainy or dry weather, wind is fatal to the plants in all stages after the stems have shot up. From their first appearance, the plants are also peculiarly liable to be attacked at the root by a species of grub, which causes great havoc.

GUM ARABIC.*

BY DR. GRAEGER.

Formerly gum arabic was generally considered to be a vegetable principle, similar to sugar and starch, and it is not many years since Fremy for the first time called the attention of chemists to the special relations which existed between the organic substance of the gum and the mineral elements or residues of its ash. The researches of Fremy relative to this question not being generally known, a brief *résumé* of them may be given here.

Just as the part played by its inorganic elements is not yet exactly defined, so there exists little precise information respecting the physiological phenomena attending the formation of the gum itself. It is known that the abnormal formation of gum in certain trees takes place at certain periods, at the same time as that of the ligneous parts and at their expense; but it is not known to the transformation of what matter the production of gum is due. One thing is surprising that a neutral substance like it should proceed from an acid fruit.

It had previously been remarked that under certain circumstances, gum submitted to the action of concentrated sulphuric acid was changed into a new body entirely insoluble in water. This takes place when an aqueous solution of gum, so concentrated that it will scarcely run, is poured into a suitable vessel containing strong sulphuric acid,—care being taken not to mix the two liquids,—and left in contact for several hours. The gum is changed into a kind of membrane that is insoluble even in boiling water. If water and a slight quantity of some alkali be added, and the mixture slightly heated, this substance dissolves into a clear liquid, from which it is not precipitated by an acid, showing that it has undergone a new modification by which it has again become soluble. The insoluble membranous substance was named by Fremy metagummic acid; the soluble modification of it as changed by alkalies has received the name of gummic acid. Ordinary gum arabic then contains a substance insoluble in water,—metagummic acid,—which like œnanthic and lactic acids loses its insolubility by the action of alkalies, and is transformed into gummic acid, combining like them with the alkali to form a true salt.

These data of Fremy have to the present time neither been contradicted nor confirmed; they have been little noticed, although there can be no doubt that they would be of great importance to vegetable physiology.

In taking up the investigation the author proposed first to determine with precision the bases combined with the gummic acid, and also to find a method of preparing pure metagummic acid, that employed by Fremy not appearing to be sufficiently practical, since it is always difficult to free the viscous mass from the last traces of sulphate of lime and sulphuric acid.

Analysis was made of some picked gum, clear and free from powder. Gum dried in the air was found to contain 11·6 per cent. of water, the composition being—

Organic matter	85·25
Ash	3·15
Water	11·60

The composition of anhydrous gum was—

Ash	3·563
Organic matter	96·437

The ash was analysed, with the following result:—

	I.	II.	III.
Lime	46·70	54·63	44·53
Magnesia	12·61	14·38	26·18
Potash	40·69	30·99	29·29

These constituents, calculated as potash, are equal to the following amounts of that base—

I.	II.	III.
128·27	134·10	122·91

Adopting 3·563 per cent. as the average quantity of ash contained in dried gum, it appears that 96·437 parts of organic matter were combined with an average of 4·45 parts of potash or 2·644 parts of lime.

It is not surprising, says Fremy, that gum, which is a salt of lime, contains only 3 per cent. of that base. Gummic acid has a very feeble capacity of saturation, which is generally the case with all the gelatinous acids in proportion as they approach organic vegetable products; their capacity of saturation augmenting in proportion as, transformed by chemical means, they depart from their primitive organic form.

The numbers given above coincide with the results of a great number of experiments, showing that the propor-

* 'Neues Jahrbuch für Pharmacie,' xxxviii. 129.

tions between the bases of the gum and the organic matter are constant, and are not dependent upon circumstances by which the quantity of lime might be augmented or decreased.

Preparation and Properties of Metagummic Acid.—One principal reason why metagummic acid so long remained unknown was, that it is not produced except under special circumstances. Gélis had, it is true, shown that gum became insoluble in water after exposure during several hours to a temperature of 125° C., and that it again became soluble if it were boiled in water a sufficiently long time. It was also known that in heating a concentrated solution of gum with strong sulphuric acid, besides sulphate of lime, an insoluble viscous body was precipitated. But the examination of the bodies so obtained could not be carried further, since through the quantity of lime present in the first it became too soluble when experimented on, and the second could not be freed from the sulphate of lime and the sulphuric acid. The plan adopted by the author is to pour a cooled mixture of 50 c. c. of 92° alcohol, 10 c. c. of water, and 5 c. c. of strong sulphuric acid, upon 25 grams of perfectly pure gum, and allow them to remain together for twenty-four hours, stirring frequently. The whole is then thrown upon a filter in connection with an air-pump, and the undissolved portion is washed several times with alcohol. It is then placed in a vessel nearly full of distilled water, shaken and washed by decantation until it gives no reaction either of lime or of sulphuric acid. The metagummic acid has then the appearance of a slightly opaline, colourless, translucent jelly, of which the volume is ten or twelve times that of the gum employed to produce it. In order to dry it, it is shaken in a linen bag to remove moisture; then placed in a vessel and alcohol poured upon it. This causes it to contract a little; the supernatant liquor is removed, and fresh alcohol poured on. It becomes pulverulent, is thrown on a filter, and, when drained, the powder is pressed between linen and left to dry in the air, which it does in a few minutes.

Metagummic acid so dried resembles exactly white gum arabic, with a slight yellow tint; reduced to a fine powder it is perfectly white. It has neither odour nor taste, but it exercises a decided acid reaction upon blue litmus paper. It will absorb 15 per cent. of water from the air, but without becoming humid. It is not soluble in cold water,—which causes it to swell into a voluminous gelatine,—or in boiling water. It dissolves, however, in dilute alkaline solutions, when the alkali does not exceed the quantity necessary to dissolve it. When there is excess of alkali the solution acquires a colour varying from yellow to dark brown, in consequence of the decomposition that takes place; metagummic acid is thereby changed into gummic acid, and in this manner salts of potash, soda, magnesia, baryta, etc., may be obtained, which all form colourless and mucilaginous solutions like gum. Acids do not precipitate metagummic acid from these solutions, but if they are evaporated to dryness and treated as before with alcohol and sulphuric acid, metagummic acid is reproduced.

The author also obtained the metagummic salts of copper and of zinc: the first is insoluble and forms a pale blue precipitate; the zinc salt is slightly soluble.

Fremy found the elementary composition of metagummic acid to be—

	I.	II.	III.
Carbon	41·10	40·82	40·96
Hydrogen	5·93	6·16	6·01
Oxygen	52·97	53·08	53·03

According to this its formula would be $C_7H_6O_7$, approaching the formula of metapectic acid, $C_8H_5O_7$. Hence it would appear to resemble the pectic or gelatinous bodies, rendering the hypothesis probable that gum is due to phenomena analogous to those which give rise to the pectic bodies. The resemblance would be still more complete if future research should discover in plants a substance analogous to the pectones, of which gum would be a product of transformation.

It will be seen from the foregoing that gum arabic cannot be considered an immediate vegetable principle, but rather a mixture of the metagummates of potash, lime, and magnesia. Experiment has not yet shown whether the proportions of these salts in gums are always the same; but it is probable that they are very variable, for there is no reason why these several bases should not substitute one another, according to the nature of the soil. The substitution would have no effect upon the appearance of the gum or its properties; the various metagummates all forming colourless solutions of the same consistence, except the ammoniacal salt, its solution being more liquid than the others. All these bases are chemically combined with the gummic acid.

Preparation of Gummic Acid.—For this purpose pure metagummic acid was dissolved in an exactly-measured quantity of lime or baryta water. A sufficient quantity of oxalic or sulphuric acid—according as lime or baryta was used—was added to neutralize the alkali. As the milky liquid so produced could not be cleared by filtration, it was allowed to stand some time. In this manner a solution of gummic acid was obtained, still a little opaline, but perfectly colourless. Evaporated to dryness it yielded a transparent, hard, brittle substance, an aqueous solution of which was strongly acid, and less viscous than a solution of an equal quantity of ordinary gum. Its reactions with alkalies and their salts were the same as those of metagummic acid.

NOTE ON ACONITE ROOT.*

BY EDWARD R. SQUIBB, M.D.

There is good reason to believe that the appreciation of the value of preparations of aconite root in therapeutics, and the increasing use of these medicines, are hindered by the want of uniformity in quality of the root as met with in the markets, and the custom of pharmacists generally of buying by appearance, or what is still worse, buying in powder. The writer has been for some years past almost constantly in search of this drug of proper quality for medicinal use, and has been frequently out of it and its preparations through inability to find it in the markets of the seaport cities of this country, and has even failed to get it in London. Yet if quality be not considered or not tested, there are few drugs more easily or more cheaply attainable at all times. From the large brown root, which rarely is, though often is called, "English," to the small black root commonly known as "German," the markets are always abundantly supplied with root of various sizes and shades of colour. The general appearance is almost always good, and the root clean and sound, and even on fracture, the substance of the root appears to be of fair quality. Upon testing, however, it will often be found that not more than four or five roots in ten have any medicinal activity, and these only in feeble degree. Occasionally parcels will be met with in which every root possesses the desired activity, at least in some notable degree. Thus it becomes necessary to decide upon some arbitrary standard of strength to govern the selection, and in the present state of the markets this must not be set too high, if anything like a uniform supply of fresh preparations is to be kept up. The arbitrary rule adopted by the writer many years ago was not to buy any parcel from which six roots out of ten did not yield a fair degree of medicinal activity, and to get as much above this as possible. Within the past two years the quality in the United States market has improved, and now the arbitrary rule has been changed, and eight roots out of ten from an ordinary handful sample is the

* From the 'Proceedings of the American Pharmaceutical Association,' 1872.

standard. If pharmacists generally would apply some such rule, we would soon have a market supplied with a much better and more uniform quality; and it is the first object of this note to urge pharmacists to a more careful discrimination, since upon this all uniformity and efficiency in medicinal use of the drug must be based. The root should never be bought in powder, because in the present state of pharmacy quantitative testing would not be applied, and because a proportion of even three or four good roots in ten gives to the powder an apparent activity which is deceptive when judged by qualitative testing.

The causes of this general bad quality of aconite root are, so far as this writer is concerned, unknown; yet two or three prominent causes may be reasonably inferred, and perhaps should be mentioned, in order that the reader may judge of their value.

One of the most probable causes of this condition of the market is that terrible screw of price from which it seems almost impossible to escape. The present ruling price of aconite root by the bale in this market varies between fourteen and twenty cents per pound, according to the appearance. Now when it is remembered that this includes two or three profits or commissions, the freight and charges inseparable from a three thousand miles' transit, to say nothing of the time, capital, and risk involved, it will be seen that the price realized by those who collect and dry the drug for the market must be very small indeed, and totally insufficient to pay for the requisite knowledge, care, and skill, since two pounds or more of fresh root are required to yield one pound of dry. Hence, in order to be sold at so low a price, it may be and probably is, collected by ignorant women and children, who take it at any season of the year in which they can find it, leave as much of the stalk on the root as they can, dry it in the easiest and most rapid way possible, and then hurry it into the market. Occasionally parcels will be found within this range of prices which are of good quality, but for anything like uniformity in good quality, the common drug market and its prices must be abandoned for special importations to order, at two or three times the common price, and under strict conditions as to quality.

From all this it would follow that if buyers would look carefully to quality so as to recognize it when they get it, and then be willing to pay for it in proportion to its intrinsic value, the markets would respond to their knowledge and true interests in the character of supplies. It is the aggregate buyer who makes the aggregate market, and if so, the pharmacist has but himself to blame for the condition of his market. No reasonable probability should escape his thoughtful consideration, and his knowledge and skill should keep pace with the artistic refinements in cunning and deception.

Many parcels of aconite root seen within the past few years, by their partial or entire tastelessness, lead directly to the suspicion that they have been partially or entirely exhausted, and afterwards dried and put into the market. There is no doubting the identity of the root, and yet there is no season of the year, age of the plant, nor probable mode of drying, which would yield it totally insipid and devoid of activity, as more than half the roots of some parcels prove to be.

It is now generally believed that the growth of microscopic plants and animals destroys the active principles of many substances, and the published results with solutions of salts of atropia seem to establish the fact for belladonna. If this be true of aconite, then mouldiness would be a cause of inertness, as it is frequently seen mouldy on arriving here, though the appearance of mould soon disappears under the skilful hands of an energetic salesman.

Aconite is a prominent illustration of the general practical fact, that when the drug can be had of good uniform quality, and the preparations from it are made with care and skill, the alkaloid from it is not only a useless but a dangerous refinement, and becomes, through variation of species or variation of process of manufacture, as deficient in uniformity as the root itself is in commerce.

Aconite leaf and its preparations are comparatively feeble, and the natural and accidental causes of want of uniformity of strength are more numerous, and less susceptible of useful control. The leaf might therefore with advantage be omitted from the materia medica.

It now only remains to be shown that there is a simple, practical, easy, and effectual way of testing aconite root by tasting it.

If a root be broken across, near the middle, and a piece the size of half a pin's head be bitten off from the edge of one of the fragments at the place of fracture; and if this piece be chewed between the front incisor teeth, in contact with the tip of the tongue, until it is converted into a pasty or liquid mass, and be then discharged from the mouth, and the parts with which it has been in contact be cleansed as thoroughly as possible by the natural flow of saliva which is produced, the testing process for the particular root in question is finished. If the root be inert, the fragment is nearly or quite tasteless, and no impression remains upon the tongue or lips after the parts are cleansed by the saliva. But if the root be a thoroughly good one, the taste is at once moderately bitter, the bitterness being in a great degree proportionate to the activity of the root.

The bitterness is, however, to a great extent lost when the mouth is cleansed, and there is then an interval of a minute or more of tastelessness. Soon, however, the peculiar and perfectly characteristic aconite impression comes gradually on, beginning with a sense of tingling, which soon becomes a pricking sensation, which passes into a local numbness, which, once felt, cannot be mistaken. This is not taste, but rather a paralysis of all sensation in the parts, and it is quite persistent, continuing from one to three hours, in proportion to the strength of the root and the quantity taken for the trial. It is not painful nor even annoying, nor is it hurtful when properly managed, but in using the test the virulently poisonous character of the drug should never be forgotten.

Both the taste and the aconite impression or effect will vary in intensity or degree in various roots, but no parcel of the root should be accepted, or be considered as officinal, in which more than two or three roots in ten fail to give the aconite impression or numbness.

If a tasted root fails to give the impression within ten or fifteen minutes, its parts should be laid off by themselves upon the sample paper, and another root may be at once taken. But if the aconite impression be obtained, this must be allowed to disappear entirely before another root is tasted, and the fragments of the good root must be laid together on another part of the sample paper. Thus in testing a good sample of the root, not more than three or four pieces can be tried in any one day, and about three days will be required to determine the quality of a sample of good root. But the testing, of course, is not incompatible with the ordinary duties of the pharmacist, and therefore involves no loss of time. In practice, the time mentioned as requisite to test a given sample is almost always exceeded, because in the routine of a busy day the subject is often forgotten for a time, so that but one or two pieces are tried in a day.

THE ROYAL GARDENS AT KEW.*

During the year 1872 the Royal Gardens at Kew were visited by 553,249 persons, an increase of a little more than 6000 over the numbers in 1871. Of this number

* From the 'Report on the Progress and Condition of the Royal Gardens at Kew, during the year 1872,' addressed to the First Commissioner of Works by the Director, Dr. J. D. Hooker.

274,250 persons visited the Gardens on Sundays, and 278,999 on week-days. The greatest monthly attendance (106,236) was in May; the greatest week-day attendance (37,795) was on Whit-Monday, May 20; the greatest Sunday attendance (18,791) was on August 18. On two occasions the daily attendance was only 7. The numbers of each class of visitors were much the same as in last year, except that there was a greater attendance of professional gardeners, an increase attributable chiefly to the greater facilities for naming the ferns and ornamental herbaceous plants. Increased interest has also been shown in the Arboretum as it progresses towards completion, and especially in the collections of deciduous trees, the planting of which has in this country, during the last quarter of a century, been to a very great extent superseded by that of conifers.

The degree to which the displacement of deciduous trees and shrubs by conifers has extended in England is best illustrated by a comparison of both public and private parks planted during the last century and the beginning of this, with those more recently laid out, and an examination of nurserymen's catalogues gives the same result.

Thus, in the Kew grounds, as at those of Sion House, Bicton, etc., very many kinds of South European, Western Asiatic, and American timber trees, besides numbers of shrubs, still survive, few or none of which are now planted, or are to be had in English nurseries; and even twenty-five years ago, when the Kew Arboretum was commenced, various American maples, oaks, poplars, limes, etc., were procured in England, for which resort must now be had to continental nurserymen or to America.

The demand for deciduous trees and shrubs is rapidly reviving, and over and above the interest of this department to botanists, Dr. Hooker states that he has every reason to believe that the named collection in the Kew Arboretum will soon be as much frequented by planters and landscape gardeners as the Botanic Garden and plant-houses now are by amateurs and professional gardeners.

The interest taken by the principal nurserymen, both at home and abroad, in this, which was once an eminently national branch of gardening, is best evidenced by the liberality with which the most celebrated firms have for some years past presented to the Kew Arboretum many rare shrubs and trees; amongst whom the foremost have been Messrs. Booth of Hamburgh, Van Volxem of Brussels, Veitch, Lucombe and Pince, Lee, Dickson and Turnbull, Paul of Waltham Cross, and Smith of Worcester.

Botanic Gardens.—No change of importance has been introduced into this department. The demand for tropical economic plants from various Governmental establishments increases so fast, that more accommodation for propagating them will soon be required.

Named ornamental plants selected from the herbaceous grounds have been introduced along the shrubberies. The American garden at the back of the Palm House has been in great part renovated. A named collection of ivies has been placed along the Rose walk, the species being trained up tree stumps eight feet high, which alternate with the pillar-roses.

Large beds of mixed shrubs have been introduced opposite the Museum of Woods, and along both sides of the Pagoda vista, within the garden fence.

A great improvement has been effected by the Works department in the painting of the plant-houses, both as regards the durability of the composition and the colours used. The introduction of a little blue on the girders of the long Succulent House (200 ft. long), and the Temperate House in the pleasure grounds, has been much approved. The dark green glass with which the fern-houses have been glazed has answered well, and very numerous inquiries have been made respecting its use in this establishment. Dr. Hooker has no reason to suppose that it has any specific effect whatever on the plants grown under it, beyond that, by partially intercepting the sun's heat-rays, it prevents scorching of the plants and drying up of the houses, whence its use in doing away with the necessity for expensive shading during a great part of the year, and in days of alternate sun and cloud, is very manifest, as also in maintaining a more uniform temperature and humidity. The cultivation of ferns and orchids in houses large enough to accommodate a stream of several thousand visitors in the afternoons of summer and autumn must always be a difficult problem, owing to the inevitable draughts and consequent drought that attend their transit, and there is no question that green glass, under such circumstances, is, whether in a horticultural or economic point of view, decidedly advantageous. In small lean-to fern-houses, built against a north wall (the best of all arrangements for growth), and in which the doors are habitually kept closed, there is probably no advantage in using green glass. The Director is, however, inclined to think that certain insect pests are much less troublesome in houses thus glazed.

The Arboretum.—Throughout the winter and spring months nearly the whole staff of the establishment has been employed in these grounds, in the formation of new walks, the rearrangement of the collections, and replanting. A new entrance has been made at the further extremity of the grounds for the accommodation of visitors arriving from Isleworth and Spring Grove by the Isleworth ferry (half a mile further up the river than the Brentford entrance), consisting of a drawbridge over the moat by the river.

The acacias, robinias, gleditschias, etc., which were scattered over about five acres of ground, have been arranged in a broad avenue, 250 yards long, leading from the old Arch to the Pagoda, the trees of the Old World being planted on one side, and those of the New World on the other.

The remaining *Leguminosæ*, which occupy beds in this ground, are, owing to the excessive poverty of the soil, almost worn out. These will be in part renewed, and the rest be classified and replanted. The named collection of alders and willows has been taken to the banks of the lake. The named collection of ashes has been planted along the Stafford walk (skirting the Botanic Garden from the Sion vista to the Cedar vista), and extends for 250 yards: here also the European and American trees are planted on opposite sides of the path, to facilitate reference.

The rose garden on the slope of the mound on which the King William Temple stands is completed, and filled with a collection of 500 of the best kinds, presented by Mr. William Paul, of Waltham Cross; to whose liberality this establishment is indebted for various other gifts.

A great deal remains to be done before the Arboretum is completed. The rearrangement of the collection of oaks will be begun forthwith, and will be followed by that of the beeches, chesnuts, hornbeams, ostryas, planes, etc., which will occupy a belt parallel to the Sion vista on the side opposite to the lake.

The birches will be planted along the path leading from the Brentford ferry gate to the Botanic Garden, the elms by that running from the Brentford gate to the Sion vista, parallel to the river, and the poplars by the one leading from the Botanic Garden to the Hollow walk; celtis, morus, and their allies will border the walk skirting the Botanic Garden on the south. The limes, etc., will be planted along the path leading from the Botanic Garden to the Douglas Spar mound. The magnolias will occupy the S.E. angle of the grounds near the unfinished garden of berberis, clematis, etc., in the gravel pit, to the north of the Douglas Spar mound.

The *Pinetum*, which is by far the most important and extensive collection in the grounds, is now all but comcompleted. The genera abies, picea, and a few others, which had previously been planted along the new walk on the south side of the lake, and extended for 160 yards on both sides of the path, are now succeeded by the collection of pinus proper, which extends from the termination of abies to the Isleworth entrance (340 yards), and thence along the lined out path (100 yards), that leads to the Sion vista. The collection of pinus proper also extends a little way up the Pagoda avenue, and 100 yards up the new path skirting the Queen's Cottage grounds, where it is succeeded by the collection of yews, cypresses, retinosporas, taxodiums, thujas, and smaller American and Japanese genera. The juniper collection is planted on either side of an avenue leading through the woods from the lake to the King William Temple, and extends for 200 yards.

The classified and named pinetum thus extends along nearly 2000 yards of path and avenue, representing double that length, or two and a quarter miles of made soil, beds, and plantations, except where interrupted by old trees. The plants are throughout so arranged that the Old World species are as far as possible placed opposite to the American species of the same genera, and there are on the average 3–12 specimens of each species or conspicuous varity, placed in groups. The number of specimens is about 1200, all correctly named, with the exception of some doubtful ones. Almost every species that can be grown in the open air in this country is represented. Very few have been bought, the majority being plants procured by exchange and correspondence with different parts of the world, and through the liberality of the various eminent nurserymen whose donations are mentioned in last year's report.

Whenever possible, the specimens in the old pinetum of the Pleasure Grounds have been transplanted to this, in most cases with apparent success, but of this there is no assurance till the spring is over. The specimen pines in the Botanic Garden have not been removed.

Method of Ticketing in the Arboretum.—The labour and expense involved in procuring ground tallies for such a large collection are great, and the subject is full of difficulties. The tallies should be so firmly planted in the ground as not to be easily removed—so strong as to resist the blow of the butt end of a scythe,—so legible as to be clearly read, and, indeed, to attract attention at five paces' distance, and should last many years without repainting. Maw's Parian tallies are imperishable, and by far the neatest, but they are shipped by a scythe blow. Cast-iron tallies, well smoothed, and painted black on a white ground, if well done, should last from eight to ten years at least; a great number of these are in use in the arboretum; the best have an oblong top or face of 5 × 4 inches, and a leg 10 inches long. The face is perpendicular (not slanting backwards from the leg), and the top edge is sharp, to prevent birds sitting on it and defiling the writing. Experiments are being made of coating the paint with paraffin, the results of which will be reported hereafter. A trial is being made of slate, teak, and Australian gum-tree wood tallies. Hanging wooden tallies are very durable, but are not always easily discovered on the trees, and from hanging obliquely are pulled aside to be read, and hence detached by visitors, who afterwards simply fling them on the ground. They should be of a light wood (good deal answers well), hung with well tarred twine or strips of oiled hide. Iron hanging labels, fixed with wire, are very objectionable, their weight and motion in the wind soon breaking the wire.

The writing on the tallies is confined to the vernacular name (given only when in common use), the Latin name with its author's initials, and the native country. Synonyms are added only when the plant is equally well or better known under such. English names not in general use, and especially such as are formed by translating the Latin one, are useless and pedantic. In the case of varieties, the varietal name follows the specific.

Interchange of Living Plants and Seeds.—The receipts during the year have been 2700 seed packets, and 11,240 plants of all kinds. This includes a very large number of young trees, shrubs, and evergreens, procured by exchange or purchase, upwards of 4000 presented by Messrs. Lucombe and Pince of Exeter, and 1000 presented by Messrs. Dickson and Turnbull of Perth. Mr. Booth of Hamburgh has again presented to the arboretum no less than 800 named species and varieties, and Messrs. Makoy of Liége upwards of 100 selected species. A very valuable selection of authentically named East Siberian, Japanese, and Amoor River trees and shrubs has been presented by the Imperial Garden of St. Petersburgh under Dr. Regel's direction. Besides the above, the following donations require especial acknowledgments:—A set of British willows from the Rev. J. E. Leefe, M.A., an eminent authority on this genus; magnificent trunks (12 feet high) of cycas and tree-ferns from Australia by Baron von Müller of Melbourne; a very fine collection of Brazilian tree-ferns and other plants, collected by himself, from the Rev. T. Preston, M.A., of Marlborough College; a set of rare palms from the Royal Botanic Garden of Herrenhausen (Hanover), under the direction of Herr Wendland; and a fine set of the larger ferns of South Africa from Mr. McGibbon, Superintendent of the Cape Town Botanic Garden.

During the autumn the Curator visited Belgium for the purpose of inspecting the magnificent collections of tropical plants cultivated there, and especially that of M. Linden of Brussels, who presented on the occasion to the Botanic Gardens of Kew a collection of 400 interesting species, many of them not previously in cultivation in England; and that of Messrs. Van Houtte of Ghent, to whose liberality on the same occasion the Royal Gardens are also greatly indebted.

Of seed packets and living plants sent out from Kew, there have been during the year 7000 of the former, and 9000 of the latter; Jamaica still claiming the largest share of contributions.

A further selection of plants has been sent to the Jardin des Plantes, Paris, to replace the losses occasioned by the siege; and large collections have been sent to the Governments of Bermuda, Gibraltar, Hong Kong, Trinidad, Barbados, Natal, India, and all the Australian colonies.

Instructions have been received to introduce the teak into Jamaica, and the West African (Liberian) Coffee into Ceylon, where the ravages of the coffee blight, a minute fungus (*Hemileia vastatrix*), are still very serious.

The cultivation of tea in Ceylon (upon which a report was called for from Kew a few years ago) is successfully established, and the quality pronounced satisfactory. The cinchona continues to flourish in the island, and the bark has been pronounced of the best quality. The Director of the Botanic Garden there is actively promoting the cultivation of chocolate, for which the climate of the island is admirably suited.

A skilful superintendent (trained at the Glasnevin Botanic Garden) has been sent out from Kew to the Botanic Garden of Natal, and has taken with him a large collection of economic plants. A gardener has been sent to the Embassy Garden at Constantinople, and another as Superintendent of the Agri-horticultural Society's Garden at Calcutta.

Under instructions from the Secretary of State for the Colonies a skilled propagator has been sent to superintend the extension of forest plantations in the Island of Mauritius. Others have been selected for the tea and cotton plantations in India.

Dr. Henderson, of the Indian Medical Service, after devoting a year to the study of his Turkestan collections at Kew, has been appointed *locum tenens* at the Royal Botanic Gardens, Calcutta, during the absence in Europe on sick leave of Dr. King, the present superintendent.

The yield of cinchona in the Indian plantations is already very large, and the bark has fetched good prices in the English market; the manufacture of quinine has been established in the Nilghiri plantations, and will shortly be commenced in the Sikkim Himalaya.

The papers respecting the opium poppy disease in India have been transmitted to Kew from the local government to be reported on, as have those on the ravages of the vine pest, *Phylloxera vastatrix*, from various continental states, by the Secretary of State for Foreign Affairs. This is a subject of very grave import, even to this country, the disease being reported as existing in various parts of England, and quite lately in the neighbourhood of London.

Samples of excellent cigars have been sent from Jamaica by Sir J. P. Grant, which prove that this island ought to rival Cuba in respect of this produce. It cannot be too often and too persistently repeated, that notwithstanding the immense possessions of Great Britain in the East and West Indies, no tobacco of any consequence is imported from either country, except from the comparatively small Spanish territories of Manila in the Old World and Havannah in the New.

Museums.—The principal acquisitions have been magnificent slabs of Deodar and Himalayan cypress (*Cupressus torulosa*) from the largest trees in the North-western Himalaya, from Major Pearson.

From the Royal Horticultural Society a valuable collection of Mexican pine-cones, models of Indian fruits and of fungi, a large slab of *Pinus lambertiana*, etc. A collection of 500 Java woods, from Dr. Scheffer of the Botanic Garden at Batavia; and a very fine collection of Central African vegetable products, from Dr. Schweinfurth, the celebrated traveller.

Amongst the other donations to the museum may be mentioned specimens of coorongite from South Australia (C. Drury, Fortnum); portion of stem of *Fraxinus Ornus*, with incisions made for the exudation of the manna; also joint of *Opuntia*, used for receiving the manna as it flows from the trunk; also a specimen of pachyma (D. Hanbury); portions of plant of *Euphorbia resinifera*, yielding gum euphorbium; also portions of plants of the true gum arabic yielding acacia, from Ait Aatab; and specimens and trunk of arar (*Callitris quadrivalvis*) (G. P. Hunot, Vice-Consul at Mogadore); series of leaf skeletons, prepared to show the ready separation of the wood and bast elements of the vascular bundles (Herr H. Lindemuth); specimens of lichen brandy manufactured in Sweden from *Cladonia rangiferina*; also specimens of cudbear, and woollen articles dyed with lichen dyes (Dr. Lauder Lindsay); samples of varieties of peppermint grown at Mitcham (Dr. Piesse).

Herbarium.—The accessions to the herbarium are of exceptional importance as regards novelties. The number of specimens acquired during 1872 has been about 17,500, of which 1500 were purchased, and the rest procured by gift or exchange. Among the most valuable presentations are the Rev. C. New's plants, collected on the Alpine zone of Kilima-njaro, the only hitherto visited snow-clad mountain in equatorial Africa, which possesses a remarkable interest, as the Flora of the Alpine zone of Africa was previously wholly unknown. A notice of it is being prepared for immediate publication. A fine collection of 2000 Brazilian plants from Mr. Glaziou, director of public parks, etc., at Rio de Janeiro. A beautiful collection of Appalachian mosses has been received with many other plants from Dr. Gray, of Cambridge, U.S., and of Mexican and New Caledonian plants from the museum of the Jardin des Plantes, Paris. The very valuable herbarium of Dr. Rottler, made by himself and the early missionaries in India, has been presented by the authorities of King's College;—as containing the types of many species imperfectly described by the first Indian botanists, and representing the state of the botany of the Peninsula at the beginning of the century, it is of great interest and importance both in a scientific and historical point of view.

A beautiful collection of Burmese orchids has been presented by the Rev. C. Parish. Dr. Brandis, F.L.S., Conservator of Forests for India, has placed his herbarium, formed in many parts of India, at the disposal of this establishment, to be selected from; together with a collection of Tibetan plants, made by the Rev. Mr. Heyde. Mr. Kurz, Curator of the Herbarium of the Calcutta Botanic Gardens, has transmitted large Burmese collections made during a late mission to that country.

For novelty as well as interest no contributions are of greater value than Beccari's Bornean plants, amounting to 1850 species, communicated by Professor Parlatore, of Florence; M. Maximowicz's Japan plants, a splendid series; Dr. Henderson's collections, made during Forsyth's mission to Yarkand; and Dr. J. Anderson's, made during the expedition to Yunan, the botany of the two latter countries having previously been wholly unknown to science.

Library.—By order of His Grace the Secretary of State for India, a complete set of the Trigonometric Survey, Revenue, and other maps of India, consisting of 174 sheets, mounted and enclosed in lettered cases, has been presented to this establishment. This is of the utmost value in reference not only to the vast Indian herbarium now collected at Kew, but to the agricultural statistics, and distribution of Indian forests, and many other matters which engage the attention of the Indian botanists habitually working here, whether in the preparation of floras, or of reports on botanical, agricultural, and forest subjects, for the supreme and local governments of India.

The classified collection of drawings of plants has been largely increased by donations, including a valuable set of drawings of Burmese orchids from the Rev. C. Parish. The collection is of great value for facilitating the naming of the living plants in the garden, and those sent by horticulturists, which arrive in large numbers, throughout the summer months especially.

Publications.—This portion of the work done at Kew is liable to be lost sight of by the general public in view of the more apparent value of the ornamental and economic uses of the gardens. But the list of works issued more or less officially during the past year is a considerable one.

The sixth volume of the 'Flora Australiensis,' prepared by Mr. Bentham and Baron von Müller, has been published under the authority of the Australian Government.

The first part of the 'Flora of British India' has been published under the authority of the Secretary of State for India in Council, and the second part is being printed.

The 'Forest Flora of North-West India,' by Drs. Brandis and J. L. Stewart, to be published under the authority of the Secretary of State for India, is nearly completed.

The 'Flora of the South African Colonies,' in continuation of the unfinished 'Cape Flora' of the late Dr Harvey and Dr. Sonder, has been authorized by the Government of those colonies, and is in preparation by Professor Thiselton Dyer.

The continuation of Von Martius' 'Flora of Brazil,' published under the auspices of the Emperor of Brazil, is being in part executed at the Kew Herbarium, by Mr. Bentham, Dr. Masters, Dr. Kanitz, Mr. Baker, Mr. A. W. Bennett, and others.

Mr. Hobkirk has been preparing a 'Synopsis of the British Mosses,' which is now published.

Col. Grant is now continuing his account of the plants collected by Captain Speke and himself in Central Africa and deposited at Kew; the first part of which has been published in the 'Linnean Transactions.'

Mr. W. B. Hemsley has published his manual of hardy garden plants.

The fifth part of the 'Icones Plantarum' (devoted to the illustration of new and little-known plants contributed to the Herbarium) has been published, together with the 98th vol. of the 'Botanical Magazine,' with plates of rare plants that have flowered, chiefly in the Royal Gardens.

Dr. Henderson's 'Report on the Botany of the Yarkand Expedition' is in the press.

Mr. Ball is still engaged in studying the Morocco collections formed by himself, Mr. Maw, and the Director in 1871, which amount to nearly 3000 species.

The Pharmaceutical Journal.

SATURDAY, JUNE 7, 1873.

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

THE ADULTERATION ACT.

THE Adulteration Act has now been long enough in force to justify the expectation that by this time there would have existed some decisive evidence as to its operation throughout the country. This is especially the case since the 7th clause provided that a quarterly report as to the number of articles analysed and the nature of the adulterations detected should be furnished to local authorities by the analysts appointed under the Act. As yet, however, but little of such evidence appears to exist, and in one case a chief constable candidly reports that nothing has been done beyond the appointment of an analyst. There are, however, some exceptions. In Glasgow Professor THORPE reports that between the 12th March and the 24th April he received 30 samples—viz. flour, 5; milk, 8; butter, 4; tea, 11; bread, 1; and one of a green paper used in covering confections. The flour he found to be unadulterated; 6 out of the 8 samples of milk, he states, contained water varying from 5 to 30 per cent.; all the butter was inferior, containing from 12 to 26 per cent. of starchy and curdy matter, and from a trace up to 16·4 per cent. of water; the samples of tea were, with one exception, genuine; the bread was free from alum; and the green colour of the paper was found to be due to a compound of copper and arsenic. In Clerkenwell, Dr. STEVENSON has reported the results of the analysis of 47 samples,—34 of bread and 13 of tea. Of the tea samples 4 were in his opinion adulterated, but he did not advise a prosecution, since he did not feel sure that the adulterations were effected in this country, and because they were not injurious to health. Of the bread 8 samples contained alum, but some duplicate samples obtained from the same shops showed a marked improvement.

Professor THORPE points out that one of the chief difficulties in working the present Act consists in the fact that the prosecutor is under the necessity of proving that the vendor of the article adulterated is aware that it is so, a difficulty which is increased by the fact that few simple and, in the hands of dealers, easily applicable tests are known, whereby the dealer can satisfy himself as to the purity of the article he retails. Such tests, he thinks, might be devised, if analysts would give their attention to the matter. Unfortunately, however, he illustrates the difficulty of the subject by himself suggesting the use of a test for butter which might sometimes lead to very erroneous conclusions.

Dr. CORFIELD and Mr. WHITMORE have also presented reports in reference to their respective districts; but neither have furnished much reason for satisfaction. Mr. WHITMORE, as analyst for the parish of Marylebone, has in his report confined his attention chiefly to milk, and has elicited a vigorous criticism from the *British Medical Journal.* Starting with the assertion that the report is weak and abortive, our contemporary proceeds to justify these comments by showing the absence of any useful purpose the report can serve. The general prevalence of the practices of skimming and watering milk have long been sufficiently well known not to require further evidence, and there was no reason to suppose Marylebone is any exception to the rule. The only useful information that could be furnished in connection with these practices has not been made public, viz., the names of the offenders. Consequently the effect of the Act, so far as the inhabitants of Marylebone are concerned, is merely the raising a vague impression that an every day article of food is systematically debased. We doubt the deterrent influence of such a course, and in the interest of the honest tradesman, would much prefer more decided measures.

But the Marylebone analyst appears to be most of all unhappy in the chemical evidence he brings forward as indicating the existence of gross adulteration of milk. He reports determinations as to specific gravity and amount of cream, together with admissions that both these data are utterly valueless for indicating the quality of milk. His attempts to obtain other data more adequate as a measure of quality in milk seem to have been frustrated by insufficient familiarity with the details of analytical work; and this is an instance in support of the opinion we expressed long since, that medical analysts would generally fail in this particular. It is here indeed possible to refer to the criticisms of a medical journal in confirmation of this view, for our contemporary mentioned above speaks of the Marylebone analyst's determinations as being "absurd" and confused.

Dr. CORFIELD's report to the Vestry of St. George's appears to have raised some difficulties, as reported in this Journal at page 963. These seem to have arisen from his misinterpretation of the proper functions of an analyst under the Act, and from a too zealous desire to deal effectively with the evil of adulteration. Such misunderstanding is made too possible by the terms of the Act as it stands, and its occurrence shows the need of further definition of duties and modes of procedure.

While dealing with this subject it is impossible to avoid referring to the general absence of anything like satisfactory results from the operation of the Adulteration Act. A large number of appointments have been made and confirmed in various parts of the country, but we are still waiting to see what benefit may accrue to the public in consequence. And if we may judge from what is publicly stated on the subject, there does not seem to be much hope of any advance. Thus, for instance, our contemporary, *Food, Water, and Air*, offers the following explanation of the present stagnation in respect of the Act:—

"It is notorious that a large number of these appointments have fallen into the hands of persons who are totally unacquainted with analytical chemistry, and who are therefore entirely incompetent for the responsible and difficult duties which, in some cases, have been thrust upon them through the interested but short-sighted policy of many of the Local Authorities, and which in others they have foolishly or greedily undertaken. Again, it is also notorious that the remuneration attached to very many of these appointments is of the meanest and most paltry description, and utterly inadequate to insure the efficient performance of the duties of the office."

Quite consistent with these remarks are the expressions of opinions heard on all sides from those competent to judge, and if further evidence were needed, it may be gathered from the fact that persons recommended and actually appointed as chemical experts under the Adulteration Act are endeavouring to learn the art of which they ought to have been thorough masters previously to their appointment. It is by no means encouraging to find that in regard to this point and in answer to the inquiry, what our Food Analysts are about? such statements as the following can be put forward with good reason.

"We can certify that many of them are engaged in the endeavour, vain and futile in some cases, to obtain a smattering of the knowledge requisite to enable them to even attempt to fulfil their duties; others, again, are endeavouring to find persons who, knowing something of analytical proceedings, are willing to act as their unacknowledged deputies, and to make the requisite analyses for them, upon which their official reports can be founded. It is in this way, therefore, that the inaction of our analysts and the consequent present failure of the Adulteration Act are to be explained."

If this statement be a true one, and we know of no reason for doubting it, what has become of the careful consideration of fitness before sanctioning an appointment promised by the Local Government Board?

THE NEW OFFICERS OF THE SOCIETY.

If the Council election this year has been wanting in that strong interest which prevailed on some previous occasions, there can be no doubt that the first proceedings of the new Council will excite a lively feeling of satisfaction throughout the whole trade. First, as regards the election of Mr. Thomas Hyde Hills to the office of President, we are sure the unanimity with which it was carried in the Council will be similarly responded to on all sides. The fact that he has been for three successive years returned at the head of the poll, as a member of Council, might alone be regarded as constituting a solid claim to the Presidential chair without reference to other considerations, and we doubt not it will be generally thought that, in electing Mr. Hills the President, his colleagues have manifested a graceful and well earned recognition of the high esteem in which he is universally held.

The election of Mr. Bottle as Vice-President will also, we believe, be received with unqualified satisfaction, by reason of his long connection with the Society and his zealous labour as a member of Council for so many years.

And if any regret were felt that Mr. Hills no longer holds the important office of Treasurer, it perhaps could not have been mitigated more thoroughly than by the appointment of Mr. Williams as his successor, for there is no member of the Council who excels him either in ability as a man of business, in earnest interest for the welfare of the Society, or in the desire to encourage all that tends to promote the advancement of pharmacy.

THE STATUE TO BARON LIEBIG.

At a meeting of the German Chemical Society recently held in Berlin, it was resolved to erect a statue at Munich in honour of the late illustrious chemist, Baron Liebig, and to invite his pupils and friends, as well as chemists of all nations, to contribute towards the funds necessary for that object. In order to carry out this resolution a committee was named; and the English members of the Committee, Messrs. Warren De la Rue, E. Frankland, J. H. Gilbert, W. Odling, John Stenhouse, and A. Williamson, have issued a circular inviting contributions. It is requested that communications on the subject be sent to Dr. Hugo Müller, 110, Bunhill Row, E.C.

EARLY CLOSING IN HULL.

The principal pharmaceutical chemists and chemists and druggists of Hull, at the request of their assistants and apprentices, have agreed to close their establishments at 7 P.M. (Saturdays excepted) on and after Monday, June 2nd, 1873.

THE BOARD OF EXAMINERS.

It will be observed by the report of the meeting of the Council that Mr. George Edwards, of Dartford, has not been reappointed as a member of the Board of Examiners. We understand that much regret was expressed by the members of the Council that through the operation of the bye-law limiting the age at which an examiner can be appointed, the Board will lose the services of a gentleman who has for so many years held an official position in the Pharmaceutical Society as member of the Board of Examiners, member of the Council, and Vice-President of the Society. At the same time we cannot but congratulate the Board that the vacancies have been filled by the appointment of Messrs. Haselden, Schweitzer, and Umney.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

June 4th, 1873.

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

Mr. W. Scott Brown having been elected Chairman until a President should be chosen, the minutes of the previous meeting were read and confirmed.

Election of President.

A vote by ballot having been taken in the usual manner, Mr. Thomas Hyde Hills was declared unanimously elected.

The President having taken the chair expressed his appreciation of the kind feelings which had prompted his colleagues to confer this mark of honour upon him, and his intention to do all he could, relying on the hearty co-operation of every gentleman at the Council Board, to support all measures having for their object the advancement of pharmaceutical science and the improvement of the position of those engaged in pharmacy.

Vice-President.

Mr. Bottle was then elected Vice-President, and in thanking the Council for the honour they had done him, remarked that he felt he should be following in the steps of a very able man of business, who had rendered valuable services to the Society. It would be his province to endeavour to imitate his predecessor's good example, to support the President as an independent member of the Council, and to encourage everything which tended to promote the science of pharmacy and the success of pharmacists.

Treasurer.

Mr. Williams was elected Treasurer for the ensuing year and briefly returned thanks.

The President then moved a cordial vote of thanks to the late President and Vice-President for their valuable services.

The vote was immediately carried, and Mr. W. Scott Brown, in the absence of Mr. Haselden, which he regretted, acknowledged the compliment. He paid a hearty tribute to the zeal and ability displayed by the late President in his official capacity, and for his own part begged to say that he thanked the members of Council for the kindness which he had always received at their hands, more especially since they had adopted in his own case what he believed to be a right principle, in electing a provincial member as Vice-President. In discharging the duties of that office he had acquired a more thorough knowledge of the practical business of the Society than he before possessed. Living at such a distance from London he was glad to be relieved of so many calls upon his time, especially as he was succeeded by the gentleman whom—if he had had the selection—he should have chosen for the office.

Secretary and Assistant Secretary.

Mr. Elias Bremridge was reappointed Secretary and Registrar, and Mr. Richard Bremridge Assistant Secretary and Deputy Registrar.

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

Bascombe, Frederick ....Weymouth.
Ellis, Robert ....Aberystwith.
Greenish, Thomas Edward ......London.
Marshall, Eli..........................London.
Wheeler, Albert ....Southsea.

Elections.

MEMBERS.

Pharmaceutical Chemists.

Bascombe, Frederick ....Weymouth.
Ellis, Robert ....Aberystwith.
Greenish, Thomas Edward ......London.

Chemists and Druggists.

Bird, Frederick....................Coventry.
Lear, George Hill.................Birmingham.
Manley, William Frederick......Peckham.

ASSOCIATES.

The following, having passed their respective examinations and being in business, were elected "Associates in Business" of the Society:—

Minor.

Appleton, Arthur James ....Sheffield.
Burbidge, Edwin ....Oxford.
Emms, William Robert ....Strood.
Frowd, Edward Francis ....Blackheath.
Harrington, Arthur Lewis ......Rochford.
Southerst, Marshall ....London.

Modified.

Howe, Henry Albert ....Eynsham.
Smith, William......................Bermondsey.
Watts, Walter ....Kington.
Womack, Thomas.................Leeds.

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

Archer, Albert ....Newport, Mon.
Blackmore, James ....Doncaster.
Blackmore, Peter Ludgate ......London.
Bracher, Walter Phipps ....Grantham.
Brouard, Ernest James ....Guernsey.
Cadoux, Samuel Henry ....Colchester.
Clare, Thomas ....Cheltenham.
Davies, George Edward ....Notting Hill.
Dawson, Francis Robert ....Bolton.
Hart, Philip ....Bolton.
Herd, Henry Wilson.........Bowness-on-Windermere.
Hine, Alfred Leonard ....Cheltenham.
Holmes, Samuel ....Hampstead.
Lomas, Charles Benjamin ......Towcester.
Mager, William Kelk ....Doncaster.
Moore, George Brass ....Barnard Castle.
Moorhouse, Walter ....Wakefield.
Pickard, Henry......................Barnstaple.
Strawson, George ....Louth.
Summers, Frank ....Durham.
Sutton, William ....Chatteris.
Towler, George Bland .... Bishop Stortford.
Wilson, Richard Edward.........Newport, Mon.
Wrigglesworth, George ....Hull.
Yeats, Thomas Flasby............Manchester.

APPRENTICES OR STUDENTS.

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

Biddiscombe, Charles ....London.
Boyden, John Augustus Charles.Wisbeach.
Collingwood, John Henry ......Little Gonerby.
Cumber, Henry......................Guernsey.
Hart, James Connorton ....Horselydown.
Hubbard, Alfred Coath ....Walsall.
Knowles, James ....Burslem.
McGibbon, George Laidlaw ...Edinburgh.
Mays, Robert Man ....South Shields.
Raynor, Charles Thomas ....Leicester.

Rickinson, Valentine, jun. ......West Hartlepool.
Tompsett, Leighton ....Strood.
Walker, Alexander ....Cullen.
Wright, Edwin ....Ipswich.

CONVERSAZIONE.

Votes of thanks were passed to the Committee of Council for Education for the use of the South Kensington Museum at the late Conversazione, and also to the official staff of the Museum for their services on the same occasion.

FINANCE.

The report of certain members of Council acting as a Finance Committee was received and adopted, and sundry payments ordered to be made.

BENEVOLENT FUND.

Several applications for relief from this Fund had been received, and had been considered by members of the Council acting as a Committee.

The SECRETARY read a short abstract of the various cases in which the Committee recommended that relief should be given, and grants were made as follows:—

The Widow of a late Annuitant in Jersey, having two daughters dependent upon her £10
A Registered Chemist and Druggist, residing at Hamilton, N.B., disabled by illness from following his business 10
The Widow of a Registered Chemist and Druggist at Brandon, having four children dependent on her 10
A Registered Chemist and Druggist aged 73, residing at Daventry 10
A Chemist and Druggist, aged 66, formerly in business, but at present only in occasional employment 10
A Registered Chemist and Druggist, aged 54, formerly in business, which he was obliged to give up through severe illness 10
A Registered Chemist and Druggist, who met with a severe accident, and has since been afflicted by illness 10

The consideration of the cases of other applicants for aid from the Fund was deferred for further inquiry.

The names of the following persons were placed on the list of approved candidates for annuities:—

Thomas Potts, of Daventry; and
Bine Linging, of Lower Norwood.

PARLIAMENTARY.

Several matters had been discussed by the late members of this Committee, who presented a report stating that certain cases were still under consideration, and recommending that the name of a person alleged to have been improperly placed upon the Register should be struck off. A communication had been received from a provincial association with reference to the illegal sale of poisons, asking if the Council were prepared to take action in the matter. The Committee recommended that an answer be sent to the effect that the Council would give their best consideration to any case brought under their notice. In the case of a firm using the style Pharmaceutical Chemists, only one member of it being on the register of Pharmaceutical Chemists, an assurance had been received that a change of the style should be made so as to avoid any cause of complaint. With regard to the Shop Hours' Regulation Bill, the Committee referred the matter to the Council with a recommendation that the Bill should be opposed.

The report and recommendations of the Committee were received and adopted, and the name of Gustavus Jordan, of Luton, was ordered to be erased from the Register.

The question of the supply of medicines, etc., by Co-operative associations, also came before the Committee *à propos* of some prescriptions which had been made up at one of these establishments in London, and the Committee referred the matter to the Council.

The PRESIDENT suggested that it should be referred again to the Parliamentary Committee when appointed, with a recommendation that a special sub-committee should be appointed to deal with it with such legal assistance as might be necessary.

After some discussion the following resolution was carried unanimously,—

"That the question of the illegal sale of poisons and dispensing prescriptions by so-called associations be referred to the Parliamentary Committee for full consideration, and that the Committee be authorized to take legal advice to any extent required."

Mr. SUTTON remarked, with reference to the Shop Hours' Regulation Bill, he had no doubt Sir John Lubbock would modify its provisions if the hardships it would inflict upon them as a trade were properly represented to him.

The PRESIDENT thought the Bill should be opposed *in toto.*

Mr. BAYNES regarded it as a mischievous piece of over legislation which would, if it were possible to conceive of its being carried, lead to innumerable practical difficulties in the carrying on of business by any one who employed persons under twenty-one years of age.

On the motion of Mr. BROWN a resolution was passed that the Bill be opposed, and that the President, Vice-President, and Mr. Sandford be requested to watch the progress of the Bill, and take such action as might be deemed needful.

APPOINTMENT OF COMMITTEES.

Mr. SCHACHT begged leave to suggest, before the Committees were appointed, that it would add much to the efficiency of the Committees, and tend to prevent the needless discussion of matters of detail at the Council, if it could be so arranged that no member should be appointed on more than one, or at the most two, Committees. He believed this desirable end could be accomplished by a redistribution of the members amongst the different Committees, placing as far as possible each gentleman upon such Committees only as it would be possible for him to attend. It was much to be desired that the business should not be hurried. Committees followed each other so closely, that the business brought before them could not be fully discussed. In addition to the Secretary they had now a very efficient Assistant Secretary, and he saw no reason why two Commitees should not sit at the same time; by this means he believed the business would be got through in a more satisfactory manner than at present. It was very desirable also that provincial members should not be appointed to serve on Committees which they were not able to attend, as had happened to himself.

Mr. STODDART desired to endorse what had fallen from Mr. Schacht; especially with regard to the attendance of provincial members.

Mr. SHAW also remarked on the difficulty experienced by gentlemen at a distance in reaching town in time to attend some of the Committees.

The PRESIDENT agreed that it would be a great advantage in many cases to have two Committees sitting at once.

After some remarks in the same direction by Messrs. BROWN, SUTTON, SAVAGE, URWICK, SANDFORD, and WILLIAMS, the Committees were appointed as follows:—

General Purposes.—The whole of the Council; to meet as occasion may require.

Finance.—Messrs. Greenish, Hampson, Owen, Robbins, and Urwick.

Benevolent Fund.—The same as the above.

Library, Museum, and Laboratory.—Messrs. Betty, Greenish, Hampson, Sandford, Robbins, and Williams.

House Committee.—The same as the above.

Parliamentary. — Messrs. Atherton, Baynes, Betty, Brown, Mackay, Owen, Sandford, Savage, Shaw, Sutton, Urwick, and Williams, with power to add to their number.

Provincial Education.—Messrs. Atherton, Baynes, Betty, Brown, Frazer, Mackay, Radley, Schacht, Shaw, Stoddart, Sutton, and Urwick.

Election of Examiners.

A ballot was taken for the appointment of Examiners in the usual way. In addition to the two vacancies reported last month, there was a third, occasioned by Mr. George Edwards, of Dartford being over the prescribed age for re-election. The following gentlemen were elected to serve until the end of the present year :—

England and Wales.

Messrs. Allchin, Barnes, Carteighe, Cracknell, Davenport, Gale, Haselden, Linford, Martindale, Schweitzer, Southall, and Umney.

Scotland.

Messrs. Ainslie, Buchanan, Gilmour, Kemp, Kinninmont, Noble, Tait, and Young.

Appointment of Editor, etc.

Dr. Paul was re-appointed Editor of the Journal, and Mr. F. Passmore Sub-editor.

Local Secretaries.

The Secretary reported that out of more than 2000 voting papers which he had sent out, only 489 had been returned. He suggested that where no nomination had been made, no local secretary should be appointed.

Mr. Sutton said he thought local secretaries might be dispensed with altogether, but certainly he should not appoint them where no trouble had been taken to make a nomination.

Mr. Savage thought the absence of fresh nominations merely showed the satisfaction which was felt at the present appointments, and did not approve of the suggestion that the appointments should not be made.

It was then resolved —

> "That the report of the scrutineers in reference to the nomination of local secretaries be referred to the Parliamentary Committee ; the Committee to be authorized to nominate, if they deemed it desirable, local secretaries in those districts from which no return had been received."

The Sessional Lectures.

A letter from Professors Redwood and Bentley was read suggesting that the lectures would be more beneficial to the students if the course of instruction were somewhat altered, being given twice during the session instead of once, and that the fees might be raised with advantage, etc.

Mr. Scott Brown moved that the letter be referred to the Library, Museum, and Laboratory Committee, to report thereon to the next meeting.

Mr. Williams seconded the resolution, and suggested that the Committee should take into consideration the whole question of the educational action of the Society.

Mr. Hampson thought they could not do better than seize the opportunity afforded by the Professors' letter to reconsider the whole matter. Everyone seemed to agree that there was something not quite right in the present arrangements, and he hoped some decision would be arrived at.

Mr. W. Scott Brown thought the letter only should be referred to the Committee, leaving them of course to adopt any hints that might be offered them.

Mr. Schacht thought the whole matter had better be included, and that the Committee should also take into consideration the instruction given in the laboratory. The chief point which had weighed upon his mind of late was that they kept up the educational establishment at considerable cost, and yet they scarcely seemed to have what struck him as a perfect system of education. Great differences were attempted to be drawn between the instruction given there and that which young men received at other educational places, the latter of which had been called a cramming process, whilst that afforded there was said to be quite the reverse, though what the reverse was he did not exactly know, particularly as he knew that in the laboratory part of the system a man might enter for a week only, and do the best he could to grind up any particular subject in that time. This certainly looked something like cramming. He was perfectly willing that their educational system should cost them a good round sum, but at the same time he should like everything to be complete and thorough, so that a student might really go through the educational course steadily, honestly, and well.

The President reminded the members that the Professors must be appointed next month, and if the whole subject were taken up he feared it would be too large for the Committee to deal with in so short a time.

Mr. Williams said it was not absolutely necessary to appoint the Professors next month, as the Session did not begin till next October. The Committee might propose adding other names, or a totally different system. He should like to know from the Council whether the Committee were to go into the whole question. It was admitted even by the Professors themselves that many who attended their lectures simply went there for the purpose of passing their examination, and this was what they all wished to discourage as much as possible.

Mr. Greenish thought the Professors' letter was one of the most important matters that had come before them for some time. If they commenced an inquiry they should go through the whole, and deal, not only with the lectures, but the laboratory also.

Mr. Sandford said they might send the letter to the Committee without any instructions to go further, as they would naturally consider any point bearing upon it.

Mr. Baynes said the matter was of the greatest importance. In his opinion they ought not to stand second to any institute in Europe. But he was quite sure at present that the position of the Society in relation to education was very imperfectly understood in many parts of the country. Some of the arrangements might perhaps be somewhat antiquated, but all these matters of detail had better be referred to the Committee.

Mr. Urwick suggested that a Special Committee should be appointed to deal with this matter, as it was one of great importance, and ought to be considered in all its bearings.

Mr. Sandford said it had been stated repeatedly that the time was coming, and he hoped it would come very soon, when the Society would give up educating. Education, in his opinion, should be separated entirely from examination, but here they both educated and examined, which was wrong in principle ; and he thought if they could get rid of the laboratory altogether it would be a very good thing. With regard to the fees, it must be remembered that when they were established and the lecturers were engaged the object was simply to tempt young men to come here to be educated, and everything was done to induce them to attend. Thus, a young man could attend the whole course from October to the end of July, if he were connected with the Society, on payment of one guinea, whereas in the medical school eight guineas was the fee charged for a course from October to the end of March. The lectures were at present simply given away. He thought, however, it would be better to consider the letter of the Professors first, for if they went into the whole question they would not get through it in a month, or perhaps a year.

The President said it must be remembered that the Council, not the professors, fixed the fees. They must bear in mind, when it was suggested that the lectures should be abolished, that these gentlemen had been engaged for thirty years and upwards, and therefore their past services must be considered. If two guineas each course were charged instead of one, there would perhaps be a deficiency of £200 instead of £400; and if three guineas were charged probably there would be no deficiency at all. He believed that it would be better at first to deal with the letter only.

Mr. GREENISH thought the letter should be dealt with, but still the Committee ought to have a wider scope for their investigation.

Mr. BROWN said he would alter the motion to this form:—

> "That the letter from Professors Redwood and Bentley be referred to the Library, Museum, and Laboratory Committee to report thereon, and also as to the other educational arrangements, and to report thereon to the Council at an early meeting."

That would leave the Committee at liberty to take up the letter first, and to report thereon, and also subsequently, or simultaneously if they thought fit, to take into consideration any other matters bearing on the educational arrangement.

The resolution was then carried unanimously.

INAUGURAL ADDRESS.

It was unanimously resolved that Mr. R. Reynolds, of Leeds, be invited to deliver the Inaugural Address in October next.

ANNUITANT ON THE BENEVOLENT FUND.

The SECRETARY said it was necessary to decide whether they should elect one or two annuitants in October next. According to their rules, annuities were only granted from the income of the invested property, and the state of the funds at present would not allow of the election of two annuitants.

Mr. ROBBINS thought it would be a pity to confine the annuities to the interest on funded property.

Mr. SANDFORD said they could not touch the invested capital according to the bye-laws.

Mr. W. SCOTT BROWN said it was impossible to settle an annuity on a person unless capital was invested to produce the requisite income.

Mr. ROBBINS said he thought if people were properly encouraged they would support the Benevolent Fund much more largely than they did at present. He should like to see the same encouragement given as was done in many other societies by conferring the rank of Vice-President, or giving a certain number of votes to those who subscribed a certain amount. There were also persons who, being members of the Society, had votes, but never subscribed at all, which was a principle he did not understand.

Mr. SANDFORD said that arose from the fact that a portion of the money from the "General Fund" of the Society was from time to time transferred to the Benevolent Fund.

The SECRETARY thought if the Council would pass a resolution to elect two annuitants in October they might try in the meantime to raise the requisite funds. He thought he could see his way to raising the necessary amount for investment.

Mr. W. SCOTT BROWN said he believed there was a great deal of misapprehension throughout the country with regard to the position of the Fund.

It was then resolved that one annuitant should be elected in October next, the annuity to be of the value of £30 per annum.

LIBRARY, MUSEUM, AND LABORATORY COMMITTEE.

The Report of this Committee was received and adopted, but it contained nothing requiring special notice.

A letter was read from Professor Attfield, reporting that Mr. Shenstone, who had been acting as Assistant-Demonstrator in the Laboratory, had accepted an engagement in another establishment, and asking that the office might be announced as vacant, to be filled up by October next. The subject was referred to the Library, Museum, and Laboratory Committee.

EXAMINATIONS IN LONDON.

May 28th, 29th, and 30th, 1873.

Present on the 28th—Messrs. Allchin, Barnes, Carteighe, Cracknell, Davenport, Edwards, Gale, Haselden, Linford, Martindale, and Southall.

Present on the 29th and 30th—Messrs. Allchin, Barnes, Brown, Carteighe, Cracknell, Davenport, Edwards, Gale, Haselden, Linford, Martindale, and Southall.

Dr. Greenhow was present on the 28th, on behalf of the Privy Council.

MAJOR EXAMINATION.

Seven candidates were examined. *Two* failed. The following *five* passed, and were declared duly qualified to be registered as "Pharmaceutical Chemists:"—

*Greenish, Thomas Edward	London.
*Bascombe, Frederick	Weymouth.
*Marshall, Eli	London.
Wheeler, Albert	Southsea.
Ellis, Robert	Aberystwith.

The above names are arranged in order of merit.

MINOR EXAMINATION.

Eighty-one candidates were examined. *Twenty-four* failed. The following *fifty-seven* passed, and were declared duly qualified to be registered as "Chemists and Druggists:"—

	*Wells, Ernest William	East Dereham.
	*Archer, Albert	Newport, Mon.
	Clare, Thomas	Cheltenham.
Equal.	Fairman, George Peters	London.
Equal.	Hine, Alfred Leonard	Cheltenham.
	Willis, Blankley William	Kidderminster.
	Emms, William Robert	Tetbury.
	Moore, George Brass	Barnard Castle.
	Davies, George Edward	Notting Hill.
	Wheatly, Arthur William	Thame.
Equal.	Bluett, Reginald	Tetbury.
Equal.	Yeats, Thomas Flasby	Manchester.
	Slater, Elias	Fallowfield.
Equal.	Hart, Philip	Bolton.
Equal.	Mason, Michael	Salisbury.
	Bales, William	Ipswich.
Equal.	Ashby, Thomas Lacey	Leicester.
Equal.	Herd, Henry Wilson	Bowness on Windermere.
Equal.	Rees, Samuel Lawrence	Hayle.
	Towler, George Bland	Bishop Stortford.
	Longley, Joseph	Barnsley.
	Wrigglesworth, George	Hull.
Equal.	Damon, Alfred Ferris	Bristol.
Equal.	Lister, Robert	Leeds.
Equal.	Mills, John Perry	Taunton.
	Betty, Robert	London.
Equal.	Strawson, George	Louth.
Equal.	Taplin, Joseph Whelan	Bristol.
Equal.	Wilson, Richard Edward	Newport, Mon.
	Monti, Peter	London.
Equal.	Anderson, Henry Dingle	Guernsey.
Equal.	Dawson, Francis Robert	Bolton.
Equal.	Barry, Frederick	Bath.
Equal.	Gould, William Robert	Southsea.
	Piquet, Frederick George	Jersey.
	Matcham, Edward	Norwich.
Equal.	Hutton, Robert Henry	Wisbeach.
Equal.	Matthews, Thomas Averill	Worcester.

* Passed with Honours.

	Blackmore, Peter Ludgate	London.
	Tucker, William Charles	London.
	Otley, John	Sheffield.
Equal.	Askew, Hugh de Bosco	Workington.
Equal.	Brouard, Ernest James	Guernsey.
Equal.	Greenwood, Dennis	Cambridge.
	Pike, John	Yarmouth.
	Summers, Frank	Durham.
	Sutton, William	Chatteris.
Equal.	Moorhouse, Walter	Wakefield.
Equal.	Nicholls, Alfred	Penzance.
Equal.	Smith, Alfred Lambert	Birmingham.
	Lomas, Charles Benjamin	Towcester.
	Boon, Nathaniel	Oakham.
	Evans, Richard	London.
	Morgan, George Henry	London.
	Mager, William Kelk	Doncaster.
	Holmes, Samuel	Hampstead.
	Turner, Charles	Buxton.

The above names are arranged in order of merit.

PRELIMINARY EXAMINATION.

The undermentioned Certificates were received in lieu of this Examination :—

Certificates of the College of Preceptors.

Brick, John	Welchpool.
Hargraves, James W.	Liverpool.
Mayne, James	Chertsey.

Certificates of the University of Cambridge.

Robinson, Charles Bradshaw	Great Bridge.
Watson, Robert John	Market Rasen.

Certificates of the University of Oxford.

Ballard, William	Hammersmith.
Fletcher, Howard Bennett	Leicester.
Hart, James Connorton	Horselydown.

Provincial Transactions.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

The half-yearly meeting of the above Association was held on Friday, May 23rd, in the College Street Room. J. Barry, Esq., J.P., Local Secretary, occupied the chair.

Mr. C. Hester, President, opened the meeting by expressing his pleasure at seeing those principals who had attended, and trusted that the little relaxation the members were going to enjoy on the following Tuesday would induce them to pursue their studies with redoubled vigour, so that the summer session might be as successful as the winter had been. He heartily thanked the examiners for the service they had rendered, and then referred to the obligation the Association was under to its late president, whose tact and zeal had so much helped it in its early life.

The Secretary (Mr. Druce) then read the following statement of receipts and expenditure and the report :—

RECEIPTS.	£	s.	d.
26 Members' Subscriptions, at 5s.	6	10	0
7 „ „ to Chemistry Class	0	14	0
1 Member's Donation	0	2	0
Balance	3	9	7½
	£10	15	7½

EXPENSES.			
Reports, etc.	1	3	0
Cupboard	1	0	0
Herbarium and Chemicals	2	14	5
Gas, 3 quarters	0	10	6
Sundries	0	8	1
	5	16	0
Balance	4	19	7½
	£10	15	7½

The Report stated that the hope expressed by the Council at the beginning of the winter session that the good attendance of the classes in 1872 might be continued or, if possible, increased, had been responded to by larger classes. Forty-two meetings had in all been held, at which structural botany had been taught, questions on two-thirds of the Pharmacopœia asked, all the official materia medica considered, and the analytical reactions of the basylous radicals practically performed, several lessons also being occupied by descriptions and explanations of the principal laws regulating the science of chemistry. During a portion of the session also a class was conducted in dispensing and reading prescriptions. The knowledge of materia medica had been much increased by the possession of Lescher's cabinet and Siebold's herbarium, and the Council suggested to the members the great service a herbarium of indigenous plants would be to the Association. The prescription book now contained a very fair collection, and a little more exertion would complete it. The Council thanked most warmly the class conductors for the diligence they had displayed in fulfilling their duties, and hoped that the members would reward them by forming as large and attentive classes as possible. The examinations had been conducted in a very able manner. From various causes, however, the competitors among assistants had not been so numerous as had been expected; but the apprentices had been very eager in the contest, and on the whole the experiment had been so successful that the Council recommended it be repeated at least yearly. The Council took the opportunity of tendering to the late president, Mr. H. J. Masters, their sincere thanks for the services he had rendered to the Association.

Several special meetings had been held and papers of an interesting nature read, but a difficulty in getting a supply of original papers had been felt. It would afford the Council great satisfaction if their principals would occasionally favour them with a paper on some subject appertaining to pharmacy. After thanking Mr. Leyes for the continued use of the room, Messrs. Maxwell and Sandall for their services as examiners, and the various donors who had so kindly rendered assistance, the report stated that during the session four members had passed the Minor examination (one in honours and the others all in good positions) and three the Preliminary, being 30 per cent. of their members who had been successful in the examination ordeal.

The report having been adopted Mr. W. Sandall read a report of the examinations which he had conducted in Botany and Materia Medica. He said the first examination was on Botany in which 3 assistants and 6 apprentices competed. In the Materia Medica examination, 4 apprentices, but no assistants competed. He confessed himself a little disappointed at the result; as he expected a larger proportion of marks in this subject, it being more generally popular. On the whole the result obtained was satisfactory considering that it was the first examination held by the Association. He suggested that in future they should be held at stated times and as frequently as possible.

Mr. G. N. Maxwell being unable to attend, sent a report of the Pharmacy examination. He said that the answers in this department of study were not so satisfactory as could have been desired, more attention was required to the various strengths and proportions of ingredients. In the more important preparations, however, the answers were good. Four apprentices competed.

The President's prize was awarded to Mr. O. Wallis.

The Secretary's prizes for the greatest aggregate number of marks in the three subjects, competition limited to apprentices, were awarded as follows :—

First . . . Mr. J. Cross, 450.
Second . . . Mr. L. Bird, 420.

Mr. James Barry then addressed the class, cautioning the members against trusting to superficial knowledge of a subject. The examination had, he trusted, evoked a healthy spirit of competition, but the examination would be altogether insufficient by itself if home study were neglected. Examinations were not the end, but a means of taking stock of the quantity and quality of knowledge obtained, and it was not only the successful men who benefited, but each and all, if proper attention were paid to improving and increasing the store of knowledge. He should have great pleasure in helping to carry out the suggestion of the Council that the examinations should be repeated, and accordingly offered two prizes, one for assistants, the other for apprentices, to be competed for, leaving the arrangement for the Secretary and Council to decide. He then presented the prizes to the successful candidates.

The Secretary read a letter from Mr. Tutton, resigning his post as Vice-President, on account of his leaving the town, and said that the prize Mr. Tutton had offered would be competed for in August.

Mr. Sandall said Mr. Druce in the report mentioned the slight attention indigenous botany received; he should be much pleased to assist the Council by offering a prize for the best herbarium, leaving the arrangement to the Council, but would suggest that rules similar to those adopted by the Pharmaceutical Society should be chosen.

Mr. Armitt said that perhaps an arrangement might be made to let the members remain out till a later hour on one morning in the week, so that an opportunity might be given to revive the botanical rambles under more auspicious circumstances.

The President having thanked the principals for their very kind offers of assistance, mentioned the proposed route for the following Tuesday's botanical ramble, and after the votes of thanks to the chairman and donors of prizes, the meeting terminated.

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

Juries Bill.

On Thursday, June 5, the House went into Committee on the Juries Bill. Clause 5, which relates to exemptions from the obligation to serve on Juries, was discussed at great length, and several additions were made to the list. Mr. Gathorne Hardy carried, on a division, by 70 to 55, the exemption of Schoolmasters of Public Schools, Professors and College Tutors resident in the Universities to which they belong ; and Mr. H. Palmer, with the assent of the Attorney-General, added to the list Officers of both Houses of Parliament during the Session of Parliament. At the Instance of Colonel Barttelot, Members of the Royal College of Veterinary Surgeons actually in practice were exempted, as also were the Governor and Deputy-Governor of the Bank of England. This last provision was carried by Mr. Crawford with the support of the Government, against the opposition of Mr. Anderson, by 88 to 57. On the other hand, Mr. West was beaten by 126 to 42 in an attempt to free Borough Justices, Councillors, Town Clerks, and Treasurers from service within the Borough and County. Mr. Alderman Lawrence failed by 81 to 17 to obtain an exemption for the Aldermen of London, and Mr. R. Fowler, who wished to reduce the age of exemption from seventy to sixty, was defeated by 54 to 18. Registrars of Births, etc., Members of the Mersey Docks Board, and Commissioners of Income Tax were also proposed for exemption by Mr. Monk, Mr. Rathbone, and Mr. Alderman Lawrence ; but in each case the Committee negatived the suggestion.

On clause 45 a proposal was made by Mr. Magniac which incidentally raised the question of local taxation. After a sharp debate, in order to avoid a division, it was agreed to report progress. In reply to a question, Mr. Gladstone said that he was afraid the measure must now stand over until more urgent business had been disposed of.

Reviews.

Botanical Companion to the British Pharmacopœia. By Hyman Marks, L.R.C.S.I. Dublin: Fannin and Co. 1873.

Of all the branches of medical education, botany is perhaps considered by students generally to be the most dry and uninteresting. The majority of botanical works are of necessity so condensed that there is but little room in them for those explanatory remarks which, in a botanical lecture, render the subject so much more lucid and interesting. This condensation is nowhere more apparent than in the descriptions of the Natural Orders of plants. The student may read over many times these scientific descriptions, and after poring over them until he is tired, frequently fail to grasp the real distinctions between one Order and another—distinctions which a botanist who has become practically acquainted with them would not fail to point out in a very few words. The natural consequence is that the whole of the descriptions given are often learnt by rote, and forgotten soon after the necessary examination is passed.

The idea of "supplying to students of medicine a ready means of acquiring the special information which heretofore they had much trouble and attendant loss of time in searching for through cumbrous works on the subject" is an excellent one, and we gladly welcome any attempt to render botany, more especially systematic botany, less irksome to students.

The little work before us has the advantages of being in a portable form, and of presenting a large amount of information in an easily accessible manner. A little alteration in the arrangement would, however, render it much more easy of reference. Thus the descriptions of the Natural Orders are given in paragraphs which require to be read through when searching for any particular character. If printed in a tabular form, the character sought would be seen at a glance.

The pamphlet is divided into three sections, the first giving short descriptions of the characters of the classes and subclasses of the vegetable kingdom, and a tabulated list of those Natural Orders comprised in each subclass which contain official plants ; the second section gives descriptions of the characters of all the Natural Orders which contains official plants ; and the third section gives an alphabetical arrangement, in a tabular form, of all the official plants, with the Linnean class and order of each, the Natural Order to which it belongs, and the part of the plant which is official.

What may be the object in giving full definitions of such orders as Menispermaceæ, Guttiferæ, Zygophyllaceæ, etc., is not very evident. Few students have the opportunities of studying these orders practically, and indeed a practical acquaintance with them is not required from medical students at the universities. If the space occupied by the descriptions of these exotic orders were used in giving a few remarks upon the best practical means of distinguishing one order from others to which it is nearly allied, the work would be rendered exceedingly useful, and a tabular comparison of the Linnean and Natural Systems would enable the student to refer any plant to its proper position in either. As the list stands at present, however, it must be entirely a matter of memory.

Explanatory notes are wanting thoughout. The student might well be puzzled on finding Gymnospermæ included under Monochlamydeæ, when, on referring to many botanical works, he will find they form a section of Exogenæ. Upon finding reticulated leaves given as a character of exogens, he might be pardoned for supposing that Dictyogenæ belonged to that class, instead of to Endogenæ, and that there must be an error somewhere. A few words in explanation of apparently contradictory statements would have entirely done away with these difficulties. It is to be hoped, therefore, that the next edition will form a really useful pocket companion for the student of botany in connection with the British Pharmacopœia, for such a work is still a desideratum.

NOTES ON THE PHARMACOPŒIAL PREPARATIONS (B. P. 1867): Specially arranged for the Use of Students preparing for Examination. By W. HANDSEL GRIFFITHS, Ph.D., L.R.C.P.E., etc. London: Baillière, Tindal, and Cox. 1873.

Dr. Handsel Griffiths is well known as an able and accomplished lecturer on the materia medica in the Dublin School of Medicine. He has already placed the student under considerable obligations by his system of 'Botanical Analysis applied to the Diagnosis of British Natural Orders,'—a work on which a deservedly favourable opinion has been expressed in our own columns. His 'Posological Tables' made a welcome addition to the resources of candidates for examination and served still more to commend its author to the pharmaceutical and medical student as a judicious and well-informed compiler of "handy-books" for qualifying boards. His 'Notes on the Pharmacopœia' will prove useful to all who find the volume issued under the authority of the Medical Council in need of supplement.

The student has only to turn to the section on the "Tinctures" to appreciate the succinctness and accuracy with which Dr. Handsel Griffiths has condensed into brief compass the chief points that he needs know about them. The section "Pilulæ" is also a favourable specimen of neat and correct condensation. Though we regard with no great partiality publications which may be abused by the indolent as substitutes for thorough and independent work, we do not otherwise object to such specimens of the class as this.

Our commendation, however, must not be unqualified. The carelessness with which Dr. Handsel Griffiths has revised the press is discreditable. We hope that in the next edition such blunders as "Tarax*i*ci" and "Hyosc*i*ami" (p. 26); "Liquor Sod*a*" (p. 45); "Pilula Rhei Composit*us*" (p. 56); "Syrupus Rhæad*dos*" (p. 70), etc., will be removed. They are apt to cause misgivings as to the compiler's scholarship, and to mislead the confiding candidate.

BOOKS RECEIVED.

PHARMACOPŒIA OF THE UNIVERSITY COLLEGE HOSPITAL. Published by Authority of the Medical Committee, 1873. Edited by WILLIAM MARTINDALE. London. 1873. From the Editor.

NATURAL PHILOSOPHY FOR GENERAL READERS AND YOUNG PERSONS. Translated and Edited from Ganot's 'Cours Élémentaire de Physique,' by E. ATKINSON, Ph.D., F.C.S. London: Longmans, Green, and Co. 1872. From the Publishers.

Obituary.

Notice has been received of the death of the following:—

On the 15th May, 1873, Mr. Robert Forster, Pharmaceutical Chemist, of Dover, aged 64. Mr. Forster had been a member of the Pharmaceutical Society since 1845.

On the 8th May, 1873, Mr. Edward Coward, Chemist and Druggist, of Western Hill, Durham.

On the 10th May, 1873, Mr. John Hudson Lewis, Chemist and Druggist, of South Street, Cockermouth.

Notes and Queries.

[338.]—DISCOLOURED PRINTS.—In reference to the subject of the query of *G. C.*, the *Boston Journal of Chemistry* states that all kinds of printed matter that has turned yellow may be completely restored by immersion, for one minute, in Javalle water, without the least injury to the paper, if the precaution be taken to thoroughly wash the article in water containing a little hyposulphite of soda. For the preparation of Javalle water, take four pounds of bicarbonate of soda and one pound of chloride of lime; put the soda in a kettle over the fire, add a gallon of boiling water, and boil for ten or fiteen minutes; then stir in the chloride of lime, avoiding lumps.

[339.]—MARKING INK.—For the information of *C. E. G.*, we reproduce the formula introduced by Professor Redwood (PHARM. JOURN. 1st Ser., Vol. VI., p. 420) of a marking ink which flows freely from the pen, without running or blotting, becomes perfectly black upon application of a moderate heat, and will not destroy the texture of the finest cambric.

℞	Nitrate of Silver	℥j
	Carbonate of Soda, crystallized .	℥iss
	Tartaric Acid	℥ij ℈ij
	Strong Liquor Ammoniæ . . .	f℥ij or *q. s.*
	Archil	f℥ss
	White Sugar	℥iv
	Powdered Gum Arabic. . . .	℥xij
	Distilled Water	*q. s.*

Dissolve the nitrate of silver and carbonate of soda separately in distilled water; mix the solutions; collect and wash the precipitate on a filter; introduce the precipitate, still moist, into a Wedgwood's-ware mortar, and add to it the tartaric acid, rubbing them together until effervescence has ceased; add liquor ammoniæ in sufficient quantity to dissolve the tartrate of silver; then mix in the archil, white sugar, and powdered gum arabic, and add as much distilled water, if required, as will make f℥vj of the mixture.

APPOINTMENTS.

BARCLAY, A. W., M.D., has been appointed (provisionally) Public Analyst for Chelsea.

BLUNT, Mr. T. P., has been appointed a Public Analyst for Shropshire: 13*s.* 4*d.* for each analysis.

BROWN, Dr. J. C., has been appointed Public Analyst for Cheshire: £100 per annum, and 6*s.* for each analysis. Also Public Analyst for Carnarvonshire: £5 per annum, and £1 1*s.* for each analysis.

COLLINS, Mr. J., has been appointed Public Analyst for Bolton: £30 per annum.

HORSLEY, J., F.C.S., has been appointed Public Analyst for Gloucestershire: £115 per annum, with offices, etc.

JOHNSON, H., M.D., has been appointed a Public Analyst for Shropshire: 13*s.* 4*d.* for each analysis.

LETHEBY, Dr. H., has been appointed a Public Analyst for Hertfordshire and for East Sussex.

MUTER, Dr., has been appointed Public Analyst for Streatham, Tooting, and Balham.

TURNER, G., M.R.C.S., has been appointed Public Analyst for the borough of Portsmouth: £50 per annum.

Correspondence.

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

The Minor Examination Bye-law.

Sir,—I had hoped that the bye-law controversy would have expired with the Special General Meeting. Any desire on my part to re-open the discussion terminated when the meeting gave its sanction to the bye-law. I must, however, claim from you—and I feel that I am fully entitled to what I ask—another opportunity of saying a few more words on this most vexed question, since you have done me the honour of applying your editorial and "quasi" legal calipers to my reasoning and opinions in respect to the particular bye-law in question.

It is not needful—although much may be said on this phase of the subject—to enter fully into the general question of the advisability of making a compulsory and fixed term of practical experience, and a fixed interval of three years, before candidates are allowed to submit themselves to the ordeal of examination.

The question strictly is, Is the *new interpretation* of the statutes a *legal or illegal* interpretation?

The absolute and obligatory duties of the examiners to examine *all persons* who present themselves for examination, are clearly expressed in the following clause, to which I have so often reverted (6th section of the Pharmacy Act of 1868):—The "Examiners for the purposes of this Act" "are hereby empowered and *required* to examine all such persons as shall tender themselves for examination under the provisions of this Act."

There are no discretionary or conditional powers here enunciated. The Society is bound in this section by the clearest legal phrase; and I still maintain that a fixing of conditions *antecedent* to the examination is beyond the legal scope of any part of this or any other section of the statutes.

The examiners have only to do with the practical and technical knowledge to be displayed and educed to their satisfaction *by means of examination.* This latter word being used in the ordinary sense.

The further provision of the 6th clause has not, as you suppose, escaped my attention. The words by which you contend the antecedent conditions of three years' services, or three years' practical experience, as well as a three years' interval between the Preliminary and Minor examinations, may be enforced—for all the three conditions are included in the bye-law—are as follows: "The examination aforesaid shall be such as is provided under the Pharmacy Act (1852) for the purposes of a qualification to be registered as assistant under that Act, or as the same may be varied from time to time by any bye-law to be made in accordance with the Pharmacy Act as amended by this Act" (1868).

By this provision the Society is empowered to vary the examination by the addition of "such *other subjects* as may be determined by any bye-law." These latter words are quoted from the 8th clause of the Act of 1852, and are referred to in that portion of the Act of 1868 (6th clause) to which you direct my particular attention.

Upon this very definite provision, by which new subjects may be introduced, you build up, *without license*, something *clearly outside the provisions of the statute.*

The *only power* granted by this provision is that in reference to *new subjects* upon which candidates may be examined, and there is not the remotest reference to any conditions to be exacted from candidates, *antecedent* to the examination. This opinion is not simply my own but it is the carefully considered opinion of more than one professional gentleman of high standing in the law.

The next important point about which you suppose I labour under a misconception, and to which I must again refer, is the legal difference and distinction between the bye-law as first proposed, and objected to by Mr. Flux (section x., clause 16), and the one sanctioned by Mr. Flux and accepted by the Special General Meeting.

The *only difference* I am as yet able to discover between the two formulæ is, that the one accepted being more onerous, exacting, and more difficult to conform to, is in consequence *more illegal* than the one signalized as contrary to "the intention of the Act," on the following plea, "that the examinations should be freely open to all the world."

The result of this new bye-law will be that the examinations will *no longer* "be freely open to all the world." It will no longer be free to a person, however competent he may be, if by the quickness of his understanding and the severity of his application, he has obtained his knowledge in less time than three years, and not according to the special mode indicated in the bye-law.

And another consequence operating as a fetter, rather than something free, will be, that however anxious a person may be to pass his Minor or Major examinations within a less interval than that of three years after passing the Preliminary examination, and however important it may be to him to pass either the one or the other examination within a less interval, he will be compelled to wait until the three years have terminated and until he is twenty-one years of age.

There is nothing free in these conditions, and notwithstanding my sincere desire to discover proof that I am an innocent victim of misconceived opinions, and that I ought to be in accord with the majority of my esteemed colleagues in this matter, I am reluctantly obliged still to adhere to my previously-expressed opinions.

I am, dear Sir,
Yours faithfully,
Robt. Hampson.

205, *St. John Street Road, E.C.,*
June 3rd, 1873.

Mr. J. Askew.—Our remarks, to which you refer, were entirely impersonal, and were written in reply to the inquiry of a correspondent. We cannot, therefore, recognize the existence of any reason for reclamation on personal grounds.

"Burry Port."—Cooke's 'Manual of Structural Botany' (Hardwick) or Oliver's 'Lessons in Elementary Botany' (Macmillan).

Payment of Assistants.—We have received a letter from *"An Underpaid Assistant"* upon the above subject, in which he speaks of the payment of masons and carpenters as contrasting favourably with that of chemists and druggists' assistants. In consideration of the increasing stringency of the examinations, he thinks there ought to be a general advance in the rate at which assistants are remunerated, and a decrease in the number of business hours. He believes that "strikes are not the first move, but the result of neglected appeals," and that chemists' assistants will form no exception to the rule.

Mr. G. H. Wright desires it to be known that it was at his request we stated that he was the rejected candidate for Council and not Mr. W. V. Wright. As regards his other complaint, we imagined that it was sufficiently well known who Mr. G. H. Wright is, and it would not have been possible to publish his letter elsewhere than in our advertisement columns.

"Vive, Vale."—(1.) Inquire of the Secretary of the Apothecaries' Company. (2.) Yes.

M. Rennaud (Torrington).—We are not aware of the existence of any laws regulating the practice of pharmacy in the countries mentioned.

Erratum.—In p. 968, col. ii. line 21, *for* "colorific rays" *read* "calorific rays."

Communications, Letters, etc., have been received from Messrs. J. R. Jackson, Fairlie, Stoakes, C. S. Davies, Macdowall, "One of the Bitten," "Roy," W. A. M., B. W. L.

The following journals have been received:—The 'British Medical Journal,' May 31; the 'Medical Times and Gazette,' May 31; the 'Lancet,' May 31; the 'London Medical Record,' May 28; 'Medical Press and Circular,' May 30; 'Nature,' May 31; 'Chemical News,' May 31; 'Gardener's Chronicle,' May 31; the 'Grocer,' May 31; 'Journal of the Society of Arts,' May 31; 'American Chemist' for May; 'Doctor' for June; 'Pharmacist,' January to April; 'British Journal of Dental Science' for June; 'L'Union Pharmaceutique' for May; 'Florist and Pomologist' for June; 'Archiv der Pharmacie' for April; 'Zeitschrift des allg. österr. Apotheker-Vereines' for May and June.

THE PHARMACY OF THE UNITED STATES' PHARMACOPŒIA.

BY WILLIAM MARTINDALE, F.C.S.,

Dispenser, and Teacher of Pharmacy to the University College Hospital.

(*Continued from page* 902.)

Extracta.—There are thirty-four formulæ for these, and the following instructions are prefixed to this class of preparations:*—Unless otherwise directed, they are to be evaporated "as quickly as possible in a broad, shallow vessel, by means of a water-bath, until they have acquired the consistence proper for forming pills; and towards the end of the process stir them constantly with a spatula. Sprinkle upon the softer extracts a small quantity of alcohol."

In all except six cases the process of percolation is adopted for exhausting the crude drugs in making these extracts. The exceptions are the extracts of fresh parts of plants,—the leaves of belladonna, conium and hyoscyamus, and taraxacum root;—extract of opium is made like B. P.—three cold macerations in water and evaporation of the clear liquors; extract of logwood is also made like B. P. from a decoction with water, and the subsequent evaporation of this.

The official extracts may be divided into five classes, viz.:—

Pure alcoholic.—The extracts of ignatia, nux vomica, cannabis americana, cannabis indica, and physostigma. The drugs are taken in powder, of various degrees of fineness, and percolated with alcohol (sp. gr. ·835), a sufficient quantity. The spirit is distilled from the tincture so obtained, and the residue evaporated by a water-bath to a soft extract. The last three drugs are macerated for four days with a portion of the spirit before proceeding to percolate.

Semi-alcoholic.—Of these there are—

a. Extracts in which diluted alcohol only is used as a solvent—*Extractum dulcamaræ, extractum senegæ, extractum stramonii seminis,* and *extractum colocynthidis.* The spirit is directed to be recovered from all, except senega, by distillation. In extract of colocynth, the colocynth pulp is first macerated with a portion of the spirit and pressed, the marc percolated with more spirit, the mixed liquors are then distilled to collect the alcohol, the residue being afterwards dried and powdered. About seven ounces of extract, it is stated, are obtained from forty-eight ounces of colocynth fruit (with seeds). *Extractum colocynthidis compositum* is a mixture of this simple extract with purified aloes, resin of scammony, cardamom, and soap, all in the state of fine powder.

b. Extracts in which the powdered drugs are percolated, first with alcohol (sp. gr. ·835) and then with diluted alcohol; the two percolates are partially evaporated separately, and then mixed and evaporated to a proper consistence. The following are so prepared:—*Extractum aconiti, extractum conii alcoholicum* (leaves), *extractum digitalis, extractum hellebori, extractum podophylli, extractum rhei, extractum stramonii foliorum, extractum valerianæ.*

c. Extracts in which the powdered drugs are treated by percolation, first, with a mixture of two volumes of alcohol (sp. gr. ·835) and one of water, and afterwards with diluted alcohol, and the mixed percolates evaporated to an extract. The following are so made:—*Extractum arnicæ* (flowers), *extractum belladonnæ alcoholicum* (leaves), and *extractum hyoscyami alcoholicum* (leaves).

d. Extracts in which the powdered drugs are treated by maceration and percolation, first with alcohol (sp. gr. ·835) and then with *common* water. The first portion of percolate is distilled to recover the spirit, and the two products are separately evaporated until syrupy, mixed and concentrated to an extract. These are *extractum cinchonæ* (yellow bark),* and *extractum jalapæ.*

Aqueous.—Extracts prepared by percolation of the powdered drugs with cold water, and the subsequent evaporation of the percolate to a proper consistence. These are *extractum gentianæ, extractum juglandis* (butternut bark), *extractum krameriæ*, and *extractum quassiæ.* The evaporation of the percolate from rhatany, after heating to the boiling point and straining, is to be continued at a temperature not exceeding 160°, to form an extract. *Extractum opii* and *extractum hæmatoxyli*, before mentioned, are also aqueous extracts.

Acetous.—*Extractum colchici aceticum.* This is prepared by diluting acetic acid with four volumes of water, percolating the powdered dried "root" (*sic*) with this solvent, adding more water until the drug is exhausted, and evaporating the percolates in a water bath to a proper consistence.

Extracts of fresh parts of plants.—There are four of these preparations; three of them are prepared from the fresh leaves separated from the branches entirely (not like the B. P., or Mr. P. Squire, in this respect)—these are the extracts of belladonna, conium, and hyoscyamus. The leaves are bruised in a stone mortar, sprinkled with a little water, and the juice expressed; then having heated this to the boiling point, the liquor is strained and evaporated to a proper consistence. The chlorophyll is thus separated from these extracts. They will therefore not be *green* extracts in the sense in which we understand the corresponding preparations of the British Pharmacopœia. When the chlorophyll is separated from these extracts, they are very hygroscopic in their nature, and troublesome to manage pharmaceutically, especially when prescribed in the form of pills, else the separation of the chlorophyll is an advantage therapeutically, as it is merely an inert substance which increases the bulk

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* Dividing the preparations into classes allows the editors of a national pharmacopœia the opportunity of giving general instructions for preparing each class, which, in the compilation of the British Pharmacopœia, was not embraced—the strict alphabetical arrangement of the whole being adhered to. The alphabetical and class arrangements might, I think, with advantage be blended together so as to permit some instructions to be given under the head of each class. Many pages of space might have been saved by such means by condensing and omitting the repetition of the process for making tinctures by maceration and percolation under each separate formula in the British Pharmacopœia. In the London Pharmacopœia short heads of this kind were appended to some classes, which were often useful. As an example of the effect of such omission, none of the infusions in any of the three Pharmacopœias under notice are directed to be agitated, as they ought to be, during their maceration, and the consequence is that, in perhaps seven cases out of ten, when negligently prepared according to the Pharmacopœia, they are never agitated at all until they are strained off.—W. M.

* I have previously mentioned that *common water* is ordered in the preparation of *extractum cinchonæ* and *extractum cinchonæ fluidum.* This appears to be a great oversight.—W. M.

of these preparations. Extra care is directed to be used in the preparation of *extractum conii* to prevent the volatilization of the alkaloid this ought to contain. After heating the juice up to the boiling point and filtering, the liquor is evaporated to the proper consistence, either in a vacuum with the aid of heat, or in shallow vessels, at the ordinary temperature, by means of a current of air directed over the surface of the liquid. *Extractum taraxaci*, the other fresh extract, is prepared by slicing the root, sprinkling it with water and bruising, until reduced to a pulp. The juice is then expressed, strained, and evaporated in a vacuum, or in a shallow dish over a water bath, to the proper consistence,—it is never heated to the boiling point; it will thus contain all the albuminoid matter the fresh juice contains, if carefully prepared.

Great care has been taken to give very minute instructions about the preparation of each separate extract, but a point that strikes one very forcibly is the liberal use of spirit ordered in making this class of preparations, and in many cases the spontaneous evaporation of it from the percolates in such a way as to materially increase the cost of the extracts so obtained. I am not aware whether, in the United States, pharmacists are liable to such a heavy duty upon alcohol as we are in this country, but I think our American cousins are wide enough awake to their own interests, not to permit of the "spontaneous evaporation" of alcohol, although the Pharmacopœia may order it.

(*To be continued.*)

THE MICROSCOPE IN PHARMACY.

BY HENRY POCKLINGTON.

(*Continued from p.* 825).

Eucalyptus Globulus.*—A remarkably beautiful and striking group of the Myrtaceæ is represented by the extensive genus *Eucalyptus* which predominates to such a degree in a great part of New Holland that it principally determines the character of the vegetation of the country. The Eucalypti, which belong exclusively to New Holland and Van Dieman's Land, sometimes reach an enormous circumference, for *E. globulus* (Labill.) not unfrequently attains a height of 150 feet, while the trunk near the ground is from 25 to 40 feet in circumference. The foliage of the Eucalypti is very remarkable, and the sabre-like form of the leaves, the edges of which are turned toward the trunk, together with their bluish green colour, gives them a sombre appearance.

In the maritime zone of Corsica, according to a pamphlet published by Messrs. Savory and Moore, the *E. globulus* vegetates throughout the year, and if the soil be suitable its growth is more rapid than that of any other ligneous plant.

"Every year, in the spring, the trunk strips itself of a portion of its outer bark, and this bark as well as that which adheres to the sapwood, and even the leaves, when dried, preserve the characteristic odour, and when chewed, have a decided bitter taste, with an after taste of resin. The wood is hard, close, compact, and suited for building purposes and ship timber." The bark and leaves only are used in pharmacy.

* Meyen, 'Geography of Plants.'

The bark is remarkable for the ease with which it separates into thin layers, whence one of its vernacular names of stringy bark, and is on this account not particularly easy of microscopical examination. A few hours' maceration in cold water, and a final gentle boiling for five minutes will generally render the ligneous fibres sufficiently soft to permit the cutting of a thin section without tearing the softer tissues. Sections cut transversely radially are the most useful and must be very thin.

The outer layers of the bark are corrugated layers of loose cork cells covered by compressed epidermal cells, and in no wise remarkable. The warty elevations are produced by semi-sub-epidermal receptacula, large very minutely porous cells, containing a mixed substance of great complexity, in large part proteinaceous, the exudation of which appears to be concerned in the stripping off of the epidermis just referred to; and in part consisting of an essential oil to which the characteristic odour is due, and which is also found in similar receptacula in the leaves. The receptacula of the bark are best seen in transverse sections, treated a short time with carbon bisulphide, and then with iodine solution. Their size and form are only to be ascertained by carefully cutting thin slices off the epidermis, and thus exposing the receptacula beneath. Ether, alcohol, and carbon bisulphide remove the essential oil, as also alcohol, and leave the proteinaceous constituents which may then be examined by the usual reagents. Nitric acid dissolves these and leaves a small residuum of doubtful character. Within these receptacula and the loose layer of parenchymatous cells immediately beneath the epidermis, are the several tissues forming the stringy bark. The stringiness is due to the long cord-like liber-tubes which are pretty evenly distributed amongst thin-walled, tender, parenchyma cells, medullary rays, and resin or oil receptacula. The liber-cells are tough and in bundles of six or more, adhere closely to each other with very slight adhesion to the other cells of the bark, so that very slight force suffices to strip the bark into layers and finally into fibres, whence it occurs to me, that were the bark cheaply obtained it might be of economic value, after being exhausted of its tanning and febrifuge qualities, for the purpose of making paper of great strength.

The liber-tubes are very long and tough, porous, with a small central cavity containing tannic acid, a proteinaceus substance that intensely stains with solution of logwood, and also the essential oil, to which probably the camphoraceous smell of the bark is in part due, though the oil is chiefly contained in large special receptacula and in the large subcutaneous cells just described. The liber-cells are best studied in a radial section stained with magenta, as much of the dye as possible being removed with hot alcohol, and their pores are best examined in transverse logwood-stained sections. Careful use of sulphochromic acid is needful to demonstrate the successive ligneous deposits of the cells.

In the cells adjoining the liber-tubes are considerable quantities of the crystal prisms of Professor Gulliver, very variously shaped, and resembling those found in the Portugal onion. They and the liber-tubes are intensely doubly refractive, and, being of various size and shape, polarize very beautifully. So that a carefully-executed section from the middle of the bark forms an exquisitely lovely polariscope object, but is very difficult to mount successfully.

The play of colour when the prisms are crossed without the intervention of a selenite filter is very fine.

The cells of the parenchyma are thin-walled, subglobose in shape, and contain, besides the crystal prisms and the ordinary albuminous contents, tannic acid and a saccharine substance that very rapidly reduces Fehling's test. The tannin is most largely present in the middle portion of the bark, in the medullary rays, and in the oil receptacula distributed through the bark, and in small quantities only in the sub-epidermic receptacula. The crystals are not imbedded in the cell-contents, and are evidently an oxalate of lime, and perhaps, some of them, of some other salt. Starch very doubtfully present in any of the specimens I have examined.

The medullary rays are narrow, and composed of nearly square cells containing a yellow, red-brown substance consisting of tannin, an oil, and protein substance. The cell walls at right angles to the direction of the rays are much more delicate than the other walls, and easily give way under tension, much facilitating the "stripping" of the bark.

Two forms of oil and resin vessels are common in the inner portion of the bark. One very long and thin-walled kind lies alongside the liber-tubes, and is not to be distinguished from them until the section has been deprived of all its colouring-matter and is either slightly stained or is examined by polarized light. The other form consists of irregularly-shaped cells, thick-walled and consolidated, and very minutely porous, of very various shapes, and chiefly aggregated in the middle portion of the bark. These cells can only be studied after the careful application of ether and alcohol to remove resin, and sulphuric acid and chlorate of potash to remove albuminous and gummy matters and to bleach the specimen. Large receptacula in the form of intercellular spaces, bounded by small cells and very similar to those found in the rind of the orange, occur near the exterior, and also, but rarely, in the inner portions of the bark, and are easily seen if the section containing them be partially exhausted with alcohol and then stained with iodine solution. The contents of these receptacula apparently do not include tannic acid, at any rate not in a state sufficiently free to give the usual reaction with iron salts. (A section stained with proto-sulphate of iron is very interesting, and shows the distribution of the astringent principle very clearly.)

To conclude, it is doubtful whether any bark requires more careful examination, or is worthy of more careful study, than the one that has occupied us so long. The leaves may now perhaps be noticed, as the substances present in them bear some relation to the oils and resins in the bark. As has already been said, the leaves are more or less sabre-shaped, and bear a white bloom, due to depauperation of the epidermis, here as in all the Australian Myrtaceæ of abnormal development. The longer leaves have great numbers of semi-lunar stomates on each surface, and the two surfaces agree more closely than is usually the case. This might be expected, from the fact that these leaves grow edgeways, and not, as our English and most other leaves, with their flat sides to the sky and sun. The structure of the petiole should first engage our attention on commencing the histology of the leaf. The first thing that we notice on examining a transverse section is the presence of receptacula a little within the epidermis, not immediately beneath it, as in the bark and in the rind of orange, containing a yellow essential oil, similar to the oil of the bark but lighter in colour, probably from the absence of one of the tannic compounds, to which a portion of the darker colour of the bark oil is due. These receptacula are precisely similar in construction to the other one, and do not on this account require further notice here.

The cells of the epidermis are thickened, not so compressed as usual, and much longer than broad (differing, however, much in this respect in different specimens). The subepidermal layer is chiefly composed of globose cells, many of which contain a rose or rose-purple chromule,* often present in sufficient quantity to give a decided purple colour to the petiole and midrib. The parenchyma cells are much thicker-walled than in the bark, and contain chlorophyll, and a few starch granules. Crystals are not usually abundant. The central woody tissue is by no means in the circular bundle commonly found in the petioles of the leaves of ligneous plants, but resembles a section through an involute vernation, the opening of the "scroll" is occupied by wood cells nearly filled with ligneous deposits, and the small central cavity containing only protein matter. Within the scroll are ordinary parenchyma cells containing granular substances, starch and small crystals. The liber-cells bounding the "scroll" are larger than the inner and have larger central cavities. Their resemblance to the cord-like liber-cells of the bark is very close, and their contents are very similar.

The structure of the "scroll" itself is somewhat complex and consists chiefly of wood fibres, pitted and dotted, fibrous and annular vessels, all interesting, but requiring more space than can be devoted to them here.

The leaves are easily sectionized if they be placed in a soft split cork, and the usual section-cutting instrument be made use of. The epidermis is composed of irregular cells, little compressed and nearly equally thickened on each cell wall. The stomates are very numerous, and consist of two equally-sized semilunar cells, the whole stomate being of course circular, the semilunar cells containing no chlorophyll, but an amorphous semigranular substance, of which I have not been able to ascertain the nature. Exudations of a yellow resinoid substance, an oxidation product probably of one of the oils of the leaf, is found on the surface of the older leaves, as tear-shaped masses immediately above pear-shaped receptacula situate below the epidermal and subepidermal layers. The receptacula within the leaf are of two forms, one circular in cross-sections, and not communicating with the exterior, the other pear-shaped, and frequently opening at the surface by a small circular orifice, not due merely to disruption of the outer cell wall, but often perfectly formed as a pseudo-stomate. The contents of the two receptacula are slightly different, the latter containing the more camphoraceous oil, not, however, unlikely an oxidation product of the other. The middle layers of the leaf do not require special notice. The margin, where the submarginal vein characteristic of Myrtaceæ is found, requires brief notice only in one particular. Within the wood cells, of which the hard margin is chiefly composed, lie small aggregations of porous cells, apparently connected with, or the terminals of, the vessels, with little or no contents and performing no appa-

* A product, as we shall see presently, of one of the chlorophylls or chlorophyll compounds of the leaves.

rent functions. Similar congeries of cells occur in a few other leaves, but are more easily seen here than in any other leaf that I have examined, excepting, perhaps, the leaf of *Tropæolum magus.*

A somewhat complete examination that I have made of the colouring-matters of the bark and leaves must stand over for the next chapter.

(*To be continued.*)

CHEMICAL EXAMINATION OF THE BARK OF THE AZADIRACHTA INDICA.*

BY J. BROUGHTON,

Government Quinologist.

The use of the bark of this well-known tree, the *Azadirachta Indica,* generally called the Nim tree, is quite general throughout the whole of India as a tonic and febrifuge. It is generally employed in the form of a decoction, though sometimes as powder, and has been stated by certain English authorities to have the same febrifuge qualities as cinchona bark. The taste of the bark is intensely bitter; the inner layer, or liber, is however by far the bitterest. The tree being very handsome, and the wood of value, it is well known in avenues; the plants generally bearing marks of having been robbed of their bark for medicinal use. The pinnate leaves have also an intensely bitter taste, and are employed in native medicine, though not as a febrifuge, being used as a poultice externally, and are said to have a powerful effect in preventing glandular tumours from coming to maturity. They are also employed by natives in their fresh, green state to cover the bodies of patients suffering from small-pox, though I believe this is done rather from a religious than a medicinal motive. The seeds yield a considerable amount of oil, which has also a strong, bitter taste, is used for lamps and in medicine. The roots are said to have vermifuge properties, but I have not examined them. The main virtues of the tree reside in the bark.

The investigation has been a matter of much labour and difficulty, from the circumstance of the bitter principle having scarcely any definite qualities, it being a neutral resin. It is slightly soluble in water, and hence the decoctions of the bark are intensely bitter, though water will not extract the whole present. To obtain it in purity the bark is exhausted with spirit of about 60 per cent., the filtered tincture precipitated with water, the dried precipitate again exhausted with benzol, again evaporated, again exhausted with carbonic disulphide, then by dry ether, and finally by absolute alcohol. The last exhaustion causes the separation of a small amount of a white transparent substance, crystallizing in fine needles, which is quite insoluble in water, has no taste, and consists of carbon, hydrogen, and oxygen. Obtainable in but small quantities, it has not been satisfactorily analysed, and has the general characters of a crystalline fat, though fusing at 175° C. It is certainly not the effective principle of the bark nor an alkaloid.

The resin purified by the successive solvents is a dark brown, somewhat soft resin, of agreeable smell, resembling that of the bark. It is slightly soluble in water, and entirely in all the foregoing solvents, but not in fixed oils. In any dilute solution its bitter taste is strong, but not disagreeable. It is soluble in strong boiling solutions of the fixed alkalies, from which acids again precipitate it apparently altered, likewise in strong sulphuric acid, by which it is also altered. It fuses at 92° C.

The determination of its true chemical formula has been a matter of great difficulty and labour, from the circumstance of its refusal to combine with other substances in a definite manner. It was finally determined by the discovery of a nitro-compound which yielded a silver salt, not, however, crystalline. From the analyses of these I ascribe to the resin the formula $C_{36}H_{50}O_{11}$. Its nitro-compound is formed in the usual manner by nitric acid and precipitation with water, is yellow, uncrystallizable, somewhat soluble in water, more readily in alkalies, and having the formula $C_{36}H_{46}(NO)_4O_{11}$.

The resin is, therefore, not in any respect an alkaloid, as it contains no nitrogen. Its chemical constitution appears to me scarcely to confirm the ascribed antiperiodic febrifuge qualities of the bark, though doubtless the bitter solution of the resin may be a good tonic. If required for medicinal purposes, it will be most conveniently employed in alcoholic solution. As the bark varies very considerably in its content of the bitter resin, a direct tincture would be unsuitable, but the impure resin, after the application of benzol in the foregoing process of preparation, would be fit for solution in alcohol and employment in medicine.

It is singular that native physicians never appear to have employed a tincture of the bark instead of an aqueous decoction. From some conversation I had with a native physician in Bengal, I believe it is the native religious dislike in that country to the use of alcohol which has prevented its use for this purpose.

The leaves contain a small amount of bitter substance of a similar nature, but which is far more soluble in water. The same substance is also contained in the bark in addition to the one described. It has very similar properties to the resin, of which it is a hydrate. No peculiar alkaloid is contained in the leaves. The oil contains a small amount of the bitter substance of the leaves, not the resin of the bark. The powerful smell of the tree is well known, but it is not due to the presence of a sulphuretted oil, as has been surmised; indeed, I have not succeeded in obtaining an essential oil from the tree. If the bark is distilled with water, the distillate has the perfume of the tree, but no oil is perceptible, though it has the power of decolorizing potassic permanganate.

A condensed account of our present knowledge of the therapeutics and chemistry of *Azadirachta Indica* is to be found in the Indian Pharmacopœia, pp. 53 and 443, from which, however, I differ in some points.

* From the *Madras Monthly Journal of Medical Science.*

WHAT IS THE TRUE COLOUR OF PULVIS CRETÆ AROMATICUS?

BY ARCHIBALD PATERSON.

With an article of such importance as Pulvis Cretæ Aromaticus, one which is so frequently prescribed, and which forms the basis of that useful remedy, aromatic powder of chalk and opium; one would very naturally suppose, that a question such as the heading of this paper asks, would be altogether uncalled for.

The ingredients of its composition only require to be in fine powder and mixed carefully.

Such being the conditions of its preparation, we should expect that it would at all times present a uniform colour. Such, however, is not the case.

This preparation finds its way into the drug market, a variety of shades, from a bright ochre yellow to a colour very much resembling Dover's Powder, which Mr. Squire, in his 'Companion to the British Pharmacopœia of 1867,' describes as a "dark fawn colour."

Now, if the dispenser gets supplied at one time with an article bearing this name, of a bright ochre colour, and next time he requires it, having asked for the same preparation, he is supplied with a powder bearing the same name, but of a colour perfectly different; it becomes a matter of doubt in his mind; and he asks himself which is the correct one?

He knows the formula prescribes a quantity of saffron in powder, and is aware that saffron gives a most brilliant colour with spirit.

He, without trying to prepare a few ounces for himself, very naturally expects that saffron should also impart the same beautiful colour to a mixture of chalk, sugar, etc., etc., and at once decides in favour of the high coloured preparation; while he attributes the want of colour in the other specimen to a deficiency of saffron.

The result of this is, that he loses confidence in the house which supplied the pale coloured article, while the establishment which sent him the powder of a high colour rises in his estimation.

Now, the strange part of the matter is this: these specimens may be both equally genuine.

It is not necessary that the rich coloured preparation should contain a grain more of saffron than its pale-faced brother; neither is it imperative that pale face should be a cheat because he does not exhibit all his colour in his countenance. The difference in appearance is simply a matter of manipulation during the preparation, which I will endeavour to show.

If the ingredients are simply in fine powder, and mixed, as the 'British Pharmacopœia' directs, and as any dispensing chemist making the powder himself would do, without any mechanical aids except his mortar and pestle, and a sieve, then the resulting product will be the pale coloured preparation. Again, if the ingredients are ground in a mill, as is done by most wholesale houses, and during the pulverising of the saffron, a few drops of rectified spirit is introduced, the result is, that the colour of the saffron (which is not intended to be displayed in the dry state) is diffused through the mixture, and the product is the high coloured powder referred to.

There is no doubt the latter preparation is the most pleasing to the eye; but I question if the production of this bright colour in the powder is quite justifiable, it gives it a richness of colour, which, although it may not be false, is certainly premature.

At the same time it causes the dispenser to expect more than he is entitled to, and to find fault with firms which do not supply the high coloured preparation. If any gentlemen suspects that the full quantity of saffron is not present in any given specimen, I would advise him to prepare a few ounces of the powder himself, to be kept as a standard test specimen. Let him now take, say ten grains of the suspected article, and an equal quantity of his own standard specimen, and macerate each in an equal quantity, say four drachms, of rectified spirit for a few hours, the shade of colour produced will give a pretty accurate estimation of the saffron value of the suspected specimen.

By adopting some such simple test, and discontinuing to ask for the high coloured article, this powder would soon become a uniform colour, resembling the old pulv. confect. aromat. which it was intended to supersede.

ADULTERATION OF PEPPER.*

BY M. BOUCHARDAT.

During the examination of a large number of specimens of ground pepper the author met with various inert powders, and among those which he detected the most often was one prepared by drying and finely pulverizing the parenchyma of potatoes which is left as a residue in the manufacture of starch. Pepper mixed with this adulterant has a more feeble odour; its taste is at first sweetish, and afterwards pungent, but less intensely so than in normal pepper. The mixed powder is uniformly grey, whilst the powder of pepper presents some blackish particles and some of a yellowish grey colour. Comparison should therefore be made between a suspected powder and one prepared by grinding pepper to the same degree of fineness. Ground pepper mixed with this potato powder floats longer on the surface of water than that which is pure, and the coloration of the water is different. Liquor iodi, added drop by drop, gives a more intense blue with the potato mixture than with normal pepper. Too much importance, however, must not be attached to this test, as M. Léon Soubeiran has shown that pepper contains a considerable quantity of a peculiar fecula.

The other substances found mixed with ground pepper were (1) lentil flour mixed with earth, which can be detected by the microscope and calcination; (2) chalk; and (3) linseed cake, ground to a degree of fineness comparable to that of ground pepper. By the aid of a good glass the fragments of linseed could easily be seen. In some specimens seized at the custom-house the powder of sesame seeds was detected; and it appeared probable that in this case, in order to obtain the proper shade for the powder, the adulterator, who had sent from Marseilles several hundred bags of this product, had mixed many sorts of seeds.

White pepper, obtained, as is known, by the decortication of black pepper, is often adulterated with talc, chalk, and starch in considerable proportions. The introduction of these three inert matters may have for its object either the direct increase of bulk or the masking of an imperfect decortication. After the examination of numerous specimens, M. Bouchardat came to the conclusion that many manufacturers supplied two products: one, known as *poivre léger*, consisting principally of the cortical part of the pepper, black fragments forming the greater portion of it; the other, known as *poivre blanc*, being mixed with talc or starch, to imitate the shade of white pepper. Although the *poivre léger* contains nothing foreign to pepper, yet as the useful part is eliminated, the sale of such an article must be looked upon as a fraud on the part of the dealer. It is also sometimes adulterated with ground grains of paradise, which is easily detected by means of a magnifying glass. In France, to avoid prosecution, the wholesale dealer is said often to sell the ground pepper pure and the mixture intended for its adulteration separately.

The usual adulterants of pepper may be clearly identified by means of a microscopic examination, with an instrument of 300 to 400 magnifying power, in the hands of a skilled person. The powder of pepper is characterized principally by its starch. This appears in compound grains retaining the form of the cells in which they were contained, and which they entirely filled. They are of variable forms and dimensions; M. Mussat has measured them from 0·030 mm. to 0·20 mm. in diameter. The simple grains of which they are formed are, from their juxtaposition, irregularly rounded, and are from 0·001 mm. to 0·0056 mm. in diameter. Under the action of iodine they assume a rather dull violet-blue colour. Solution of caustic potash attacks them but slowly. This fecula is accompanied by the *débris* of the pericarp, which presents two very distinct forms of cells. In one case they are nearly cubical, with rather thin walls, containing a blackish granular matter, which is the fleshy portion of the

* 'L'Union Pharmaceutique,' vol. xiv., p. 145.

pericarp; in the other, the cells forming the endocarp, they are cuneiform, often slightly curved, and their very thick walls are canaliculate. The author found their mean size to be 0·025 mm. wide by 0·062 mm. long. Potato starch is easily distinguished from that of pepper by its simple, more or less rounded or ovoid or irregularly trigonal, strongly refractive grains. The largest measure 0·180 m.m. All, except the smallest (which measure about 0·010 m.m.), have a conspicuous, often stellate hilum, and their concentric zones are clearly visible. Dilute solution of caustic potash attacks them very rapidly. A yellow tissue contained in several of the specimens examined was distinguished easily by its elongated polygonal cells, with thin, clear, yellow walls, enclosing a slightly darker granular substance. It probably belonged to some oleaginous cruciferous seed, or to linseed.

In consideration of the great skill with which pepper is now adulterated, M. Bouchardat recommends that dealers should, as far as possible, buy their pepper whole and grind it themselves.

NOTES ON ALOES.*

BY EDWARD R. SQUIBB, M.D.

A pretty close examination and cross-examination of the aloes of the commercial market, during the past few years, has led the writer to the inference that the differences in it are due quite as much to difference in mode of preparation as to difference in species, climate, etc. Comparing the varieties of the market with the uses and effects of the drug, without too much dependence upon the books, it will be found that there are two distinct classes.

Between these classes there seems to be a pretty sharp line of difference, while the individuals of each class shade off into each other without any well-marked boundary line. The prominent, and perhaps characteristic difference between the two classes of the drug is, that in their therapeutic effect one is comparatively mild and gentle, and unirritating, with tonic and aromatic qualities, while the other is more harsh and drastic, producing more irritation, and much more liable to overaction. This difference adapts the individuals of the first class better to use in human beings, and renders a selection for the mildest among the individuals very desirable, if not necessary, in the delicate organization of women, in the treatment of whose diseases this drug is so important and so valuable. The individuals of the second class are better adapted to the medication of animals, and by right should not be used for mankind.

Carrying this therapeutic distinction into the drug market, and applying it closely, the two classes will be easily made out by a marked difference in the sensible properties. The one class is of a lighter colour, generally soft, and often semi-fluid in consistence, and varying in both colour and consistence with length of exposure to the air, and with temperature. The odour is entirely different, both in quality and degree, being aromatic in quality and feeble in degree. When strong, and approaching to the character of a stench, as it not unfrequently does, this may arise from decomposing animal matter, such as goat-skin, fragments of which are often found in the aloes. From the appearance of these fragments of skin, and fragments of the aloe plants, and from the presence of uncoagulated albumen, it seems almost certain that the individuals of this class have not been subjected to artificial heating, but that the exuded juice is dried in the sun,—perhaps in goat-skins, which line a shallow excavation made in the sand at the stump of the plant, whose leaves may have been cut off near the ground and laid with their exuding, cut ends over the goat-skin.

The second or more drastic class affords equal evidence of being prepared by artificial heat, and the depth of colour, to some extent, indicates the amount and quality of the heat used. Most, but not all, the varieties of this class give evidence of being made by decoction of the plant, rather than by evaporation of juices obtained by exudation from the fresh plant.

All the individuals of the first class are known in the market as Socotrine aloes, or occasionally as East India aloes; while the second class has no generic or class name, but embraces the individual varieties which come from the West India Islands, and from Eastern and Southern Africa. This group is well represented by the commercial titles Barbadoes aloes, Cape aloes, etc. And each of the two names mentioned covers, in the market, sub-varieties, produced neither in Barbadoes nor in the Cape of Good Hope.

While some of the finer varities of this class are occasionally met with which are very aromatic and very nice, giving evidence of careful preparation, this is so rare an exception that it does not modify the judgment of the writer to the effect that the whole class should be excluded from the materia medica and pharmacy which is specially applicable to mankind, and be confined to the larger uses of veterinary practice, where it has special and very important advantages over the other class.

The so-called Socotrine aloes varies quite as much, though all under one name, as the other class with its various names, but of late years there is a growing tendency in the market to separate it into two sub-varieties by difference in colour, so that it is now not uncommon to hear of red Socotrine aloes, and yellow Socotrine aloes, the red variety being justly held in the highest estimation. A curious observation, often verified by the writer, is that the red variety is always yellow at first, and gradually changes to red through intermediate shades, by age and exposure to the air: and that continued exposure tends constantly to deepen the red colour into garnet at first, and finally into reddish-black, when the edges are no longer translucent. The yellow sub-variety, however, does not become red by age and air contact, but only deepens, as it dries and becomes brittle, into a yellowish liver colour, or yellowish-brown, with very little of the red tinge, or none at all. This yellow subvariety it is in which the fetid, stinking odour is occasionally met with, and as both subvarieties are of the same yellow colour at one early stage, even of their drug market career, and at this stage distinguishable chiefly by odour and visible impurities, the question arises as to whether both are not from the same source, and the same process of preparation, the parcels which become red being well and carefully prepared, while the parcels which do not become red, may, from containing putrescible matter, undergo a fermentation which may destroy the elements upon which the red colour depends, and other more valuable qualities, as the aroma, etc.

The fetid odour of this subvariety is always diminished by age, and is altogether lost in the powder made from it.

As a general rule this Socotrine aloes is much higher in price than any of the grades of aloes by decoction, and loses much more largely by drying. All except the finer parcels of the red variety require to be melted, diluted, and strained before they are fit for medical use, and the loss by straining varies very much, say from 5 to 10 per cent. It is curious to notice how small a proportion of these impurities is visible by inspection of the aloes beforehand. The average loss from straining and drying is perhaps 15 to 18 per cent., but has, in the writer's experience, once reached 27 per cent. upon a large lot. The substances separated by straining through a sieve of sixty meshes to the linear inch are chiefly pieces of goat-skin, shreds of the aloe plant, sticks, small stones, and hair. Exceptionally entire goat-skins are found in the parcels, and one was met with tied up at the openings, showing how the juice is transported to the packing places. One outlet—the neck—appeared to have been left open, as in the transportation of grape-juice from the wine-presses, through which to pour out the contents. After being emptied—for it was found empty—this skin appears t

* From the 'Proceedings of the American Pharmaceutical Association.'

have been dropped into the package of aloes, possibly by some child, as the skin is smaller than others which have been met with. From another parcel a rude knife of very peculiar shape and construction was strained. This knife, as shown, was probably used to cut off or incise the leaves of the plant, though it does not appear to be particularly well adapted to such purpose for civilized hands. The above figures are given from an experience of straining, drying, and powdering more than twenty-two thousand pounds of Socotrine aloes.

The melting, straining, and drying of the aloes by artificial heat is very injurious to it, of course, as in proportion to the want of skill and care with which this is done it degrades the aloes to the character of the lower grades made by decoction. But when the question is reduced down to a choice between this injury done and the common practice of drying on steam tables without straining, and thus powdering up goat-skin, stones, sticks, etc., there can be no doubt as to which course is best for the interests of medicine. The finer packages of red Socotrine aloes, which always command a high price but are slow sale, contain so little of impurity which can be separated by a No. 60 sieve, that as a rule it is better to use it without this hurtful process. Spread thinly out upon shallow trays of tinned iron, the advisability of straining can be approximately and usefully judged. And if this be done in cold weather when the aloes does not run, and when the air is comparatively dry, a couple of months' exposure, at ordinary temperatures, is sufficient to dry the aloes well, retaining its natural aroma to a highly desirable and useful extent. It is very much to be feared that the use of such aloes in the officinal formulas is very much undervalued, since the Socotrine aloes which has passed through the writer's hands within the past ten years has been very nearly all used by successive crops of quack pill men, who must have good drugs while getting up the reputation of their nostrums, though this may not be the time when the money is made. Pharmacists, as a class, use very few such drugs, because not knowing their value they will not pay the price.

A case of very good red Socotrine aloes, imported by the writer from Messrs. Arthur S. Hill and Son, of London, is shown herewith, and will be found in the exhibition-room of the Association during the meeting. The members are invited to make a critical examination of it. This case cost £19 10s. per cwt. of 112 lbs. in London. That is to say, about 83 cents gold without freight, duty, or any other element of cost. The currency cost price to the writer cannot be far from 1 dol. 20 cents per pound. It is drier than usual, though not cleaner than the best of its kind, and will not lose in drying more than about 10 per cent., while it does not need straining. Add 10 per cent. to 1 dol. 20 cents and the cost will stand about 1 dol. 32 cents currency. A very high price, but the cost well represented in intrinsic value.

This case, however, is exceptionably costly, since five cases had by the writer from Messrs. Dix and Morris, of New York, next previous to this shipment, were of nearly as good quality, and quite as clean, though not quite so dry, at 75 cents per pound currency.

ANIMAL NUTRITION.

BY HERR STOHMANN.

The author, who has studied the subject of animal nutrition by the aid of a series of experiments upon goats, has published the results in *Der Naturförscher* for April. The following abstract of the memoir is taken from the *London Medical Record* (June 4):—

With regard to the proportion of food-stuffs utilized in nutrition, as deduced from a comparison of excrement with food consumed, Herr Stohmann finds that "there is no essential difference in the utilization (*Ausnützung*) of meadow-hay in different kinds of ruminating animals—the ox, the cow, the sheep, the goat." The same thing, indeed, has been previously expressed by other observers; it is a result of some methodological importance, as establishing the possibility of comparing experiments made on different species of animals, and drawing general conclusions from these.

"The addition of greater quantities of easily digested non-nitrogenous matters to hay causes considerably less absorption of albuminous substances and of raw fibres (*Rohfaser*—a somewhat impure cellulose, obtainable by a simple analysis)." As proof of this is given the following. The absorption of albumen in meadow-hay, in one of the animals, was 58·4 per cent.; on addition of 200 grs. starch-flour and 200 grs. gum, the absorption sank to 32·6 per cent. So also with the raw fibres, though in greater degree. In the fodder consumed there were 110 grs. of raw fibres furnished daily. Supposing a digestibility in these equal to that in meadow-hay for fodder, 49 grs. ought to be digested daily, whereas only 11 grs. were digested. The digestibility of raw fibres is therefore diminished in the proportion of these numbers.

"The addition of carbohydrates seems to have no influence on the digestibility of fat." The percentage absorption-numbers were the same as for unmixed hay.

"The absorption of substances of the albuminoid group is dependent on the proportion of nitrogenous to non-nitrogenous matter in the fodder." In this statement, partly the same thing is expressed as in the former, but it has special reference to protein-stuffs, and to the addition of any other food-stuffs, not merely the easily digestible non-nitrogenous materials. This relation Herr Stohmann has endeavoured to express by way of mathematical formula, as follows:—

$$p' = \frac{p}{1 + \frac{1}{9} \cdot \frac{S}{p}}$$

where p denotes the quantity of protein-stuffs consumed, p', the digested portion of these, and S, the weight of the non-nitrogenous constituents of the fodder." It will be seen that p increases with the decrease of S; so that the protein-stuffs are the more digestible the more they preponderate in the food.

There can be no doubt that a formula of this kind will never be absolutely accurate. Apart from the various digestibility of protein-stuffs of different origin, there would, in the case where $S = 0$, be a perfect absorption of the protein-stuffs; *i. e.*, the fæces would be free from nitrogen; whereas Herr Stohmann himself takes cognizance of the fact, that the solid excrements are richer in nitrogen, the more protein-stuffs have been consumed as food. But this is not the meaning of the formula; it claims only a relative validity, and that only within the limits of variation of ordinary fodder mixtures (or a little beyond these). To this must be added that it agrees very fully with the numbers obtained in experiments; and so, with the proviso mentioned, it may be accepted as a means of estimating beforehand the digestion of protein matter, in a healthy ruminant, for a given amount of fodder. Herr Stohmann does not attempt a theoretical explanation of the phenomenon in question, and probably the data are insufficient for this; it is, however, a decided advance, to succeed in constructing a valid formula like that just given.

"Easily-digested carbohydrates diminish the absorption of fat." Under the influence of starch-flour and gum, the absorption of the fat of meadow-hay is reduced from 35 to 23 or 24 per cent.; through sugar, even to 7 per cent. We here see again the similar influence of starch-flour and gum, whence it appears that both substances are closely allied in the process of digestion.

In addition to the foregoing propositions, there are others which are of a more secondary and methodological interest.

"The sum of the digested non-nitrogenous constituents of meadow-hay is approximately equal to the quantity of non-nitrogenous extractive matter and fat contained in it; it is, however, influenced by the various digestibility of the raw fibres. Fodder materials of the same kind, but of different origin, are digestible in very various degrees. The digestive power of one and the same animal for the same fodder varies little, and may, under normal conditions, be regarded as almost constant. The digestive powers of different individuals of the same species are slightly but not essentially different."

Herr Stohmann further extended his researches to the connection of milk-production, and other phenomena of metamorphosis, with nutrition.

The amount of milk.production is dependent on the individuality of the animal, on the duration of the lactation period, on the fodder, and especially on the albumen contained in this,—as appeared from experiment, by increasing and diminishing the amount of albumen. A fodder which, reckoning for a constant animal weight, is sufficient for abundant production of milk in a large animal, does not meet the requirements of a small animal; whence it follows that a small amount of animal weight of a goat is more expensive to maintain than a corresponding quantity of a cow. The goat is, during its comparatively short lactation period, a more liberal milk-producer than the cow; since, for the same weight of animal, an equal supply of milk is never obtained from the cow. The milk-production is influenced by the quantity of water consumed and distributed through the body. Cows fed with watery fodder, green fodder, turnips, and the like, give considerably more milk; we also find nursing women drink large quantities (proportionally) of liquid. This shows that the production of milk is an essentially different process from fattening. Greater consumption of water, while it furthers milk-production, hinders fattening; milk-production demands a large exchange of albumen, while everything that promotes this exchange opposes fattening. The fat contents of fodder have, according to Herr Stohmann, no special influence on the secretion of milk. Protein-stuffs, also, do not operate immediately, but after some time; and it would appear that the lacteal glands are slowly "built up" at the expense of the albuminous blood, and afterwards, on falling asunder, they give forth the milk.

Lastly, with reference to the influence of nature of food on change of material (*Stoffumsatz*), Herr Stohmann has some propositions which closely correspond with those advanced by Voit with reference to carnivora.

"Increase of albumen in food causes increased change of albumen in the body;" a statement, which, *e.g.*, is proved by the following numbers from experiment:—

Fodder.		Nitrogen Absorbed by the Goat.	Nitrogen Excreted in Urine.
Hay.	Linseed Meal.		
1500 grammes	100 grammes	17·9 grammes	10·7 grammes
1400 ,,	200 ,,	21·1 ,,	14·5 ,,
1100 ,,	500 ,,	31·0 ,,	18·9 ,,
800 ,,	800 ,,	41·1 ,,	27·8 ,,

The quantity of nitrogen employed for the production of constituents of the body rises and falls with the increase and diminution of albumen in the food; a fact which is readily explained if one considers that the albumen-change increases almost proportionally to the nitrogen received, but not quite; so that there is an ever-increasing remainder for incorporation of protein in the tissues, and for the production of milk.

Increase of albumen in the food acts, in the first instance, on the production of milk-albumen, and in much smaller degree on incorporation of albumen. The incorporation and expenditure of albumen are dependent on the state of the body; a fact which is especially apparent in changing from one fodder to another, when the albumen-change corresponding to the new food does not at once come into play. The albumen-change in the body increases with increased water consumption.

An incorporation of fat takes place, when with great quantities of albumen there are given great quantities of easily digestible non-nitrogenous matters.

SAND EROSION.

The novel method of engraving and boring glass, stone, etc., by causing jets of fine siliceous sand to impinge with great velocity upon the portion intended to be removed is illustrated in the International Exhibition at South Kensington by a machine invented by Mr. Tilghman, of Philadelphia. The machine is thus described in a Report on Machinery and the Processes connected therewith, furnished to the *Journal of the Society of Arts* by the Rev. Arthur Rigg, M.A.

"There are two machines now in operation upon glass, and one at work on stone. The small machine is to appearance a very plain painted box or stand—nothing of machinery visible. In the top of this box are two holes, about an inch and a half in diameter. If the wooden casings were removed, there might be seen below these holes a pipe, which descends, and is formed somewhat trumpet-mouthed on the outside of the bottom of the box. Below this mouth is a turned wooden basin. From the upper part of the box, on the spectator's left hand, a pipe passes underneath the floor to the centre of a rotating fan, near the wall of the room, and therefore by this a vacuum can be formed in the box. As the only inlet of air is past the trumpet-mouthed opening, a rapid current ascends the pipe connected with it whenever the exhaust-fan is at work. From large hoppers (funnel-shaped) containing sand, a regulated quantity falls towards the turned wooden basin; in falling on the basin it is influenced by the entering air, is jetted from the pipe, and so strikes upon, say, glass covering the holes; the exposed glass is rapidly depolished. Where, however, an elastic substance, as paper, india-rubber, etc., covers the glass, no action of the sand takes place.

"If interstices or openings be formed in this elastic substance, as a pattern, then the surface of the glass is removed in accordance with such pattern, and to a depth dependent upon the time of exposure, and the intensity of the current of air, and quality of the sand.

"Next to this small "vacuum" machine is a large compressed air-blast one, capable of acting upon a sheet of glass three feet broad. A design in paper or lace being pasted on the glass, it is laid upon endless bands, by the motion of which it may be carried forward. In the middle of the compartment (which is glazed upon one side so that spectators may see the operation) provision is made, by a suitably-formed transverse opening, for a blast of air with sand. When the ordinary machinery is set in motion this blast commences, the glass is travelled at a prearranged velocity, and in as little time as one may require to read this account, the ornamented glass is delivered at the side of the box opposite to that at which it entered.

"So slightly an elastic surface as the changed character of some of the materials used in photography suffices to resist the action of the sand; hence the photographic design may be etched by sand on glass. Examples of various works done by this process are on a table near to the machine. The third machine is in a separate building. It consists of a wooden table, on which the stone is laid. This table can be traversed impulsively in one direction, by the action of a Clement's driver, on a spur wheel, and so motion is given to a rack.

"Above the table, provision is made for traversing the combined steam and sand jet. This is accomplished by a mangle-wheel motion, variable according to the breadth of the stone to be operated upon. By these two motions, transverse to each other, every portion of the stone may be reached. The steam and sand jet is arranged upon the plan adopted by Mr. Siemens, for exhausting the telegraph despatch tubes—the sand being admitted by an inner small tube, surrounded by jets of steam, as from concentric rays of an argand burner. Whilst your reporter was present, a delicate and somewhat intricate cast-iron pattern was laid upon a piece of marble. The steam in the boiler was at 55 lbs. pressure. In five minutes the marble, measuring 13 inches by 6, was penetrated to a depth of about 3-16ths of an inch, leaving the surface as originally polished, and with the beautiful tracery design in high relief. The sand is ordinary silver sand, and was used at the rate of one pint per minute; the slab of marble was three-quarters of an inch in thickness, and was rapidly cut by the sand blast, and so separated from a larger piece.

"This eroding action of sand mixed with water has formed many of the ravines and glens in our island. If the following statement, made to the writer of this report about ten years ago, be true in fact, there is a property in water which has not yet been utilized. Whilst standing near a new steam-boiler which was being tested under water pressure, and when the load was near its maximum, a small and (except that the sun shone upon it so that the light was decomposed) imperceptible jet appeared; the writer was about to pass his finger across it, when a workman said, 'Don't do that, sir; a boy had his finger cut off with one of those jets.' Might not a jet of water be used as a saw?"

With reference to the remark in the last paragraph as to the part this eroding action of sand mixed with water has played in affecting the physical features of this country, it will be interesting to quote from the lecture "On Niagara," recently delivered at the Royal Institution, by Professor Tyndall, some remarks as to the genesis and proximate destiny of those falls:—

"Time and intensity are the main factors of geologic change, and they are in a certain sense convertible. A feeble force acting through long periods, and an intense force acting through short ones, may produce approximately the same results. To Dr. Hooker I have been indebted for some samples of stones, the first examples of which were picked up by Mr. Hackworth on the shores of Lyell's Bay, near Wellington, in New Zealand, and described by Mr. Travers in the 'Transactions of the New Zealand Institute.' Unacquainted with their origin, you would certainly ascribe their forms to human workmanship. They resemble flint knives and spear-heads, being apparently chiselled off into facets with as much attention to symmetry as if a tool guided by human intelligence had passed over them. But no human instrument has been brought to bear upon these stones. They have been wrought into their present shape by the windblown sand of Lyell's Bay. Two winds are dominant here, and they in succession urged the sand against opposite sides of the stone; every little particle of sand chipped away its infinitesimal bit of stone, and in the end sculptured these singular forms.

"The Sphynx of Egypt is nearly covered up by the sand of the desert. The neck of the Sphynx is partly cut across, not, as I am assured by Mr. Huxley, by ordinary weathering, but by the eroding action of the fine sand blown against it. In these cases nature furnishes us with hints which may be taken advantage of in art; and this action of sand has been recently turned to extraordinary account in the United States. When in Boston, I was taken to see the action of the *sand-blast*. A kind of hopper, containing fine siliceous sand, was connected with a reservoir of compressed air, the pressure being variable at pleasure. The hopper ended in a long slit, from which the sand was blown. A plate of glass was placed beneath this slit, and caused to pass slowly under it; it came out perfectly depolished, with a bright opalescent glimmer, such as could only be produced by the most careful grinding. Every little particle of sand urged against the glass, having all its energy concentrated on the point of impact, formed there a little pit, the depolished surface consisting of innumerable hollows of this description. But this was not all. By protecting certain portions of the surface and exposing others, figures and tracery of any required form could be etched upon the glass. The figures of open ironwork could be thus copied; while wire gauze placed over the glass produced a reticulated pattern. But it required no such resisting substance as iron to shelter the glass. The patterns of the finest lace could be thus reproduced; the delicate filaments of the lace itself offering a sufficient protection. A fraction of a minute suffices to etch upon glass a rich and beautiful lace pattern. Any yielding substance may be employed to protect the glass. By immediately diffusing the shock of the particle, such substances practically destroy the local erosive power. The hand can bear without inconvenience a sand-shower which would pulverize glass. Etchings executed on glass with suitable kinds of ink are accurately worked out by the sand-blast. In fact, within certain limits, the harder the surface, the greater is the concentration of the shock, and the more effectual is the erosion. It is not necessary that the sand should be the harder substance of the two; corundum, for example, is much harder than quartz; still, quartz-sand can not only depolish, but actually blow a hole through a plate of corundum. Nay, glass may be depolished by the impact of fine shot; the grains in this case bruising the glass before they have time to flatten and turn their energy into heat.

"And here, in passing, we may tie together one or two apparently unrelated facts. Supposing you turn on, at the lower part of a house, a cock which is fed by a pipe from a cistern at the top of the house, the column of water, from the cistern downwards, is set in motion. By turning off the cock, this motion is stopped; and when the turning off is very sudden, the pipe, if not strong, may be burst by the internal impact of the water. By distributing the turning of the cock over half a second of time, the shock and danger of rupture may be entirely avoided. We have here an example of the concentration of energy in *time*. The sand-blast illustrates the concentration of energy in *space*. The action of flint and steel is an illustration of the same principle. The heat required to generate the spark is intense, and the mechanical action being moderate, must, to produce fire, be in the highest degree concentrated. This concentration is secured by the collision of hard substances. Calc-spar will not supply the place of flint, nor lead the place of steel in the production of fire by collision. With the softer substances, the *total* heat produced may be greater than with the hard ones, but to produce the spark, the heat must be intensely *localized*.

"This power of erosion, so strikingly displayed when sand is urged by air, renders us better able to conceive its action when urged by water. The erosive power of a river is vastly augmented by the solid matter carried along with it. Sand or pebbles caught in a river vortex can wear away the hardest rock; 'potholes' and deep cylindrical shafts being thus produced. An extraordinary instance of this kind of erosion is to be seen in the Val Tournanche, above the village of this name. The gorge at Handeck has been thus cut out. Such waterfalls were once frequent in the valleys of Switzerland; for hardly any valley is without one or more transverse barriers of resisting material, over which the river flowing through the valley once fell as a cataract. Near Pontresina, in the Engadin, there is such a case; the hard gneiss being now worn away to form a gorge through which the river from the Morteratsch glacier rushes. The barrier of the Kirchet above Meyringen is also a case in point. Behind it was a lake derived from the glacier of the Aar, and over the barrier the lake poured its excess of water. Here the rock, being limestone, was in great part dissolved; but added to this, we had the action of the sand particles carried along by the water, each of which, as it struck the rock, chipped it away like the particles of the sand-blast. Thus by solution and mechanical erosion the great chasm of the Fensteraarschlucht was formed. It is demonstrable that the water which flows at the bottoms of such deep fissures once flowed at the level of what is now their edges, and tum-bled down the lower faces of the barriers. Almost every valley in Switzerland furnishes examples of this kind; the untenable hypothesis of earthquakes, once so readily resorted to in accounting for these gorges, being now for the most part abandoned.

"And now we come to Niagara. Soon after Europeans had taken possession of the country, the conviction appears to have arisen that the deep channel of the river Niagara below the falls had been excavated by the cataract. In Mr. Bakewell's 'Introduction to Geology,' the prevalence of this belief has been referred to: it is expressed thus by Professor Joseph Henry in the 'Transactions of the Albany Institute:'—'In viewing the position of the falls, and the features of the country round, it is impossible not to be impressed with the idea that this great natural raceway has been formed by the continued action of the irresistible Niagara, and that the falls, beginning at Lewiston have, in the course of ages, worn back the rocky strata to their present site.'

"A connected image of the origin and progress of the cataract is easily obtained. Walking northward from the village of Niagara Falls by the side of the river, we have to our left the deep and comparatively narrow gorge through which the Niagara flows. The bounding cliffs of this gorge are from 300 to 350 feet high. We reach the whirlpool, trend to the north-east, and after a little time gradually resume our northward course. Finally, at about seven miles from the present falls, we come to the edge of a declivity which informs us that we have been hitherto walking on table land. At some hundreds of feet below us is a comparatively level plain, which stretches to Lake Ontario. The declivity marks the end of the precipitous gorge of the Niagara. Here the river escapes from its steep mural boundaries, and in a widened bed pursues its way to the lake which finally receives its waters.

"The fact that in historic times, even within the memory of man, the fall has sensibly receded, prompts the question, how far has this recession gone? At what point did the ledge which thus continually creeps backwards begin its retrograde course? To minds disciplined in such researches the answer has been and will be, at the precipitous declivity which crossed the Niagara from Lewiston on the American to Queenston on the Canadian side. Over this transverse barrier the united affluents of all the upper lakes once poured their waters, and here the work of erosion began. The dam, moreover, was demonstrably of sufficient height to cause the river above it to submerge Goat Island; and this would perfectly account for the finding by Sir Charles Lyell, Mr. Hall, and others, in the sand and gravel of the island, the same fluviatile shells as are now found in the Niagara River higher up. It would also account for those deposits along the sides of the river, the discovery of which enabled Lyell, Hall, and Ramsay, to reduce to demonstration the popular belief that the Niagara once flowed through a shallow valley.

"The physics of the problem of excavation, which I made clear to my mind before quitting Niagara, are revealed by a close inspection of the present Horseshoe Fall. Here we see evidently that the greatest weight of water bends over the very apex of the Horseshoe. In a passage in his excellent chapter on Niagara Falls, Mr. Hall alludes to this fact. Here we have the most copious and the most violent whirling of the shattered liquid; here the most powerful eddies recoil against the shale. From this portion of the fall, indeed, the spray sometimes rises without solution of continuity to the region of clouds, becoming gradually more attenuated, and passing finally through the condition of true cloud into invisible vapour, which is sometimes reprecipitated higher up. All the phenomena point distinctly to the centre of the river as the place of greatest mechanical energy, and from the centre the vigour of the fall gradually dies away towards the sides. The horseshoe form, with the concavity facing downwards, is an obvious and necessary consequence of this action. Right along the middle of the river the apex of the curve pushes its way backwards, cutting along the centre a deep and comparatively narrow groove, and draining the sides as it passes them. Hence the remarkable discrepancy between the widths of the Niagara above and below the Horseshoe. All along its course, from Lewiston Heights to its present position, the form of the fall was probably that of a horseshoe; for this is merely the expression of the greater depth, and consequently greater excavating power, of the centre of the river. The gorge, moreover, varies in width as the depth of the centre of the ancient river varied, being narrowest where that depth was greatest.

"The vast comparative erosive energy of the Horseshoe Fall comes strikingly into view when it and the American Fall are compared together. The American branch of the upper river is cut at a right angle by the gorge of the Niagara. Here the Horseshoe Fall was the real excavator. It cut the rock and formed the precipice over which the American Fall tumbles. But since its formation, the erosive action of the American Fall has been almost nil, while the Horseshoe has cut its way for 500 yards across the end of Goat Island, and is now doubling back to excavate its channel parallel to the length of the island. This point, I have just learned, has not escaped the acute observation of Professor Ramsay. The river bends; the Horseshoe immediately accommodates itself to the bending, and will follow implicitly the direction of the deepest water in the upper stream. The flexibility of the gorge, if I may use the term, is determined by the flexibility of the river channel above it. Were the Niagara above the fall sinuous, the gorge would obediently follow its sinuosities. Once suggested, no doubt geographers will be able to point out many examples of this action. The Zambesi is thought to present a great difficulty to the erosion theory, because of the sinuosity of the chasm below the Victoria Falls. But, assuming the basalt to be of tolerably uniform texture, had the river been examined before the formation of this sinuous channel, the present zigzag course of the gorge below the fall could, I am persuaded, have been predicted, while the sounding of the present river would enable us to predict the course to be pursued by the erosion in the future.

"But not only has the Niagara River cut the gorge, it has carried away the chips of its own workshop. The shale being probably crumbled is easily carried away. But at the base of the fall we find the huge boulders already described, and by some means or other these are removed down the river. The ice which fills the gorge in winter, and which grapples with the boulders, has been regarded as the transporting agent. Probably it is so to some extent. But erosion acts without ceasing on the abutting points of the boulders, thus withdrawing their support and urging them gradually down the river. Solution also does its portion of the work. That solid matter is carried down is proved by the difference of depth between the Niagara River and Lake Ontario, where the river enters it. The depth falls from 72 feet to 20 feet, in consequence of the deposition of solid matter caused by the diminished motion of the river.

"In conclusion, we may say a word regarding the proximate future of Niagara. At the rate of excavation assigned to it by Sir Charles Lyell, namely, a foot a year, five thousand years or so will carry the Horseshoe Fall far higher than Goat Island. As the gorge recedes it will drain, as it has hitherto done, the banks right and left of it, thus leaving a nearly level terrace between Goat Island and the end of the gorge. Higher up it will totally drain the American branch of the river, the channel of which in due time will become cultivable land. The American Fall will then be transformed into a dry precipice, forming a simple continuation of the cliffy boundary of the Niagara. At the place occupied by the fall at this moment we shall have the gorge enclosing a right angle, a second whirlpool being the consequence of this. To those who visit Niagara a few millenniums hence I leave the verification of this prediction. All that can be said is, that if the causes now in action continue to act, it will prove itself literally true."

The Pharmaceutical Journal.

SATURDAY, JUNE 14, 1873.

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

THE SOCIETY'S SCHOOL OF PHARMACY.

THE appointment of a Committee to consider the suggestions submitted to the Council by Professors REDWOOD and BENTLEY, in regard to alteration of lecture courses and the fees for attending them, may be accepted as an earnest that some steps will now be taken towards the realization of that severance of the School from the Society which has so often been pointed to as an event not only necessary but also in some respects desirable under present conditions. The resolution by which the Committee was appointed had indeed a wider scope than the suggestion of the above-named Professors, taking in not only the lectures but also the laboratory; but it is mainly in regard to the lectures that there seems to be most urgent need for some modification of the practice hitherto followed.

The extremely low fees charged for attendance at these courses of lectures are quite anomalous, and though it was no doubt sound policy for the Society to continue for a time the fees adopted when the School was in its infancy, it must be evident to all that when the work of establishing recognition of the necessity for special education had been achieved, there was no longer any reason for maintaining the lecture fees at so low a rate. At the outset it was necessary to attract students, and almost to give them the means of improving themselves, since it was wholly optional whether they did so or not. Under such circumstances the funds of the Society were well applied in defraying the cost of lectures; but now, when the technical education of pharmacists has become a necessity, it is time to stop such a course, since the various means by which that necessity is provided for have acquired a value which should make them remunerative, or at least self-supporting.

These views in regard to the Society's lectures, which have long been entertained by a few, were broached in the Council some years ago, and a distinct proposition was made, more than once we believe, to raise the lecture fees. It is to be regretted that this was not done long ago; for in place of a single difficulty there are now two which present themselves in connection with the subject. On the one hand we have complaints that so large a sum is absorbed in meeting the difference between the cost of lectures at Bloomsbury Square and the fees paid for attending them; while, on the other hand, any endeavour to place the Society's School upon an independent footing would seem to be rendered impossible until such time as the attendance fees shall have been raised to a standard that would make the lectures remunerative to the professors.

The opinions expressed at the late Council Meeting and at the General Meeting, as well as on various previous occasions, sufficiently justify us in speaking of the financial dissociation of the metropolitan School from the Society as being both necessary and desirable. It is therefore now especially important that this School should be made—what every such school should be—self-supporting; and our readers will doubtlessly look forward with considerable interest to the result of the Committee's deliberations.

THE CONFERENCE OF 1874.

AT page 1001 of the present number will be found a discussion which seems to indicate the prospect of a break in the periodical recurrence of a gathering at once useful and pleasant to all connected with pharmacy; unless, indeed, ingenuity is exercised meanwhile to devise a remedy for the state of things which is said to preclude the Conference from meeting in Ireland. Failing this, we may, next September, have the President and officers of that body asking each other when they shall meet again, like the witches in 'Macbeth,' and with as little idea of the precise locality as those erratic females.

Certainly the representations of the gentlemen who lately came over from Ireland as a deputation to the Executive Committee of the Conference are such as to justify the opinion that it is not expedient for the Conference to meet in Belfast, or, indeed, at all in Ireland, until the pharmaceutical difficulties prevailing in the sister island have been removed. We shall probably yet hear more on this subject before it is definitely settled. But it will not be out of place to express the opinion that it would be eminently inconsistent with the objects and principles of the Conference to find itself in the position of a bone of contention between two antagonistic parties, and compelled to share the regrets of Captain MACHEATH under similar perplexity.

EARLY CLOSING AT PETERBOROUGH.

IN reference to the subject of a paragraph in last week's Journal, stating that the Chemists and Druggists of Hull had determined to close their establishments at 7 P.M. (Saturdays excepted), we are informed that the Chemists and Druggists of Peterborough have unanimously adopted the same practice during the last fifteen months, and that the arrangement works well, giving general satisfaction. The Bank Holidays also are observed in that city by all classes of tradesmen.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, 5th June, 1873; Dr. Odling, F.R.S., President, in the chair.

After the customary business was completed, six communications were read before the Society, the first being "On the Dioxides of Calcium and Strontium," by Sir John Conroy, Bart., M.A., in which the author gave the method of preparation and properties of these substances. Mr. T. Wells then described a new form of ozone generator, which gives abundance of ozone, and has the advantage of being easily constructed and not liable to be broken. The other papers, which contained but little of general interest, were entitled "On the Behaviour of Acetamide with Sodium Alcohol," by W. N. Hartley, "On Iodine Monochloride," by J. B. Hannay, "On Triferrous Phosphide," by Dr. R. Schenk, and "On Sulphur Bromide," by J. B. Hannay.

The meeting finally adjourned until Thursday, the 19th June, for which the following memoirs are announced:—1. "On the Influence of Pressure upon Fermentation, Part II.," by Horace Brown. 2. "Researches on the Action of the Copper-Zinc Couple on Organic Bodies, Part III," and "On Normal and Iso-Propyl Iodides," by Dr. J. H. Gladstone and A. Tribe. 3. "On Cymenes from different Sources, optically considered," by Dr. J. H. Gladstone. 4. "On the Action of Bromine on Alizarine," by W. H. Perkin. 5. "On some Decompositions and Oxidation Products of Morphine and Codeine Derivatives," by E. L. Mayer and Dr. C. R. A. Wright. 6. "On the Decomposition of Tricalcic Phosphate by Water," by R. Warington. 7. "On a New Tellurium Mineral, with Notes on a Systematic Mineralogical Nomenclature," by J. B. Hannay. 8. "Communications from the Laboratory of the London Institution, No. XII., on New Derivatives of Cresol," by Dr. H. E. Armstrong and C. L. Field.

BRITISH PHARMACEUTICAL CONFERENCE.

Meeting of Executive Committee

At 17, Bloomsbury Square, London, on Wednesday, May 21st, 1873.

Present—Messrs. Schacht (in the chair), Carteighe, Clayton, Greenish, Rimmington, Savage, Attfield, and Moss.

The minutes of the previous meeting were read and confirmed.

Bell and Hills Fund.—Professor Attfield reported that, in accordance with a resolution passed at the last meeting of Committee, he had caused to be printed a circular setting forth the origin of the Fund, the action taken at the last annual meeting respecting Mr. Hills's gift of £200 for the encouragement of pharmaceutical research, and the proposal of the Committee to appropriate this sum by a method similar to that adopted under like circumstances by the British Association, including a set of rules for guidance in making grants. A copy of the circular had been sent to the respective editors of the Pharmaceutical Journal and the *Chemist and Druggist*, who had kindly given considerable prominence to the matter. A copy, together with a private letter on the subject, had also been sent to each member of the Executive Committee and to every member who had contributed an original paper to the Conference. In all, about seventy copies had been distributed. In answer, no actual applications for grants had been made, but several suggestions of subjects for investigation had been offered. Mr. Martindale suggested a thorough investigation of the plasters of the Pharmacopœia. Dr. Wright suggested that sums might be offered to members who would aid in clearing up questions about doubtful alkaloids. Mr. A. H. Allen would give a grant to any member who would further work at methods for detecting adulterations or admixtures of fixed oils; and there were the suggestions by Mr. Tichborne respecting researches having for their object the improvement of many of the official formulæ and the exclusion of others, contributions to the natural history of drugs, modes of economizing alcohol in making spirituous preparations, investigations on disinfectants, and papers on the application of physical instruments in pharmacy. Mr. Savage would encourage gentlemen having mechanical skill to produce an improved pill-machine for dispensing purposes, and machines for rapidly and perfectly commingling ingredients for large and small pill-masses. Mr. Greenish would urge the production of a model compact pharmaceutical laboratory. Professor Attfield said he had also received letters respecting the circular from Messrs. Proctor, Rogerson, Keyworth, D. B. Sharpe, Braithwaite, R. H. Davies, S. R. Atkins, and E. C. C. Stanford, and reminded members that some two hundred subjects for research were given in the "blue" list, a copy of which had recently been sent to every member of the Conference. If the cost of working out any of these subjects deterred members from accepting them, such members should at once apply to the Committee for grants.

The Chairman said the issue of the Bell and Hills Fund circular had produced some valuable suggestions, which would probably be further entertained by members when the minutes of the Committee came to be published.

Increase in the Annual Subscription to the Conference.—Professor Attfield said that when the Conference was established the founders did not entertain any idea of publishing that large, handsome, and important volume, the 'Year-Book of Pharmacy.' Indeed, when such an enterprise was mooted, it was accompanied by a proposal to charge members cost price for the work; but finding that their small annual subscription left them year after year with an increased balance in hand, a decision was arrived at to use up the accumulated funds before making any charge whatever for the book. These funds had now been exhausted, and indeed the Conference was slightly in debt; the cost of printing and binding the 'Year-Book' had moreover recently increased, in consequence of the advanced price of materials and labour. In short, the expenditure of the Conference now exceeded its income, and any increase in the numbers of members beyond the present roll of 2000 would not only add to the labours of the already overworked secretarial staff, but also actually tend to increase instead of diminish debt. Under these circumstances it became necessary for the Committee to devise and recommend a scheme which would again place the Conference on a sound financial basis.

Mr. Clayton said the 'Year-Book' was a volume for which a publisher would charge 12*s.* 6*d.* or 15*s.* Indeed with regard to its money value he had heard only one opinion—that the book was worth far more than the annual subscription and postage (5*s.* 6*d.*). Probably not five per cent. of the members would object to pay more for the book than the present subscription to the Conference.

Mr. Hanbury, Mr. Brady, and Mr. Reynolds had written letters to the Secretary supporting a proposition to raise the annual subscription to 7*s.* 6*d.*, and in return for this sum to present every member of the Conference with the 'Year-Book,' post-free.

Mr. Rimmington and Mr. Greenish supported the adoption of this course, and Professor Attfield said it would remove all financial difficulties, probably without alienating any important number of their supporters.

Mr. Carteighe proposed, and Mr. Savage seconded the following resolution:—"That the annual subscription to the Conference be in future 7*s.* 6*d.* per annum." Carried unanimously.

Place of Meeting for 1874.—Professor Attfield said that on the 7th of December last he had ventured to ask two prominent members of the Conference resident in Ireland for some general information respecting pharmacy in Ireland, where the Conference might possibly meet (in Belfast) in the autumn of 1874, in accordance with the custom hitherto obtaining of assembling at the time and place of meeting of the "British Association for the Advancement of Science." One of these gentlemen wrote:—"After careful consideration I cannot advise that the Conference should meet in Belfast. I fear that scientific pharmacy is not very well represented here in Ireland. Moreover, Belfast is a long way from London, and unless the collateral attractions of the 'Giant's Causeway' might be an incentive, the local inducements are but small." The other gentleman wrote:—"After viewing the matter in every light, I cannot recommend the Conference to go to Belfast. You would get very few Irish papers at the meeting." In April also Professor Attfield, as secretary, had at the suggestion of Mr. Schacht, written to Mr. Pring (Messrs. Grattan and Co.), Belfast, explaining the objects of the Conference, and its custom respecting the place of meeting, and had forwarded to him a 'Year-Book' and various papers relating to the Conference. Mr. Pring said in answer that he feared a sufficient number of members to make the meeting a success would not attend. In answer to a fuller and more explanatory letter which the Secretary read to the Committee, Mr. Pring gave reasons (which he afterwards personally repeated to the Committee at greater length) why it would be inexpedient in his opinion for the Conference to meet at Belfast.

Mr. Greenish said that notwithstanding the opinions of Mr. Pring, and those whom Mr. Pring represented, he hoped the Conference would keep up the practice of meeting in the town in which the British Association assembled.

Mr. Carteighe would like to hear more about Belfast and the pharmacists there, before finally deciding the question under consideration.

Mr. Clayton, who had just visited Belfast, gave valuable information regarding the relative positions there of the dispensing apothecaries and the so-called druggists.

Professor Attfield had also made extensive inquiry in the same direction, and placed the result before the Committee for its guidance.

Mr. Schacht thought that the further consideration of the subject had better be adjourned. The Committee consequently postponed the discussion.

Editorship of Year-Book.—The Secretary reported that Mr. C. H. Wood had intimated that in consequence of his appointment as Quinologist to the Government in India, he would have to leave England about next October. But this would not prevent him from editing the next issue of the 'Year-Book,' and he proposed, therefore, to hold his present office of Editor until September next when he would place his resignation in the hands of the Committee.

The Secretary was instructed to issue an advertisement announcing that the Editorship of the 'Year-Book for 1874' would be vacant, and inviting applications from candidates for the appointment.

The following gentlemen were duly elected members of the Conference:—A. S. Amoore, F. J. Barrett. G. H. Bayley, G. F. Bindloss, W. H. Booth, J. Bordass, F. W. Branson, W. Brewster, W. L. Bridgman, J. B. Brierley, T. H. Clifford, A. G. Cole, Cooke, M. P. Davies, T. Dobinson, Edwards, J. Elgey, A. W. Field, J. Finlay, R. Fortune, Grimwade, A. Harrington, H. G. Harradine, J. Hart, J. Hayes, E. Histed, W. H. Horril, J. C. Hunter, J. Jackson, W. King, J. MacCreath, H. J. Masters, H. Mathews, A. Mercer, A. T. Monkhouse, W. Pitchford R. M. Pratt, R. W. Pring, A. J. Rayson, J. Robson, C. Shapley, J. Spencer, J. Simpson, N. Spyer, J. Swaine, T. C. Taylor, G. P. Tennent, J. D. D. Thomas, W. Thorp, jun., J. Tirrell, W. W. Urwick, M. F. Walton J. S. Ward, W. A. Watts, J. Westlake, E. Wildsmith, J. L. Wills, J. H. Wilson, B. Wood, R. Wood, A. Wrigh.

Meeting of Executive Committee at 17, Bloomsbury quare, London, on the 29th May, 1873. Present—Messrs. Deane (in the chair), Hanbury, Greenish, Carteighe, Hills, Williams, Umney, Attfield, and Moss.

The minutes of the previous meeting were read and confirmed.

Place of Meeting for 1874.—Professor Attfield reported that on the day after the last meeting of the Committee he received the following letter:—

"9, *Trinity Street, Belfast,*
"*20th May*, 1873.

"To Professor Attfield,

"Sir,—At a meeting of the Protective Association of Licentiate Apothecaries of Ireland, held in this town on the evening of the 15th inst., Mr. Pring stated that he had been in correspondence with the London Secretary of the British Pharmaceutical Conference respecting the advisability or otherwise of the Conference assembling in Belfast at the same time as the British Association in 1874. The unanimous opinion of the members present was that it would give them very great pleasure to welcome the Pharmaceutical Conference, and to co-operate in furthering its objects, if the present movement of druggists in Ireland against the interests of the apothecaries did not present an obstacle. To fully explain the matter and the difficulties of the situation, it was agreed that a deputation of two or more of the members should proceed to London some time next week to meet the Committee of the Conference, if the Committee was willing to receive them. I would feel obliged if you would kindly inform me at your earliest convenience of the time and place of meeting.

"I am, dear Sir, faithfully yours,
"REUBEN BOLTON, L.A.H., *Hon. Sec.*"

Professor Attfield said that he at once acknowledged Dr. Bolton's letter, assuring him that the executive of the Conference would gladly hold a special meeting on any day that would best suit the deputation, explaining also that the Conference was a non-political body, that membership of it conferred no guarantee whatever of professional competency, and giving other information respecting the Conference. In answer, Dr. Bolton fixed Thursday, May 29th, as the day of meeting, and stated that the deputation would consist of Dr. Whitaker, Mr. Pring, and Dr. Cantrell. Professor Attfield at once telegraphed to Dr. Bolton that the executive would meet the deputation at 17, Bloomsbury Square, on the day mentioned at eleven o'clock in the forenoon, and two of the three gentlemen were now waiting to meet the Committee.

Dr. Whitaker and Mr. Pring were then introduced to the Chairman and other members of the Committee. Dr. Cantrell was unable to be present.

Mr. Pring, after making some remarks complimentary to the Conference, and acknowledging the welcome given to the deputation by the Chairman, went on to say that the compounders of medicine in Belfast, who, before they could legally dispense prescriptions had been obliged to pass a classical examination, to serve a long apprenticeship to pharmacy, and to face the ordeal of examination in chemistry, botany, and materia medica, were disinclined, in the interests of pharmacy as well as in self-interest, to recognize on any such common footing as that afforded by the Conference the so-called druggists of Ireland, men who might be of good social position, and who often traded largely in other articles, but who had given no guarantees of educated fitness for pharmacy such as those just mentioned. They had never dispensed prescriptions, and had been by law prevented from so doing for the last hundred years.

Dr. Whitaker adverted to the honour conferred on him by his appointment as a representative of Irish compounders of medicine to a body like the British Pharmaceutical Conference, which had such excellent aims as encouragement of research, and the promotion by non-political means of friendly feelings amongst pharmacists. He was glad, too, because the occasion gave him an opportunity of explaining that, although he and Mr. Pring, and those whom they represented, were termed apothecaries, they were not apothecaries in the English meaning of the word, and still more, their position was identical with that of English pharmacists, who merely sold poisons and dispensed prescriptions. It was true that the state of the law was such that they—the apothecaries of Ireland—were legally recognized as medical practitioners, and had had to pass a medical as well as a pharmaceutical examination, but this accomplished, many of them, who obtained the qualification merely for the purpose of keeping shop and dispensing medicines, ceased to keep up their medical knowledge, and practised pharmacy only. Pharmacy in many respects was more advanced in Ireland than in England, for only those could legally practise it who had spent a certain number of years in preparing medicines, then in attending the classes of the Professors, and lastly, in passing a much more severe examination than the English "Minor," and he thought pharmacy would be degraded instead of elevated if an Act came into force admitting into the ranks of Irish pharmacists the grocers and sundriesmen, who, as a rule, knew nothing of pharmacy beyond the art of buying and selling, among other things, drugs; who on the strength thereof called themselves "druggists," and latterly added thereto the title of "chemists." Such men would no doubt gladly fill the meeting-room of the Conference, but the apothecaries, who were the real pharmacists, the sole preparers of prescriptions, would rather not meet gentlemen who would know little or nothing of the subjects likely to be considered there. Doubtless the so-called druggists might even now become members, without waiting for a visit from the Conference, but that was a very different thing from the Conference being brought to their doors, thereby giving them a certain kind and amount of status to which they were not fairly entitled.

Some conversation then ensued on the general position of parties in Irish pharmacy. Nearly all present took part in the discussion, the object of which was to enable the Committee to come to a satisfactory decision respecting the question of holding a meeting in Belfast in 1874. In the end it appeared that in Ireland there were apothecaries practising medicine and pharmacy, apothecaries practising pharmacy but not medicine, and druggists practising neither medicine nor pharmacy. The second of these three classes was the most numerous of the avowed dispensers of medicine, and provided anatomy and physiology could be removed from their examinations, would be content to let matters remain as at present; they would, however, gladly aid in establishing a new society like the Pharmaceutical Society of Great Britain, or perhaps better, in founding an Irish Branch of the latter Society. They would not, however, admit any qualification for dispensing inferior to the English Major examination.

The deputation then retired. The following resolution was proposed with the view of deciding the question as to whether or not it would be desirable in 1874, to continue the custom of the Conference assembling in the town and just before the time of the meeting of the British Association.

Moved by Mr. Daniel Hanbury,—

Seconded by Mr. Thomas Hyde Hills,—

"That the Committee, having heard the statements of Dr. Whitaker and Mr. Pring, apothecaries of Belfast, regarding the present unsettled condition of pharmacy in Ireland, are of opinion that it would not be expedient for the Conference to meet in Belfast in 1874."

Carried unanimously.

Some discussion ensued respecting the class of town at which to meet in 1874, and a very general opinion was expressed in favour of London. A letter from the President was read, in which, while agreeing to London, Mr. Brady questioned whether or not some attractive watering-place, not likely to be visited by the British Association, and where high-class pharmacy was in the ascendant, might be chosen for the gathering in 1874. No decision followed, but it was remarked that if London were selected, the time of meeting should be quite early in August or even during the last week in July.

PARIS SOCIÉTÉ DE PHARMACIE.

This society met on Wednesday, May 7, under the presidency of M. Grassi. After the preliminary business had been disposed of, M. Boudet and M. Buignet referred to a paper presented to the Academy of Medicine by M. Chantard, on the "Spectrum of Chlorophyll." (A translation of this paper will be given in an early number.)

Syrup of Iodized Tar.

M. Latour read a report of a commission upon an iodized preparation of tar which had been presented to the Society by M. Bretet, a pharmacien at Cusset. This gentleman had attempted to utilize an observation made by M. Lefort, that cold tar water, prepared according to his method, possesses the property of dissolving a limited quantity of iodine, and that in consequence of its combination or association with the fixed or volatile principles contained in the tar water the presence of the iodine is obscured, and is no longer detected by starch and nitrate of silver. M. Bretet proposes to use such an iodized tar water in the preparation of a syrup. For this purpose the tar water is prepared by the process of Lefort, with 100 grams of liquid tar to each litre of water at 75° C. The liquor being cooled and filtered, 1800 grams of sugar are added to each litre, left to dissolve in the cold, and the whole passed through canvas. The liquor is then of a full brown colour, but it gradually loses colour, and after a few hours its tint is not much darker than the ordinary syrup of tar; it is then filtered into a closed vessel. This syrup is slightly opaline, does not colour starch, does not taste of iodine, has a good appearance, and is easily preserved.

The reporters found that in this process the iodine dissolved slowly, and they proposed instead to divide 1 gram of iodine carefully and rapidly with 600 grams of powdered sugar, incorporate with this mixture 33 grams of Norwegian tar previously washed, place the whole in a wide-mouthed glass-stoppered bottle, pour on it 400 grams of distilled water at 80° C., shake frequently until cold, pour the product upon a moistened strainer, and filter through paper. The filtration is slow, but it can be made in the open air without fear of any loss of iodine. So prepared, the syrup is transparent, very aromatic, and faintly amber-coloured; it does not give off any iodine vapour. The proportion of iodine may be increased, but the syrup is very acid, and the reporters doubt its tolerance by the patient.

The report referred to certain physiological and chemical points which require further investigation.

M. Grassi exhibited some specimens of ceresin, a substance obtained from ozokerite. He also gave some information respecting it the substance of which has already appeared in this Journal at page 513.

M. Guichard described some large crystals of benzoic acid that had been produced by the prolonged action of bisulphide of carbon upon benzoin.

M. Latour presented specimens of nitrate of zinc and caustic pencils made from that salt. (See Pharm. Journ., *ante*, p. 903.)

M. Roucher read a short communication on the use of glycerine in plasters. He stated that by the addition of a small quantity of glycerine to diachylon plaster, or even to pitch plaster, they were preserved better and a much less friable product was obtained.

SOCIETY OF ARTS.

Recent Processes for the Manufacture of Gas for Illuminating Purposes.*

BY T. WILLS, F.C.S.

During the last two years various causes have combined to make the time a very favourable one for the introduction of new schemes for the manufacture of gas. Amongst these causes the following may be mentioned:—First, the fear (although to a great extent perhaps groundless, yet, nevertheless, frequently expressed) that our supply of coal will be gradually lessening, and that, at no very distant date, it will become so curtailed as to increase its value to a formidable extent; second, the tendency of the coal market to push the price of coal up, to an extent out of all proportion to the necessity, has also created uneasiness; and third, partly in consequence of this, although it must also be said, partly on account of a widespread suspicion of mismanagement, gas companies have avowedly been occupying lately an exceedingly difficult position (a position immediately recognised and very soon taken advantage of by their *employés*), with no great prospect which could inspire hope for the future. Again, the great prosperity of the country, and the free circulation of money, coupled with a comparatively small number of safe and lucrative investments, have to a great degree been the motive power of many schemes, which, without their aid, would have had considerable difficulty in fighting their way into public notice. There is one other cause lending its tendency in this direction, which, though perhaps only entertained by a few, is yet continually growing in importance, and that is the belief that the present mode of gas manufacture is wasteful and unscientific, and only at the best a poor method of obtaining the desired result. To those who have not realized this fact, it is only necessary to point to the very small amount of the hydrogen and carbon contained in the coal which find their way into the gas; to the large number of bye-products obtained in the process—bye-products which, it must be remembered, although themselves valuable, and daily increasing in value, are produced and disposed of only because at present it is impossible to prevent their formation, and which should consequently occupy quite a secondary position; and to the existing imperfections in the apparatus used in the purification, storage, and distribution of the principal product.

The present paper takes into consideration two or three of the most important of these new processes. It is intended to examine them by the light of scientific facts, and to say very little about the commercial merits or demerits of any particular scheme or schemes, although it cannot be overlooked that the one has a very important bearing upon the other. To do even this satisfactorily, it will be necessary to review briefly the chemical and physical laws which are called into operation in the manufacture of gas, and also to give a short description of the apparatus at present employed for this purpose.

The organic origin of coal is, at this time, an undisputed fact; and we recognize, in the black carbonaceous mineral, the decayed and partially decomposed remains of a luxurious tropical vegetation, a vegetation as far excelling, in extent and rapidity of growth, the present growth of the tropics, as that does the more moderate growth of the temperate regions. This being so, in order to arrive at a correct knowledge of the nature and constitution of coal, we must go back to the stems, tissues, and foliage of the plants and trees, the growth and death of which has given us our coal measures.

The number of elements entering into the constitution of such vegetation is exceedingly limited—at the most four—yet the arrangement of these four is so complex that it is at times impossible to perceive in what manner they are united. This complexity of arrangement is peculiar to organic compounds, and as a rule stamps them as being the product of some vital energy or force.

Woody fibre, viz., that part of the plant or tree which gives to it its form and shape, we know contains the elements carbon, hydrogen, and oxygen, and we also know the amount of each which enters into its constitution, but the exact manner in which the three are united to each other is unknown. Now, when any complex organic body is left to itself to decay, in other words, to become oxidized, the tendency is for it to resolve itself into simpler compounds; and if the decomposition goes on to completion, the carbon and hydrogen will each unite with oxygen, to form the most stable compound which they possibly can with that body, viz., in the case of carbon, carbonic acid ($C\,O_2$), and of hydrogen, water ($H_2\,O$). If the fermentation or decay be arrested at some intermediate stage, then compounds will be formed less complicated than the original woody fibre, but still more or less removed from the final result, according to the stage at which the action was stopped. The decomposition of this woody fibre has proceeded to a considerable extent in coal, a portion of the carbon and a large portion of the hydrogen having gone off in the form of marsh gas (fire-damp), and a further portion of carbon, together with the oxygen, as carbonic acid, while a third portion of carbon has been separated in its elementary state. We are able to trace this action through several stages, which will be more distinctly seen from the following table, in which the amount of carbon is kept up to 100 in the several carbonaceous materials:—

	Carbon.	Hydrogen.	Oxygen.
Wood	100	12·18	83·07
Peat	100	9·85	55·67
Lignite	100	8·37	42·42
Bituminous coal .	100	6·12	21·23
Anthracite. . .	100	2·84	1·74

Here, not only are we able clearly to trace, by the analysis of these substances, the changes through which they have passed and are passing, but their physical appearance and structure fully confirms this evidence. Thus, in peat, the structure of woody fibre is recognisable at a glance; in lignite and bituminous coals this structure is not so clear, but still unmistakable; while in anthracite or stone coal nearly all trace of it is gone. This slow decomposition or fermentation may be regarded as a slow burning or combustion, viz., a union of the matter of the wood or coal with oxygen, and it is attended with the same result.

If, instead of slow fermentation and decay of the wood into coal taking place, the wood had been burned at once, practically the same result would have been obtained; the elements of the wood would seek to place themselves in a much simpler relationship to each other; the various changes would have been gone through more rapidly, but the final result would be identical with that of the previous case, viz., the production of water and carbonic acid. Here also there are many intermediate stages. Combustible gases are formed in abundance, together with tarry and oily matters, composed of carbon and hydrogen, and it is only by the further burning of these that the complete decomposition is obtained. What is true here of wood is also true of coal itself, if it be taken as the starting point, more particularly, however, of those coals which still contain a fair proportion of hydrogen and oxygen.

In each case the more intense the heat, the more rapidly does the decomposition proceed, or, in other words, the quicker does the combustion take place. Further, the more complicated the structure of any particular substance, the more readily will it be split up by the action of heat, provided that its constituents can exist in a number of simpler states, which in carbon compounds and organic substances is invariably the case. In the above instances

* Read Wednesday, May 21, 1873.

it is supposed that the wood or coal is heated in air, but it is evident that we may prevent the access of air to the heated material, and by so doing we can arrest the decomposition of such material before the final stage of decomposition, as the only oxygen present will be that given off from the substance, which will in either case be insufficient for the complete combustion of the carbon and hydrogen. If the substances be heated under such circumstances, a number of compounds of carbon and hydrogen will be formed, simpler than the original wood or coal, but still having a considerable complexity of constitution.

This resolution of complex bodies to simple forms, under the influence of heat, out of contact with air, is termed destructive distillation, and is the process invariably employed in the manufacture of gas directly from coal. Thus it will be seen that the possibility of making such gas depends in the first place upon two things:—

1st. The great complexity of organic bodies, especially vegetable matter, and consequently coal.

2nd. The power which the elements constituting such substances possess, of forming a number of simpler bodies (some of them gaseous) when heated out of contact with air.

Although it is perfectly true that we cannot, in the process of destructive distillation, burn up our carbon and hydrogen into carbonic acid and water, for the want of the necessary oxygen, yet we may even go further than this, and reduce the carbon and hydrogen to their elementary condition, if the heat be only sufficiently intense, and it may be mentioned here that the reason why the experience of gas-engineers has always shown that a higher temperature gives a greater yield of gas per ton of coal, but gas of lower illuminating value, is to be found in this tendency of the carbon and hydrogen gradually to resolve themselves, under the influence of heat, into simpler and yet simpler products, until eventually a temperature is reached at which the greater portion of the carbon is deposited, and the hydrogen goes off in its elementary gaseous state.

The following Table, in which the proportion of hydrogen is maintained at 100, illustrates this point.

Table, showing the Proportion of Hydrogen and Carbon in Coal Gas distilled at different Temperatures.

Temperature.	Hydrogen.	Carbon.	Name of Gas.
Dull red heat..	100	614	Principally olefiant gas (C_2H_4).
Red heat	100	580	
Bright red heat.........	100	472	Olefiant gas (C_2H_4) mixed with marsh gas (CH_4).
White heat.....	100	325	Marsh gas (CH_4).
Continued white heat.	100	7	Nearly pure hydrogen, carbon deposited.

The number of well-known intermediate products obtained during the destructive distillation of coal is very large, and it is extremely probable that there are many that have as yet escaped observation. The subjoined table enumerates the principal of these products, as well as the physical condition in which they exist at ordinary temperatures. It seems scarcely necessary to say here, that these are true products, and in no wise educts, that is to say, they had no previous existence in the coal.

Gaseous.

Hydrogen	Butylene
Marsh gas	Carbonic oxide
Acetylene	Carbonic acid
Olefiant gas	Nitrogen
Propylene	Ammonia

Liquid.

Water	Cymol
Benzole	Aniline
Toluole	Picoline
Cumol	Bisulphide of carbon

Solid.

Paraffin	Pyrene
Naphthalin	Chrysene
Paranaphthalin	

These products are here represented as isolated and existing by themselves, but, in reality, they are found mechanically mixed in the rough materials obtained during gas distillation; practically, the result of this distillation consists of only four products:—1st. The coke which remains upon the bed of the retort in which the coal is carbonized; 2nd. A light, watery fluid, which contains some of the more soluble gaseous substances dissolved in water; 3rd. A pitchy or tarry substance formed of the liquid and solid products, the lighter portion of which contains the liquid oils and naphtha; and finally, the gaseous bodies, together with which is always found more or less of the vapours of the more volatile liquids.

As the hydrocarbons become richer in carbon, and proportionately poorer in hydrogen, the tendency is for the substance to assume the liquid state; and if this excess continues to increase, eventually to become solid. Thus, olefiant gas is C_2H_4; benzole (a liquid), C_6H_6; while naphthalin (solid) is $C_{10}H_8$.

It is advisable here that we should look a little more closely into the physical condition of some of these bodies, as upon this depends the success, or want of success, which attends many of the new schemes.

The solid, liquid and gaseous states of matter are not divided from each other by any sharp line of division, but gradually pass from one to the other by insensible gradations; this is evident to us in the case of solids and liquids, for we are acquainted with many bodies which cannot fairly be placed in either class, and to which the term viscous may appropriately be applied; not so evident, but still observable, is a state of matter bearing a relation to the liquid and gaseous states, such as viscous bodies do to liquids and solids; and, from such and other evidence, we regard gases as being the vapours of liquid bodies, more or less removed from the boiling points of such bodies.

A perfect gas would be defined as possessing the condition of perfect fluid elasticity, and presenting under a constant pressure a uniform rate of expansion for equal increments of heat, but it seems probable that this theoretical definition is never absolutely realized, for although we still speak of a few gases as perfect, and represent them therefore as fulfilling the above law, yet all analogy and previous experience would indicate that eventually even this statement will have to be modified. The term vapour was for a long period a term for a distinct class of gaseous substances, viz. those which could be made to assume the liquid condition; but, by the investigation of many experimenters, led by Faraday, this point is at present only a question of the adequateness of the means employed, and hence this term may now be used in a much wider sense, and may include all gases whatsoever, for that these are but the vapours of liquids possessing exceedingly low boiling points appears to be distinctly proved. All liquids whatever, at all temperatures, give off certain quantities of vapour from their surfaces; the amount thus given off differing for different bodies and for different temperatures; if the liquid be enclosed in any vessel, the vapour will exert a certain pressure upon the sides of such vessel, and this pressure will vary with the temperature, being higher for higher temperatures, and lower for lower ones. This pressure is termed the tension of the vapour of that particular substance. This may be readily illustrated in the following manner:—If a small quantity of water be passed up into the vacuum existing at the top of an ordinary barometer, the mercurial column will immediately be depressed to a certain extent, which depression will be due to the vapour given off from the water at the particular temperature at which the observation is made, and its amount will represent the vapour tension of water. Now, if alcohol be used in a similar experiment, the depression will be much greater, and hence the vapour tension of alcohol is said to be greater than that of water, and so on, every liquid giving a different result.

Now, if we take a case in which the amount of liquid passed to the top of the mercurial column is insufficient for the formation of that amount of vapour which the given space can take up, the whole of the liquid will then disappear, and the depression will appear to be due to the presence of a quantity of true gas, and this is borne out by the fact that a vapour in this state—unsaturated, as it is called—follows all the laws that the more permanent gases do. It will be found, for example, to vary in volume directly as the pressure, and further to increase or decrease in volume at a uniform rate on an increase or decrease of temperature. But now, on the other hand, let more of the liquid be passed up into the vacuous space than can possibly be required to fill it with vapour; in this case a quantity of the liquid will remain upon the surface of the mercury, and the superincumbent vapour is then said to be saturated, which indicates that as much vapour as can exist at that particular temperature will be found so existing in the given space; if, therefore, the temperature be now raised, a further quantity of the liquid will be converted into the gaseous condition; if lowered, a portion of the liquid already existing as gas will return to the liquid state; in the same way, if the pressure be lowered or raised, the same result will be observable. Thus it is seen that the vapour proceeding from every liquid substance possesses a fixed maximum tension for every particular temperature or pressure, which it cannot exceed under any circumstances.

It follows, also, that if we take the case of an unsaturated vapour, by either increasing the pressure or reducing the temperature, we shall eventually reach this point of maximum tension or saturation, after which any further increase of pressure, or decrease of temperature, will be attended with a condensation of the vapour into the liquid state; and, in fact, it has been by using either one of these processes, or both combined, that nearly the whole of the bodies existing as gases have been liquefied. Another point must be mentioned here. In the above illustrations the various liquids were supposed to be passed up into a vacuum, the vacuum existing above the mercury, in an ordinary barometer. Now, precisely the same results would have been obtained if this vacuous space had been filled by any gaseous body; the quantity of vapour given off by a liquid is absolutely independent of the medium into which it is so given off.

The importance of some of these facts, as regards the manufacture of gas for illuminating purposes, will be seen when it is considered that coal gas not only contains certain permanent gases, but also a large quantity of the vapours of volatile hydrocarbons, which contribute in no small degree to its luminosity; and these points will be referred to again, more particularly when speaking of carburetting air or gas.

A few words are necessary here to state a few facts regarding the luminosity of the flame of gaseous hydrocarbons.

It is still generally accepted that the luminosity of flame is due to the presence of intensely heated solid particles (although some powerful objections have been urged against such a belief). In the case of the combustion of all hydrocarbons, these solid particles are particles of carbon.

Now, a flame will be more or less luminous according to the greater or less number of such particles present, and to the temperature to which they are raised. The denser the hydrocarbon, the greater number of carbon particles will exist in a given space, and when its vapour is burned there will be a correspondingly greater number precipitated into the interior of a flame. Now, bearing these two points in mind, it will be manifestly advantageous to obtain for combustion such compounds of carbon and hydrogen in that proportion of the two which shall give us the greatest quantity of carbon to the smallest quantity of hydrogen, provided that the heat of the flame is maintained sufficiently high to raise the carbon particles to whiteness. This latter condition is quite as important as the former, for it is quite possible that a gas containing a considerable amount of the denser hydrocarbons shall, by reason of the comparatively low temperature of its flame, possess less illuminating power than a gas possessing a smaller quantity of such hydrocarbons, the temperature of the flame of which, however, is somewhat higher. It would appear to follow from this, that every effort ought to be made by the gasmaker to obtain a gas containing as large a proportion as possible of these more luminous compounds; but a glance at the following table, containing analyses of the gas supplied by several different companies, will show that, at any rate, this effort, if made, is not very successful, the greater bulk of the gas being composed of hydrogen, the flame of which is without any light-giving properties whatever, and marsh gas, a gas possessing the least light-giving power of any hydrocarbon, as it contains the smallest proportion of carbon to the largest of hydrogen.

Composition of Coal Gas Supplied by the Following Companies:—

	Great Central.	Imperial.	Chartered.
Illuminating hydrocarbons	3·56	3·67	3·53
Marsh gas	35·28	40·66	35·26
Hydrogen	51·24	41·15	51·80
Carbonic oxide	7·40	8·02	8·95
Carbonic acid.	0·28	0·29	—
Nitrogen	1·80	5·01	0·38
Oxygen	0·44	1·20	0·08
	100·00	100·00	100·00

The result, as stated here, is even more unfavourable than it at first appears, for the above figures, representing the quantity of illuminating hydrocarbons, express not only those that are really gaseous bodies, but also the vapours of liquids held dissolved in the gas. There can be no question that a great advance in the manufacture of coal-gas would be made, if by any means, applied either to the primary distillation of the coal or to the gas after its production, whereby the amount of acetylene (C_2H_2) or of olefiant gas (C_2H_4) could be increased; for olefiant gas contains, in a given bulk, just twice as much carbon as marsh gas, and acetylene a still larger quantity. The value of this increase is not to be measured only by the increased quantity of carbon contained in a given bulk of gas, for a small portion of either of the above compounds, diffused through a non-illuminating gas, is much more than equivalent to a similar quantity of carbon combined in some less condensed compound. An illustration of this occurs in the case of marsh gas. If marsh gas, possessing, it will be remembered, only a small amount of luminosity, be decomposed, either by its passage through a heated tube, or by the electric spark, the carbon it contains will be deposited, while the amount of hydrogen set free will occupy double the volume of the original gas. Yet the flame of this nearly pure hydrogen will be found to possess a greater luminosity than the flame of the original marsh gas, although it has lost nearly the whole of its light-giving material, accounted for by the presence of a very small quantity of acetylene, produced during the decomposition. The light of a coal-gas flame is, without doubt, somewhat increased in a similar manner, for the reason that during the precipitation into the interior of the flame of the solid hydrocarbons—viz., during the decomposition, under the influence of the high temperature of the flame of the gaseous bodies—small quantities of very much more highly condensed substances are formed, substances which probably would exist in the solid state if isolated at ordinary temperatures. Further than this, coal-gas, although practically a gaseous body at all temperatures, does, as has been said, act as a vehicle for holding in suspension, and carrying a certain quantity of the vapours of such bodies as benzole, toluole, naphthalin, etc., which are to be found in the tar, with what practical success—success which is sufficiently certain as to be relied upon—we shall have to consider when speaking of the special carburation of gaseous bodies as a means of obtaining illuminating gas. It is, indeed, for this purpose that these remarks regarding the luminosity of flame have been introduced.

As there are at least three schemes, to which reference will be made, for the manufacture of gas, which deal with modifications of the existing apparatus employed, it will be desirable to give a general statement of that which is at present almost exclusively used.

The coal to be distilled is exposed, in quantities of about five hundred-weight at a time, to a comparatively high heat—a bright cherry-red heat is usually employed—in elongated tubular vessels of earthenware or iron, called "retorts," the shape of which varies slightly, some being that of a capital D, with its perpendicular stroke placed as a base, others circular, and others elliptical; ten feet long, twenty inches wide, and fourteen inches high, are about the proportional measurements. A number of such retorts are usually set in a furnace, and heated by one fire; in most large works double retorts are used, which are worked from both ends, as if they were two single ones. At the mouth, or mouths, is a flange, upon which a plate of metal—the lid—is capable of being secured strongly, and made tight with luting, if necessary; through these mouths the coal is introduced by means of long scoops or gutters, and the coke at the close of the operation withdrawn by the aid of rakes. Immediately upon the introduction of a charge of coal into a heated retort, carbonization commences, and gas is evolved. This carbonization occurs first with that portion of the coal which lies in contact with the sides and bed of the retort, and hence is more complete than that of the interior, which, however, undergoes destructive distillation, and furnishes gases and vapours of higher hydrocarbons. These coming into contact with the heated mass on the exterior, split up into simpler bodies, the great desideratum being to heat the coal to an equal extent all through at the same time. The gas is conducted from the retorts by perpendicular pipes, about five inches in diameter, which rise near the mouth, called stand-pipes; these pipes, which taper towards their upper extremities, are, above the furnace, bent twice at a right angle, and enter a larger pipe running horizontally over the centre of the retorts. This tube, which is called the "hydraulic main," is at all times half full of tar and oil, and the ends of the bent tubes are allowed to dip into this tar to the depth of two or three inches, for the purpose of cutting off all communication between the retort and the gas which has left it. This hydraulic main is fixed horizontally, the tar being drawn off from its extremities, and as the whole length of tube is kept at a fair heat—which heat should not be too strong—by reason of its contiguity to the furnace, the tar is usually in a liquid condition. It becomes essential that the gas should be submitted to a process of cooling, in order that those more condensible bodies which have been vaporized by the great heat may be deposited; owing to the great mobility of gaseous matter, and its possessing a high latent heat, this process becomes one of some little difficulty, and necessitates the exposure of the gas to a very large cooling surface. This is attained either by simply passing the gas through iron tubes of sufficient length, or through hollow iron columns, having an annular closed space through which the gas circulates. The extent of surface needed is sometimes very large, as much as ten square feet of cooling surface being often necessary for every cubic foot of gas passing per minute. If it were left for the evolution of the gas in the retorts to maintain a sufficient pressure to drive it through the various apparatus, considerable loss would result from leakage; and it is found further that the gas produced under pressure is not so good in illuminating power, a considerably greater quantity of carbon being deposited under such circumstances. Hence is is customary to employ what is called an exhauster, this being usually a rotary fan, acting the part of a rough air-pump. The use of this apparatus places the pressure entirely under control, and allows it to be reduced at the retorts to about half-an-inch of water.

After the gas leaves the condenser, it has to be submitted to the various processes of purification; but as these do not in any way bear upon the present subject, it will be sufficient to state that it is first washed or *scrubbed* by passage through a coke tower, over which water is allowed to trickle, to remove any residue of tar and also the ammonia which it contains. Thence it passes into a tank of milk or cream of lime, kept in continuous motion for the removal of carbonic acid and sulphuretted hydrogen, and lastly through a series of trays filled with dry lime and oxide of iron, for the removal of the residual sulphur existing in the form of sulphuretted hydrogen or bisulphide of carbon. The gas is then stored and distributed.

It was mentioned in an earlier portion of this paper, that if coal be distilled at a high temperature, a very large yield of gas can be obtained; this increased yield, however, will be coupled with a considerable diminution of illuminating power. The reason for this was then explained—in fact, the distillation of coal may be carried on at such a low temperature that the quantity of gas obtained is practically nothing, the whole of the products appearing in the solid or liquid state (a *prolonged* exposure of gaseous hydrocarbons to a low or even moderately high heat is attended with precisely similar results, viz., the formation of more complex substances), or conversely the heat may be so high as to completely decompose the whole of the hydrocarbons into their constituent elements. It is found advisable, in ordinary working, to take a mean of these results, and thus a fair yield of gas is obtained, together with a not inconsiderable amount of tar and oily matter. These latter products increase in direct proportion to a decrease of temperature, and a consequent decrease of gas—thus:

Table of Amount of Gas and Tar obtained at Different Temperatures.

Temperature of Distillation.	Amount of Gas obtained.	Amount of Tar.
Very low red heat ...	7500	150 lbs.
1300° to 1400° F. ...	8300	120 lbs.
Bright red heat	9500	70 lbs.

There are three considerations which influence a gas engineer with regard to the temperature at which he shall distil the coal, and which sometimes compel him to use a heat higher than would otherwise be advantageous; these are, first, the time which can be afforded for the production of a given quantity of gas—a lower temperature means a more or less lengthened time of exposure for the same quantity of coal, and where, as is usual, the necessary plant is only just sufficient for the supply of the required quantity of gas, this prolongation of the process is impossible; second, the percentage of fuel (coke) used in the furnaces for the distillation, this is likely to be greater for a greater interval of time; and, thirdly, the quality of the coke produced, for the demand for coke, and consequently its value, is great, and it is therefore the principal bye-product in the gas manufacture, and its production in fair quantity and of good quality becomes an important point in the economy of gas-making.

In 1871 a patent was taken out for "Improvements in the manufacture and purification of gas, and in certain parts of the apparatus employed therein," which, while mainly dependent upon the distillation of coal and other bodies at low temperatures, proposed to fulfil all that could be desired with regard to the second and third of the above considerations, and at the same time offered in compensation for the prolonged time occupied by the distillation a very considerably increased yield of gas of a much higher than usual illuminating power. This process is carried out by distilling the coal at a much lower temperature than usual—in the original scheme from 600° to 1000° F. is mentioned, but in practice from 1300° to 1400° F. will probably be employed; at this temperature, from a ton of gas coal about 8500 cubic feet of gas are obtained, together with a greater than ordinary yield of tar and oil; this tar is condensed, by special means employed for securing a greater rapidity in the process, and collected as free from water as possible, with a view to its being re-distilled in a separate and peculiar retort. The gas produced during the carbonization of the coal is, as may be expected, a rich gas of high illuminating power, and after its production it is in all respects treated in the ordinary manner, and will therefore not require further special mention, unless it be in one particular, and that is its comparative freedom from what has been called the *residual* sulphur impurity; as this sulphur impurity consists almost entirely of the volatile bisulphide of carbon, which is recognized as a product of high temperatures, the occurrence of only a small portion of that body in gas distilled at as low a temperature as that used in this process is in no wise strange, although, doubtless, at the same time it is a favourable result. The special point of this invention consists in the submission of the oil and tar collected to separate destructive distillation at a low heat, whereby a certain quantity of those substances is vaporized, attended at the same time with the formation of another quantity of condensible products. These products are again distilled with a further partial decomposition, and this process is repeated until a given quantity of tar has been converted into vapour, and a certain amount of pitch. The means used for obtaining this result are as follows:—The tar and oil are allowed to flow into an iron pan, maintained at a temperature of about 700° or 800° F.; in this apparatus the more volatile constituents are rapidly evaporated, and are conveyed into a hollow iron tank for the purpose of retaining any of the material mechanically carried over, thence through a retort filled with charcoal in small pieces, and heated to a temperature of about 1000° F.; by the passage of the various vapours through this vessel they no doubt suffer decomposition, not brought about by any property of the ignited charcoal, but doubtless by the more thorough heating of the gas, the very large heating-surface afforded by the charcoal successfully bringing the particles of vaporous matter up to a sufficiently high temperature for decomposition; in this manner a quantity of gaseous matter is formed, notably hydrogen, carbonic acid, carbonic oxide (the oxygen being obtained by the splitting up of what water there is present), marsh gas, and a small quantity of illuminating hydrocarbons; the condensible products are treated again in the same manner as before mentioned. The gas obtained from the oil and tar is treated in the ordinary manner as regards purification, and is ultimately mixed with the gas originally obtained from the coal. The aggregate quantity thus produced is declared to be in excess of that usually obtainable from an equal quantity of coal, and possesses a considerably greater illuminating value.

This is the most recent of many processes for the distillation of coal tar and oil. Hitherto it has been found most economical to distil the substance from which gas is to be manufactured at once, that is, having only one stage in the process, for previous experience has shown that the production of a quantity of intermediate products, and their after distillation, has always been a wasteful mode of working, both as regards the result obtained and the expenditure of power and material in order to obtain it.

(*To be continued.*)

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

Juries Bill.

The adjourned Committee on this Bill will be resumed on Thursday, June 12.

Trade Marks' Registration Bill.

The second reading of this Bill was adjourned from Monday to Thursday, June 12.

The Adulteration Act.—Decision of the Court of Queen's Bench.

Court of Queen's Bench, Westminster, June 4. Sittings in Banco, before Mr. Justice Blackburn, Mr. Justice Quain, and Mr. Justice Archibald.

Fitzpatrick *v.* Kelly.

This case raised an important question under the Adulteration of Food Act of 1872. The respondent, a butterman of Liverpool had been proceeded against for selling adulterated butter. It appeared that the butter, which was sold for 7*d.* a pound, was mixed with lard, dripping, tallow, palm oil, and the fat from certain seeds. By the 2nd section of the Act it is provided that whoever shall sell any articles of food as unadulterated which are adulterated shall be liable, etc. The stipendiary magistrate of Liverpool dismissed the summons, on the ground that the respondent could not be brought within the section unless he represented that the butter was unadulterated, or unless it was shown that he knew the butter was adulterated.

Mr. Justice Blackburn thought the construction which the magistrate had put upon the Act was wrong. His Lordship was of opinion that, unless the seller said that the butter was adulterated, he represented that it was butter, and not anything else, and he thought that this construction imposed no hardship upon the seller, for before selling he could easily ascertain whether the article was pure or not. The 3rd section was so drawn that it was difficult to say what it meant, but his Lordship was clearly of opinion that it was not necessary to prove a guilty knowledge on the part of the seller.

Mr. Justice Quain thought when, on being asked for butter, a tradesman handed an article across the counter, he thereby represented that that article was butter, and not a mixture of the horrible ingredients mentioned in the case, and that the magistrate was wrong in holding that an express representation was necessary.

Mr. Justice Archibald thought that this was an important and valuable enactment, and that the construction which the magistrate proposed to put upon it would considerably curtail its provisions.

The case was, accordingly, sent back to the magistrate.

Mr. Milward, Q.C., and Mr. Bigham (with whom was Mr. R. G. Williams) were counsel for the appellant; Mr. Segar argued for the respondent.

During the argument, Mr. Justice Blackburn pointed out that any tradesmen who might be desirous of selling mixed or adulterated articles without rendering themselves liable to be proceeded against under the Act, could do so if they announced that the articles which they sold were mixed and adulterated.—*Times.*

Obituary.

Notice has been received of the death of the following:—

On the 9th May, 1873, Mr. Charles Palmer Gibson, Chemist and Druggist, of Whitefriargate, Hull. Aged 32. Mr. Gibson had been a Member of the Pharmaceutical Society since 1869.

On the 25th May, 1873, Mr. Henry Savage, Chemist and Druggist, of Brechin.

On the 2nd June, 1873, Mr. George William Pickles, Chemist and Druggist, of Leeds.

On the 4th of June, 1873, Mr. James Orissa Peggs, Chemist and Druggist, of Norwich.

Notes and Queries.

[340.]—TINCTURA LARICIS.—"*Isca*" asks for information respecting the proportions for making Tinctura Laricis.

[In 1858, Dr. Moore read a paper before the College of Physicians, Dublin, on the "Therapeutical Properties of Larch Bark" (PHARM. JOURN. 1st Ser., Vol. XVIII., p. 35), in which reference was made to an extract of larch, prepared and made from the watery infusion, and a tincture, made with proof spirit in the proportion of one pint to two ounces of larch bark. This tincture is of a "dark carmine colour, has an agreeable 'pinic' smell; in taste it partakes of the oleo-resins, is styptic and carminative."—ED. PH. J.]

[341.]—CAPSULÆ PAPAVERIS.—Will any correspondent furnish a few hints for the cultivation of papav. alb. so as to produce good marketable capsules (or give a reference to a work on the subject), and oblige an INQUIRER?

[The poppy likes a strong, rich soil, not too dry. The cultivation is, we believe, of the simplest character. The seed is sown in the spring in rows, the plants being in due time thinned out, so as to allow each proper space.—ED. PH. J.]

ARTIFICIAL FIBRIN.—Dr. Goodman of Southport describes (*British Medical Journal*, May 17th) the preparation of an "artificial fibrin," which he believes will prove a valuable dietetic substance in cases of feeble alimentation and deficient nutrition, especially where rejection of food constitutes a prominent feature. It is formed by exposing albuminous material, such as the ordinary hen's egg, to the action of cold water for a given period. He states that if the shell be broken and removed, and the contents immersed in cold water for about twelve hours, they are found to undergo a chemico-molecular change, and to become solid and insoluble. This change is indicated by the transparent white of the egg assuming an opaque and snowy white appearance, far surpassing that of an ordinary boiled egg. The product and the fluid in which it is immersed must now be heated to the boiling point, and the fibrin will then be ready for use.

[The application of the term "fibrin" to this prepared albumen is quite arbitrary, and does not represent any real chemical resemblance.—Ed. PH. JOURN.]

BOOK RECEIVED.

FOODS. By EDWARD SMITH, M.D., LL.B., F.R.S., etc. (International Scientific Series). London: H. S. King and Co. 1873. From the Publishers.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Ekin, C. Marshall, D. Amos, Harper, Zimmermann, R. R., C. U., "Corolla."

Correspondence.

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

A POTENTIAL CHARM IN DRUGS (?)

Sir,—The following incident occurred a few weeks since in a market town in Lincolnshire, and will serve to illustrate one of the popular beliefs in that locality as to the nature and qualities of certain drugs in subduing the otherwise unruly and naughty propensities of a certain class of wives and husbands.

A man, by occupation a pedlar, entered a druggist's shop and, in a serious and dejected tone, asked to be supplied with a pennyworth of devil's dung and a pennyworth of dragon's blood. The curiosity of the druggist being aroused as to the purpose for which they were required, he thereupon asked his customer what on earth he was going to do with them. After a little hesitation he replied, "Why? I've a purpus for 'em,—I don't mind telling you,—my wife has run away from me, and I've been told by a woman that if I burnt the devil's dung and buried the dragon's blood, it will fetch her back—she can't help herself." "Well," replied the druggist, "I have never known them used for that purpose before, but you can try them." A few days afterwards, the pedlar, on being asked how he got on with the devil's dung and dragon's blood, said, "O, it's all right, she came back next day."

Dragon's blood is believed to be very efficacious, and is frequently sold to village girls, or to old crones who procure it for them (generally in ounce packets) as a means of ascertaining who are to be their future husbands. The method of using it is, so I have been informed, to put the packet of dragon's blood under the pillow on going to bed, and the damsel will see in a sweet vision, about the hour of 12 P.M., the village swain she is to marry.

I may say that at least three-fourths of the dragon's blood sold in these parts is used for this purpose. It is invariably sold in the powdered state, and it is to be hoped that the packet does not get burst during the visionary excitement. G. W.

May 21st, 1873.

A BOTANICAL EXCURSION.

Sir,—By all means have dinner, conversazione, ball, etc., *quantum velis*; but besides all these for the *élite*, can nothing be done for or by those whose tastes lie out of the sphere of a white cravat and a dresscoat?

Were I to suggest an object for a free and easy gathering, it would be a botanical excursion. The summer is before us, what better use could be made of a bank holiday? The general public set us druggists an example by going to Bushy Park to see the horse-chestnuts (Whit Monday to wit); or again, the May-blossoms in the Pagoda vista at Kew. Wishing to see a revival of the old "simpler's" spirit, I am, etc., GERARDE'S GHOST.

H. Proctor.—We regret the inconvenience you have experienced through the late receipt of your journal. Your letter has been handed to the Secretary, who will, no doubt, make inquiries respecting your complaint.

W. Ganderton.—Your advertisement, and the stamps enclosed have been handed to the publishers.

W. A. M.—Having made inquiries respecting the occurrence mentioned by you, we are informed that it was quite by an accident the list in question was put upon the table of the reading-room. The librarian has found out where it came from, and will take care that it does not appear in the room again. We think you were quite right in calling attention to the circumstance.

J. C.—(1) We do not know. (2) We think it quite possible.

J. A.—Probably the name is the result of an arrangement between the prescriber and a particular dispenser, or it may refer to a special Pharmacopœia.

W. Fingland.—We purpose publishing shortly an article descriptive of the apparatus you refer to.

C. Davies.—We do not know of any such preparation.

Mr. Baynes (Hull).—We are obliged for your communication.

MATERIA MEDICA OF THE UNITED STATES' PHARMACOPŒIA.

BY E. M. HOLMES,

Curator of the Museum of the Pharmaceutical Society.

The new Pharmacopœia of the United States, representing as it does the medical progress of a country so closely allied to our own in many respects, cannot fail to attract the attention of all who are interested in medicine in this country. It will doubtless be eagerly scanned, to see what new medicines have been introduced and what improvements adopted by the medical authorities; and the results of the last ten years' experience, as embodied in the present issue, will doubtless influence to a certain extent the proposed additions to our own Pharmacopœia. The general features of the work have already been fully described in a previous number of this Journal, and remarks have also been made upon many of the preparations.

A comparison of the materia medica of the present edition with that of the last Pharmacopœia, as well as with that of the British Pharmacopœia, may perhaps reveal a few points of interest.

The materia medica is subdivided into a primary and a secondary list. The primary list contains chiefly medicines of acknowledged value, with a few others, which, although they appear as ingredients in some of the more important preparations, cannot be regarded as possessed of remedial properties; to this class belong cochineal, red sanders, marble, etc. The secondary list includes medicines which were at one time much employed, but are now gradually falling into disuse, without being entirely discarded, as well as others which have been lately introduced to the notice of the medical profession, and are undergoing trial, but which are not generally accepted as possessed of decided remedial properties.

This arrangement doubtless presents certain advantages. Medicine is not entirely free from the sway of fashion, and although "pandering to fashion, or to doubtful novelties in pharmaceutical science," is reprobated in the preface to the Pharmacopœia, it cannot be denied that practically it is difficult to avoid doing so; thus the great demand for palatable medicines in America has probably led to the introduction of the large number of fluid extracts sweetened by glycerine, and these would probably have found a more fitting place in the secondary list, had doubtful preparations been allowed in it. Some really valuable medicines are occasionally allowed to fall into disuse, while newer and less useful drugs usurp their place. Many medicines which are frequently ordered in the prescriptions of older physicians rarely occur in those of a later school, but should not on that account be expunged from the Pharmacopœia. In such cases the secondary list is of great service in preventing really useful remedies from being entirely lost sight of. It also provides a place for those medicines which are used to some extent in particular localities only, but which are almost unknown in others.

It is very doubtful, however, if the secondary list is of much practical use as a half-way house for the introduction of new remedies, especially as it only appears once in ten years. During that period the medical public has made up its mind as to what medicines are of real value, and such are accordingly placed at once in the primary list. Within the last twenty years only seven remedies have been adopted into the primary list from the secondary one, viz.: brominium, chondrus, statice, stillingia, gelsemium, hydrastis, and ruta. Of these brominium and gelsemium alone can be said to possess powerful properties. Chloral, conii fructus, cerii oxalas, physostigma, and the other valuable introductions into the new Pharmacopœia, have never appeared in the secondary list. This list must therefore be regarded rather as a resting place for remedies which are doubtfully received from the first, and for those which, like saffron, although much used in domestic practice, have no decided properties to recommend their use. It is rather singular that there should be no similar purgatory for doubtful preparations. It may reasonably be hoped that the proposed Appendix to the British Pharmacopœia, while it retains the useful characters of the secondary list, will admit doubtful preparations into its catalogue.

The primary list of materia medica might perhaps be found more easy for reference if united with the preparations, the whole being arranged alphabetically as in the British Pharmacopœia.

Since the last decennial revision, 24 additions have been made to the primary, and 3 to the secondary list.

(*In the P.B.*)	(*Not in the P.B.*)
Acidum carbolicum.	Acidum carbolicum impurum.
Acidum oxalicum.	Ammonii nitras.
Cannabis indica.	Calcii hypophosphis.
Cerii oxalas.	Cannabis americana.
Conii fructus.	Chloral.
Cuprum.	Cinchona.
Physostigma.	Ferri hypophosphis.
Sodii nitras.	Gossypii radicis cortex.
	Iodoformum.
	Origanum.
	Potassii hypophosphis.
	Potassii sulphis.
	Sodii bicarbonas venalis.
	Sodii hypophosphis.
	Sodii hyposulphis.
	Zinci oxidum venale.

Of these conii fructus and origanum were dismissed from the U. S. Pharmacopœia of 1864. The rejection of conii fructus was certainly a blunder, the weight of evidence being greatly in its favour as compared with conii folia. The progress of science during the last ten years not having shown any good reasons why origanum should be regarded as possessing any very remarkable properties, its reintroduction seems to have been a mistake in the other direction. The reason for the readmission of cinchona—a term denoting any variety indifferently, provided it contain 2 per cent. of alkaloids—is not very evident; the kind of bark to be used being specified in each of the preparations containing cinchona. As different varieties contain different alkaloids, or a variable proportion of alkaloids, and as some of the alkaloids are said to be more efficacious than others, the license allowed must produce different results in the hands of different dispensers. It is difficult to understand why *Cannabis americana*, a plant but little used in America, should occupy a place in the primary list, while its more powerful congener, *C. indica* is also official. Gossypii radicis cortex is said to possess emmenagogue and parturient properties, but its action appears to be very uncertain, so that it is doubtful whether it deserves a place in this list. Iodoform was recommended some time ago in this country for glandular diseases, on account of the large proportion of iodine which it contains, but did not meet with much favour. Whether it deserves the position it has obtained has yet to be proved. The rest of the new remedies are well known in this country, and it is to be hoped that the more important of them, physostigma, chloral, ammonii nitras, and acidum carbolicum impurum will be included in the proposed Appendix to the P. B. About the importance and extensive use of chloral there can be no question; a syrup or solution of which one fluidounce should represent one ounce or half an ounce of chloral, would have been an exceedingly useful and convenient preparation, especially if combined with some really efficient flavouring agent to disguise its very disagreeable taste. It is much to be regretted that such a solution was not introduced among the preparations. Acidum carbolicum impurum is frequently ordered by medical men as a disinfectant, and varies greatly in appearance and in quality, some specimens being more offensive than the impurities they are intended to remove. Two medicines, however, which are in constant use, and which might be supposed to have at least an equal claim with such substances as iodoform and oxalate of cerium, appear to have been overlooked. These two are pepsine and a preparation to represent chlorodyne.* An official recognition of the former with appropriate tests for ascertaining its purity and strength, is certainly a desideratum. With regard to the latter, it is, I believe, as largely prescribed in America as it is in this country, and is quoted in most wholesale drug-lists. Several formulæ have been published, and each manufacturer probably uses the formula he finds most advantageous, or such a modification of it as his experience may suggest. Many retail chemists also make their own chlorodyne. Hence it is most desirable that so powerful and useful a remedy should have a recognized standard of strength and composition.

Many of the most useful remedies in the Pharmacopœia are imitations of secret preparations formerly introduced by enterprising and clever men. Charta sinapis, ext. cinchon. fluid. liq. potass. arsen., liq. potass. permang., mist. ferri co., pil. antim. co., pulv. ipecac. co., tinct. cinchon. co., etc., owe their origin to patent medicines or secret preparations. Indeed, it is very probable that if a little trouble were taken to trace the history of Pharmacopœia preparations, at least one-half would be found to have originated in a similar manner. There could therefore be no objection, on the ground of countenancing secret remedies, to the introduction of an equivalent for this excellent preparation.

Two of the preparations, valerianic acid and valerianate of zinc, have been removed to the primary list. This small number might perhaps have been considerably increased, as there are many preparations which it is impossible for the majority of chemists to manufacture with convenience or profit on their own premises, and these would find a more fitting position in the materia medica, provided that the descriptions and tests appended to each were thoroughly practical and easily applicable.

Three of the articles in the secondary list of the last edition, have been removed to the primary list in the present one. These are—gelsemium, hydrastis, and ruta.

* Although scarcely within the province of materia medica, but belonging rather to the preparations, the importance of chlorodyne may excuse a reference to it here.

Gelsemium.—This is certainly a powerful remedy, and worthy of the attention of therapeutists in this country. According to King's 'Dispensatory' it removes nervous irritability more completely than any other known agent. It is much used in America as a febrifuge. The peculiarity of its action seems to be that it causes a most complete relaxation of the muscular system, so that the patient is unable even to raise the eyelids. This effect, however, passes off in a few hours, and leaves the patient refreshed. On account of this action it has been recommended in the treatment of tetanus, and spasm of the glottis, etc. Instances of death resulting from large doses being taken are on record. It has been stated, however, but the statement seems to require further investigation, that these fatal results have been owing to the admixture of the root of a plant very similar to it in appearance, which is known as the white jessamine, or white poison vine, *Gelsemium sempervirens* being called the yellow jessamine in America. In this country it is known as the Carolina jessamine.

Hydrastis canadensis, or golden seal.—A full account of the properties and uses of this plant have been given in a former volume of the PHARMACEUTICAL JOURNAL, by Professor Bentley, and therefore it need not be alluded to here.*

Ruta graveolens.—Rue appears to be one of those drugs, the use of which is more or less influenced by fashion. Long used as a domestic remedy, and possessing some powerful properties, it occasionally finds its way into Pharmacopœias. It is rather surprising, however, to find it in the primary list, since there are other remedies for the complaints for which it is used, which are more pleasant and safer to administer.

The other changes which have taken place in the primary list consist in the transference of extractum cannabis to the preparations under the name of extractum cannabis indicæ, and in the dismissal of oleum bubulum or neat's foot oil.

With regard to the secondary list, three new articles have been introduced—

Asclepias incarnata.
Asclepias syriaca.
Castanea.

Asclepias incarnata and *syriaca* were dismissed from the U. S. Pharmacopœia of 1864. It has been stated that this was done on insufficient grounds. They possess alterative properties, and are used in the United States in scrofula, etc. For this purpose *A. syriaca* is more particularly used. It appears somewhat doubtful, however, whether the root which gives the best results is yielded by either of the above-mentioned species.

Castanea.—This must not be confounded with the *Castanea pumila* or chinquapin, which was formerly officinal. The present *Castanea* is the *C. vesca*, or Spanish chestnut, as it is called in this country. The leaves of this plant have been strongly recommended of late years as a specific for whooping-cough. In the only case which has come under my observation, the decoction of these leaves effected a speedy cure. As we have no specific for this distressing malady, the remedy is well worthy of a trial in this country.

One article only has been transferred from the primary to the secondary list, and this fact appears to have escaped the notice of the compilers of the Pharmacopœia. The article alluded to is gillenia. It includes the root of two species, *G. stipulacea* and

* PHARMACEUTICAL JOURNAL, 2nd Ser., Vol. III. p. 540.

G. trifoliata. These roots possess emetic and cathartic properties. As an emetic they are in no way superior to ipecacuanha, although in case of a scarcity of the latter drug, they might in some measure replace it.

Four articles have been dismissed from the secondary list—aletris, angelica, arum, gossypii radix. Aletris is the *Aletris farinosa,* which has been used as an uterine tonic. Angelica is the same species that was formerly officinal in this country. Arum is the *A. triphyllum,* known in America as dragon-root or Indian turnip. Like most of the *Araceæ*, it is very acrid when fresh, and loses its properties when heated or dried. It was one of those unstable remedies which are well weeded out of a Pharmacopœia. Gossypii radix has been replaced by gossypii radicis cortex, which now figures in the primary list.

NEW METHOD OF ESTIMATING NITRIC, CHLORIC, AND IODIC ACIDS.

In the current number of the *Journal of the Chemical Society*, page 541, appears a paper on a new method of estimating nitric, chloric, and iodic acids, by T. E. Thorpe, Esq., F.R.S.E. The method devised by Professor Thorpe is based on a reaction noticed by Messrs. Gladstone and Tribe, an account of which appeared in a recent number of this journal. When zinc-foil is placed in a solution of copper sulphate, its surface, after a time, becomes coated with a spongy deposit of copper. The zinc thus coated causes rapid evolution of small quantities of hydrogen when placed in pure distilled water, especially if gently heated. Professor Thorpe has found that if nitre be placed in the water surrounding the two metals no hydrogen is evolved, but a distinct smell of ammonia is perceived, the water acquiring a permanent alkaline reaction from the formation of potassium hydroxide. This reaction is represented in the following equation—

$$8H_2+2KNO_3=2NH_3+2KHO+4H_2O$$

The ammonia evolved from a given quantity of pure nitre was estimated by leading it into dilute hydrochloric acid, precipitating as platinum-ammonium chloride, drying and weighing. The following results show that the conversion of the nitrogen into ammonia is complete—

(1) 0·5090 grm. KNO_3 gave
1·0498 grm. $PtCl_4\,2NH_4Cl$, and 0·0301 gram. Pt, equivalent to 0·50908 grm. KNO_3

(2) 0·4183 grm. KNO_3 gave
0·9208 grm. $PtCl_4\,2NH_4Cl$, and 0·0013 grm. Pt, equivalent to 0·4188 grm. KNO_3

In other experiments the following numbers were obtained—

KNO_3 used.	KNO_3 found.
0·0474 gram.	(1) 0·0476 gram.
——	(2) 0·0473 „
——	(3) 0·0487 „
——	(4) 0·0469 „

The presence of alkaline chlorides and sulphates is without influence on the result. *Calcium nitrate, lead nitrate,* and therefore in all probability the nitrates of *silver, mercury, copper, thallium,* and in fact of all metals precipitated by zinc, are similarly decomposed, the zinc nitrate which is formed being afterwards reduced. Of all the nitrates experimented upon, the most difficult of reduction appears to be *ammonium nitrate.* The discordances appear to depend upon differences in the strength of the solution and the amounts of zinc and copper taken. If the solution is too strong, nitrogen dioxide is evolved, and if the amount of zinc and copper be insufficient the reduction is incomplete. With precautions ascertained by experiment, however, the conversion of the nitric acid into ammonia is complete in the case of ammonium nitrate.

The mixture of zinc and copper appears to have very slight action upon *urea.* A minute quantity of ammonia found was referred to a trace of ammonium salt present in the urea, arising from the mode of its formation, or more probably being produced by decomposition of the urea from long-continued boiling with water.

Professor Thorpe believes that this reaction might be usefully applied to the determination of nitrates when present in drinking waters, and suggests a *modus operandi*, which, omitting certain details, is as follows. The weighed residue in the platinum dish obtained in the determination of the total soluble matter in the water is treated with 10 or 12 c. c. of water, to which a small piece of previously ignited lime about the size of a hemp-seed is added, and the liquid is gently boiled until about 4 or 5 c. c. only remain. The primary object in adding the lime is to facilitate the evolution of the ammonia. Three or four grams of thin sheet zinc previously cleaned by a little dilute acid, and cut into small pieces, are placed in a flask, which has a capacity of 100 c. c. The zinc is covered with a moderately concentrated solution of copper sulphate, which is allowed to act until a thick dark brown spongy covering of copper is precipitated. The metals are repeatedly washed by decantation with cold water, care being taken to detach the copper particles as slightly as possible from the zinc, and lastly drained. The nitrate solution and the rinsings from the platinum dish are transferred to the flask until the liquid therein amounts to 25 or 30 c. c. A caoutchouc stopper pierced with two holes and carrying a funnel-tube provided with a well-fitting glass stopcock, and a delivery-tube bent twice at right angles, is then inserted. The delivery-tube terminates in a test-tube, also provided with a caoutchouc stopper, into which is fitted an exit-tube containing fragments of glass moistened with very dilute hydrochloric acid. One drop of pure dilute hydrochloric acid is placed in the test-tube, which is cooled by immersion in distilled water, and the distillation is commenced. The liquid in the flask is boiled away, nearly to dryness; boiling distilled water is added by means of the funnel, and the distillation continued. This process is repeated till the test-tube contains about 40 c. c. of water, the contents of the exit-tube are rinsed into the test-tube, and the latter replaced by a second tube of precisely the same size. Another distillate of 40 c. c. is collected, the glass fragments again rinsed and a third tube substituted. The contents of the three tubes are diluted till they measure 50 c. c., and the amounts of ammonia contained in each are then estimated in the usual way by Nessler's solution.

Direct experiments made with the view of testing this method of determining nitrates in water show that it is thoroughly trustworthy. In each case all the ammonia was contained in the first 40 c. c. of distillate.

The chief advantage claimed for this process over the aluminium, or the zinc and iron process, is that it does away with the use of strong alkali, which is not only difficult to distil on account of bumping, but unless great care is taken frequently introduces more nitrates than are originally present in the water.

Alkaline chlorates and *iodates* are reduced by zinc and copper to chlorides and iodides, which are afterwards estimated by the usual volumetric or gravimetric methods.

ACTION OF GASEOUS AMMONIA UPON NITRATE OF AMMONIA.*

BY F. M. RAOULT.

If a current of dry ammonia gas be directed upon crystals of nitrate of ammonia, the salt melts, absorbing the gas, as ice would do. This phenomenon is produced under ordinary pressure at all temperatures between $-15°$ C. and $+25°$ C. The liquid obtained is colourless. Exposed to the air, it loses at first a part of its ammonia, and deposits crystals containing one equivalent of the gas to one equivalent of the salt; these crystals in their turn lose their ammonia by a prolonged exposure to the air, and at length only pure nitrate of ammonia remains.

The composition of the liquid in question varies with the temperature. At 10° below zero 100 grams of nitrate of ammonia absorb 42·50 grams of ammonia gas; consequently the product formed at this temperature contains one equivalent of the salt combined with two equivalents of the gas, and corresponds to the formula $NH_4,NO_3 + 2NH_3$. It is not frozen by a mixture of ice and salt. Its sp. gr. is 1·05. Heated, even slightly, this ammoniacal nitrate is decomposed. It boils with loss of ammonia, and at about 28·5° C., under the ordinary pressure of 760°, it is transformed into a crystalline mass, containing 21·25 grams of the gas combined with 100 grams of the salt, and corresponding consequently with the formula $NH_4,NO_3 + NH_3$.

This new ammoniacal nitrate, which is solid, is broken up in its turn, if heat be continued, and at 80° C. there is left a residue of pure nitrate of ammonia.

The following are the exact quantities of ammonia absorbed by 100 grams of nitrate of ammonia, under a pressure of 760° and at different temperatures:—

Temperature.	Gas absorbed.	State of product.
− 10 deg.	42·50 grams.	liquid.
0 „	35·00 „	liquid.
+ 12 „	33·00 „	liquid.
18 „	31·50 „	liquid.
28 „	23·25 „	liquid.
29 „	20·90 „	solid.
30·5 „	17·50 „	solid.
40·5 „	6·00 „	solid.
79 „	0·50 „	solid.

These ammoniacal nitrates, as will be seen, are analogous to the ammoniacal chlorides, and, like them, decompose easily.

An aqueous solution of ammonia dissolves much more nitrate of ammonia than pure water does. The absorbent power of the salt for the gas is therefore not diminished by the presence of water. On the contrary, a solution of nitrate of ammonia in water absorbs a little more ammonia gas than the water and the salt it contains would do separately. At temperatures between zero and $+20°$ C. the coefficient of the solubility of the gas is the same in water and in the saline solution, and, what is no less remarkable, the heat due to the absorption of the gas is almost identical in both liquids.

The liquid and anhydrous ammoniacal nitrate of ammonia, prepared and kept as much as possible at a low temperature, constitutes a new reagent and solvent, low in price and easily manipulated. It can be used for the rapid production of pure and dry ammonia gas, for which it only requires slightly heating. It can be used also, under the guise of an ammoniacal chloride of silver, for the liquefaction of ammonia gas in a Faraday's tube; it yields in fact one-third of its volume of liquid ammonia, provided only that one of the branches of the tube be kept at 100° C. and the other at zero. Its decomposition, however, is not complete under these conditions; it still contains one equivalent of ammonia combined with one equivalent of the salt, and upon cooling forms a white crystalline mass.

* 'Comptes Rendus,' vol. lxxvi. p. 1261.

THE SILPHIUM OF THE ANCIENTS.*

BY A. S. OERSTED.

In a paper originally published in the 'Overs. over de K. Danske vid. selsk. Forh.' for 1869, of which a German abstract appeared lately in the 'Zeitschrift für Ethnologie' (1871, pp. 197–203), the author gives a history of our knowledge of the silphium plant of antiquity, and the results of modern researches directed to the determination of its nature.

In the middle of the seventh century B.C. some Greeks from the island of Thera settled on the north coast of Africa, in the district then called Cyrenaica, and now known as Barka. The state which was subsequently developed owed its great commercial prosperity very largely to its trade in silphium, and the numerous coins found in the district bear on one side the head of Jupiter Ammon, and the silphium on the reverse. This plant grew wild in the uncultivated southern part of the country, and did not succeed under cultivation. From its root when sliced a milky juice exuded, which, when dried or mixed with meal, formed that costly spice which was so highly valued by the Greek and Roman *gourmets*, and was also in high repute as a medicine. Silphium fetched its weight in silver, and was reckoned with other precious things in the Roman state treasuries. During the decline of Cyrenaica the production of silphium gradually decreased; the country first fell into the hands of the Ptolemies (322 B.C.), and afterwards became a Roman province. In 61 B.C. 30 lbs. of silphium were brought to Rome; and the Emperor Nero had a specimen of the plant sent to him as a curiosity. It was still known in the fifth century A.D.; Synesius, who, when he died in 431, was Bishop of Barka, mentions that he supplied a friend with a specimen of the rarity. The reason of its decrease is said by Strabo to have been an incursion of nomadic barbarians who laid the country waste. The farmers also let their cattle feed upon it.†

Much has been written as to the nature of this remarkable plant, which, from the description and the figures on the coins, has always been known to be an umbellifer. Modern travellers who have visited Barka (now an altogether desolate land, with numerous ruins of towns and temples), such as Della Cella, Pacho, Barth, the brothers Beechey, and more lately Rohlfs, have considered a common umbellifer which the natives call drias (*Thapsia Silphium*, Viv., *Laserpitium Derias*, Pacho; according to Cosson (Bull. Soc. Bot. Fr. 1865, p. 277) merely a form of the South European *Thapsia garganica*, L.) to be the silphium plant; but neither its appearance nor its properties bear any resemblance to those of that plant. The celebrated plant of antiquity was wholesome to cattle; the drias is poisonous and has frequently proved fatal to camels. Various other species have been suggested by authors:—*Ferula tingitana*, L., by Sprengel; *Laserpitium gummiferum*, Desf., by Link; *Ferula Assafœtida*, by the Dict. d'Hist. Nat.; and *Laserpitium Siler*, L.

Prof. L. Müller, when engaged in his work on the coins

* From the *Journal of Botany*, June, 1873.

† For an exhaustive account of all that can be read in the ancient authors on the silphium plant, reference may be made to Thrige's 'Res Cyrenensium' (Hafniæ, 1828), pp. 304–315.—[*Ed. Journ. Bot.*]

of Cyrenaica ('Numismat. de l'ancienne Afrique,' vol. i., "Les monnaies de la Cyrénaique," 1860), asked the aid of the author on the question of the silphium; and it was then discovered that a figure on the coins which had been supposed to represent a heart (Dujalais in 1850 ('Rev. Numism.' pp. 256–264) had correctly explained its nature) was the fruit of the silphium. A close examination showed that this figure presented with considerable clearness the characters of the genus *Ferula*, or a closely-allied genus.

The fœtid gum-resin called assafœtida was also known to the ancients, and considered by them as closely allied to the silphium, being called medicinal silphium. The plant yielding this drug was first ascertained by Kaempfer, who in his 'Amœnitates Exoticæ' (1712), which contains the results of his travels in Asia from 1683–1693, gives (p. 536) an account of it, which, though remarkable for its precision and accuracy, has no exact description of the fruit. This was only supplied a few years ago, when Lehmann, Bunge, and Borszczow again discovered the plant, which was described by Bunge* as the type of a new genus, under the name of *Scorodosma fœtidum*. Besides Kaempfer's plant we know now, however, a second plant yielding assafœtida, discovered in 1838 by Falconer in North Cashmere, and described by him in 1846 as a new genus, *Narthex*. This flowered in the Botanic Garden at Edinburgh, and Sir W. Hooker published an excellent figure of it in Bot. Mag., t. 5168. The plant is 7 feet high, the leaves grow in pairs close together, and the sheaths closely cover the thick, upright stem in a way very unusual in umbelliferæ. The first glance at Hooker's figure recalled to the mind of the author the silphium plant on the coins, and a closer examination confirmed him in considering *N. assafœtida*, Falc., to be very nearly allied to it.

In the determination of their affinity it is important to insist upon the accuracy with which other plants and animals (*e. g.*, the date-palm, the horse, sheep, gazelle, and jerboa) are represented on these coins; we cannot doubt that in the case of so valuable a plant equal accuracy would be employed. A minute comparison of the figures of the two plants will strengthen our belief in this.

If we reduce the picture of *Narthex* to the size of the representation of the silphium on the coins, and place the one by the other, we shall remark a surprising likeness in the appearance of the two plants. The stem, and form and arrangement of the leaves and flower-stalks, are quite the same, and a comparison of each distinct organ brings out still more clearly this resemblance. The root, or rather the root-stock, of both plants is of the same form and ramification. The erect, thick stem, longitudinally furrowed, which characterizes *Narthex*, is also found in the silphium; these furrows are very clearly depicted on the coins. There is also, particularly if one examines the best representations on the coins, a remarkable resemblance in the arrangement of the leaves; we can see that these are not truly opposite, but only approximate in pairs; the sheaths are very large, with conspicuous longitudinal nerves; the blade is divided into three to five segments, on which again subdivisions are indicated. That these notches should not be represented on the common coins in so small a space is quite natural; if, however, we compare the outline of the *Narthex* leaves with the representation of the leaf-surface of the silphium, there is a great resemblance. The form and size of the flower-stalks agree entirely in both plants. As to the fruit, we see from the coins that the silphium quite agrees with *Narthex* and *Ferula*. In these umbelliferæ the fruit is very closely compressed, and furnished with a thin membranous border, for which reason Theophrastus characterizes it as foliaceous. The small differences in the structure of the vittæ, by which these genera have been separated, we need not of course expect to find drawn on the coins. On the other hand, there may be usually observed at the bottom and top of the fruit of silphium small globular bodies, of which the first represents the base of the fruit-stalk, and the second the stylopode. On one coin the carpophore is represented between two mericarps, with their apices turned towards each other. So far as the coins go the silphium plant might be referred equally well to *Ferula* or to *Narthex*. As, however, it so entirely agrees with the only known species of *Narthex* in habit, it is in every way more probable that it should belong to that genus.* As a species it is not of course to be identified specifically with *N. Assafœtida*; not only does the obcordate form of the fruit forbid this, but the properties of the gum-resin. That obtained from the Indian plant entirely agrees with the Persian assafœtida. The author proposes to call it *N. Silphium*.

According to Pliny (Nat. Hist. xvii. 2) there were three distinct zones of vegetation to be distinguished in Cyrenaica —the wooded coast zone, an intermediate zone in which agriculture was carried on, and a hilly and desert zone where the silphium grew. This description is equally applicable at the present day. The slope of the plateaux from Barka towards the coast is still covered with a luxurious growth of wood, amongst which is especially noteworthy the occurrence of the cypress, of which Rohlfs brought with him fruiting specimens. As soon, however, as the heights are attained, the appearance of the landscape changes; only low, stunted bushes, artemisias, and thistles clothe the ground, whilst splendid ruined towns attest the density of the earlier population. Farther on towards the south the land takes a wilder character, and it was here that the silphium grew in the past. As Barka has not yet been thoroughly explored (since the collection of Della Cella, which laid the foundation for Viviani's "Floræ Libycæ Specimen," and Pacho's small collection, we have only the very considerable collection of Gerhard Rohlfs), the hope need not be given up that the silphium plants may still be found either there or farther into Africa. Other plants which have disappeared from the places in which they were known to the ancients are often refound in distant regions; for instance, the African papyrus, which was formerly very common in Egypt, is now no longer to be found there, but occurs again in the distant swampy regions of the White Nile.

* Mém. de l'Acad. Imp. des Sc. S. Petersb., 1860, 1861.

* The genera *Narthex* and *Scorodosma* are both reduced to *Ferula* by Boissier (Fl. Orient, vol. ii., p. 994) and Bentham (Gen. Plant. i., p. 918).—[*Ed. Journ. Bot.*]

EDUCATION OF DRUGGISTS' APPRENTICES.

[At the present time, when the subject of education is attracting so much attention, and the organization of a general educational system is felt to be a necessity, the following paper, taken from the *New York Druggists' Circular*, though referring especially to America, will doubtless be of interest.]

A year ago I contributed some hints upon this subject for the readers of the *Druggists' Circular*, and have till now failed to redeem my pledge of adding further thoughts upon the subject.

The points then urged were, preliminary education, study, attention to business; and nothing surely is more important than these. If there was need to direct the thoughts of the rising pharmacists then, that need is still as urgent as ever. Our colleges of pharmacy are being multiplied, but the field is vast, and colleges cannot be brought to every man's door. The public demand at our hands that we give reliable medicines, that we dispense them with care, that we know our business. The increasing classes in attendance upon the lectures of the various colleges of pharmacy during the past winter, and the large number of graduates this year, show the desire of the young men to perfect their education. But these are few, compared with the great number of young men to whom such privileges are, from various causes, denied.

They want information: how shall they obtain it? There are but two ways,—by study and by experiment. Of all the works relating to our business, none can compare with the 'U. S. Dispensatory' for such a variety of information, reliable, compact, and appropriate to the wants of the student. The employer who values his own interests and cares for the advantages which he will derive from the proper education of his young men, will seek to give them opportunities for study as well as direct the proper objects of such study.

Perhaps no better method of explaining the subject could be adopted than to sketch an outline of study; and this the writer, with some misgivings as to his own judgment, will do.

Presuming the student has a copy of the last edition of the 'U. S. Dispensatory,' the references to pages which follow will be understood as referring to the thirteenth edition of that work. The student should, however, possess a copy of the new edition of the 'U. S. Pharmacopœia,' issued this year, as there have been quite a number of changes in the formulæ of some of the preparations, and he *should always make that book his guide* when preparing any of the officinal formulæ.

The first portion of the 'U. S. Dispensatory' is devoted to materia medica; and here will be found the description, botanical characters, commercial history and varieties, properties, and medicinal uses and doses of the drugs with which he is surrounded. The second portion of the work has a most excellent introductory, covering the main points of pharmaceutical manipulation (pp. 909–947), and which should receive the careful study of every young student of pharmacy. The preparations of the pharmacopœias of the United States and Great Britain are detailed, and followed by explanations of the process, and the properties, medicinal uses, and doses of the finished preparation.

Many of the less used drugs and preparations will be found in the third portion of the 'Dispensatory,' but these may be left out of consideration for the present.

The student should read, and, under the supervision and with the assistance of his employer or an older clerk, endeavour to carry into practice some of the instructions on pages 909–947, beginning with weights and measures, and making himself master of each portion as he proceeds. Do not be in too much haste to pass to the next subject or process. If it is worth knowing or doing, let it be understood or done well. In connection with the processes and instruction on the pages alluded to, their practical application can be daily made in the various requirements of business, but it must not be done by the young student unless under the immediate oversight of his superior. Many of the operations can be done on a small scale as experiments, and no opportunity should be lost to make a practical application of the hints you obtain by reading.

Beside the manipulations of pharmacy, the young student should systematically peruse the first portion of the 'Dispensatory,' and make himself familiar with materia medica. The better plan is to take up a class of drugs and study them in their resemblances, as also in their peculiar traits. For instance, they may be grouped as gums, gum-resins, resins, oleo-resins, balsams, fixed oils, volatile-oils, leaves, barks, roots, seeds, or fruit. Crude chemicals, mineral acids, and the various chemicals which are purchased, should be classified under the metallic base or alkali which is present. Make a list of the articles you see about the store under some such arrangement as this, and when the opportunity offers read up the subject and note the main points in a blank-book kept for that purpose. Nothing will so surely help to fix it in the mind as making a written memorandum for reference,—and the writer urges this point particularly. I have before me a little book with an alphabetical index, under which I can find almost every article which is used in medicine and is mentioned in the 'Dispensatory,' giving the officinal name, the principal synonym, the ordinary name, its medicinal properties and doses, and yet the book will readily go in the pocket. It is the work of one of the best pharmacists in New England, who, after successfully conducting business for several years, thought it an honour worth seeking to graduate in a college of pharmacy.

The second hint is, to assist study by experiments to prove the truth of the statements and formulæ read. Whether it be chemical, pharmaceutical, or botanical, there are almost invariably some simple and inexpensive tests or experiments which can be easily used to affirm the reliability or correctness of the information received. Attfield's 'Chemistry' has been highly recommended as a text-book, and the experiments which are detailed in it are peculiarly adapted to the wants of the student in pharmacy. The apparatus required is but little; a majority of the reagents are in every drug-store; it needs only a little time, now and then, and *the will*, to do the work. The time thus redeemed from other less useful occupation, or which is in many instances wasted, will repay amply both the student and the employer.

The writer has alluded to but three books as subjects of study, as he knows from personal observation that too many of the drug-stores in our land have a much smaller collection of books relating to the business than they should possess; and this is one reason why many young men make less progress than they should, while employers in many cases actually progress *backward*, at least so far as scientific knowledge is concerned. In these days, it is not only *economy* in the management of business which insures success, but it requires *brains* to know the business and acquire the respect and confidence of those who patronize you. To keep up with the advances which are being constantly made in our business, we must necessarily read those periodicals which will inform us on those subjects. The employer who neglects to provide his store with these does himself an injury; and if he or his assistants think they are too busy to read them, they neglect a duty to themselves and their patrons.

Systematic study, accompanied by experiments, should be a part of the daily experience of every student in pharmacy, and attendance upon the lectures of a college of pharmacy when it is possible.

CLASSIFICATION OF THE ABSORPTION BANDS OF CHLOROPHYLL.*

BY M. J. CHAUTARD.

The author divides the various absorption bands of the spectrum of chlorophyll at present known into three distinct classes.

The first consists simply of the band in the middle of the red, comprised between the B and C Fraunhofer lines, which he calls the "specific band."

In the second category he includes all the other absorption bands, however numerous, noticed in the spectra of neutral, acid, or alkaline solutions of recent or old chlorophyll. These he designates "supernumerary bands." The most remarkable is that which results from the breaking up of the "specific" band of the red under the influence of alkalies. As to the bands recognized in the other colours, they are liable to modification by so many different causes that he considers their study would not lead to uniform results.

Finally, a third and new category will include what he calls "accidental" bands, or those not having the permanent character of the former, and produced under special conditions. There is here again a breaking up of the "specific" band of the red, due in this case, not to an alkali, but an acid. Whilst in the former case the "supernumerary" band occurs by the side of the orange, near to C., in this latter case the band occurs in the least refrangible portion, at the commencement of the red, about A.

The author mentions the following points as the most

* 'Comptes Rendus.' vol. lxxvi. p. 1273.

important, taking for a type the alcoholic solution of young and fresh nettle leaves.

The leaves, wetted with dilute alcohol, are to be bruised rapidly in a mortar, then expressed with the fingers and filtered. The green tincture which results gives the four bands, distributed from red to green, of fresh chlorophyll. The "specific" band appears at from 20° to 24°.* A drop of hydrochloric acid being added, the black band of the red is transported laterally to about 15°; at the same time the limit of the red is extended in the same proportion. The liquor becomes yellowish and slightly turbid. This band, much widened, is in reality composed of two distinct rays, which may be separated either by diluting the liquor slightly with alcohol, or, more surely, by diminishing the thickness of the solution. One of these bands appears then in the ordinary place, 20° to 22°; this is the "specific" band. The second, "accidental" (itself double sometimes), appears at about 15°, preceded and followed by a very decided red tint.† In the remainder of the spectrum the colours are slightly obscured, and it is only after an interval of time, varying from half an hour to a day, that the "supernumerary" bands of the altered chlorophyll become visible, at the same time as the "accidental" ray of the extreme red is gradually extinguished in the darkness which limits the spectrum on that side. The addition of the alcohol should be carefully made, for it may happen that a too great dilution of the solution, instead of separating the "accidental" band, prevents its appearance; this it would do by overshooting the ephemeral state of the solution to which the band owes its origin.‡

The generation of this "accidental" band presents numerous variations; thus it may be that the "specific" band in the red undergoes no modifications either in position or in extent, but the limit of the red is extended, and from it there arises a very thin, dark band, followed quickly by a second, and these finish by combining into a single thick, dark band, which acquires the same breadth and tint as the former, and soon afterwards disappears in the obscure extremity of the spectrum.

As an important detail, the author adds, that if the leaves, after being once expressed, are again treated with alcohol, a new tincture is obtained, possessing a smaller degree of sensitiveness than the first. The sensitiveness of the solution also diminishes after it has been prepared a few days. Solutions from old, but unaltered leaves, accord less readily than those from young leaves with the phenomena above indicated, which appear to belong to a particular state of the chlorophyll at the period of formation, when the stability of its elements is less complete.

If the solution be filtered just as the two bands in the red are clearly seen, there is, with the clear liquid, a disappearance of the "accidental" ray—only the "specific" band and the "supernumerary" bands of the most refrangible portion of the spectrum being produced. If the solution be allowed to clear by standing, there is the same disappearance of the "accidental" band, which can be made to reappear momentarily by agitation.

The colouring matter which accompanies the chlorophyll in certain plants,—red beetroots for example,—may sometimes mask the "supernumerary" bands of the chlorophyll, but the "specific" band of the red always appears, as well as the "accidental" band, under the conditions before mentioned.

The foregoing results are also obtained (and that naturally because of the acidity of the plant) with the leaves of the sorrel; but what is most curious is that the "accidental" band, after attaining the same intensity as the "specific," becomes increasingly stronger, whilst the latter becomes more feeble, until sometimes at the end of an hour it has completely disappeared, and there remains but one band of absorption, two or three degrees in width, having its centre at about 15°. In order to observe all the details of this phenomenon, it is often necessary, from the feeble coloration of the solution, to use it in a thickness of from eight to ten centimetres.

Many other plants, especially the red cabbage and the St. John's wort, present peculiar "accidental" or permanent bands, and to these the author proposes to call the attention of the Academy on a future occasion.

* = to 1-2 Sorby.

† This is a verbatim translation, the words in the original memoir being, "précédée et suivie d'une teinte très franche." But perhaps, "preceded and followed by a narrow well-marked red band" would better meet the facts of the case.—Ed. Ph. J.

‡ The appearance of the "accidental" is due to the unlocking of the chlorophyll compounds by the reagent, which acts upon one very rapidly and less rapidly upon another, all being differently soluble in different menstrua, such as carbon bisulphide, alcohol, ether, etc.—Ed. Ph. J.

THE DIRECT SYNTHESIS OF AMMONIA.*

BY W. F. DONKIN.

The action of induced electricity on mixtures of certain gases has been lately shown by Sir Benjamin Brodie† to yield very interesting results.

An obvious application of his method was to treat a mixture of dry hydrogen and nitrogen in a similar manner as those referred to above, with the view of effecting the synthesis of ammonia; and Sir B. Brodie kindly allowed me the use of his apparatus for the purpose of the experiment, which was conducted as follows:—

A mixture of about three volumes of hydrogen with one of nitrogen in a bell-jar over water, was passed through two tubes containing pumice moistened with alkaline pyrogallate and sulphuric acid respectively, then through a Siemens induction-tube, and into a bulb containing dilute hydrochloric acid. The whole apparatus being first filled with pure hydrogen, about half a litre of the mixed gases was sent through the apparatus, the induction-coil not being in action; the bulb containing the acid was then removed and another substituted, containing an equal volume of the same acid.

About half a litre of the mixed gases was now passed through the apparatus, submitting them to the action of the electricity. The contents of the two bulbs were next transferred to two test-tubes; and after adding excess of potash to each, Nessler's test was applied. The first solution gave a faint yellow coloration, the second a rather thick reddish-brown precipitate.

No attempt was made to estimate the quantity of ammonia formed, as it would vary with many of the conditions of the experiment.

Since writing the account of the above experiment, which was made in Dr. Odling's laboratory at Oxford on March 24, I have seen in the 'Comptes Rendus' for April 22, 1873, a note of an experiment by Messrs. Thénard of Paris, in which they observe the formation of traces of ammonia by the action of electricity on a mixture of hydrogen and nitrogen; but no details of the mode of operating are given.

LABORATORY NOTE ON THE RED AND GREEN IODIDES OF MERCURY.‡

BY F. R. WILLIAMS.

Nearly ten years ago I was frequently engaged in the manufacture of considerable quantities of red and green iodides of mercury. At first I was in the habit of washing the green iodide with alcohol to purify it from adhering red iodide, as is usually done. But on one occasion, by reason of a misunderstanding, the proportion of iodine was considerably increased, and therefore the union between it

* Read before the Royal Society, May 1, 1873 (Proceedings, vol. xxi. p. 281).

† Proceedings of Royal Society, April 3, 1873, and Pharm. Journ., 3rd series, vol, iii. pp. 136, 156.

‡ From the *Chicago Pharmacist* for May, 1873.

and the mercury was almost instantaneous and very violent, so much so that the whole material was for a moment in a complete state of fusion, the evolution of heat being sufficient to fill the spacious apartment with dense violet vapours. The proportion of the materials was then rectified by supplying the deficiency of mercury, and the mixture was now thoroughly triturated. The resulting compound did not have the deep olive green colour that this preparation usually possessed, but, on the contrary, it was of buff or yellowish green cast. Alcohol did not change its colour, and therefore I presumed that the intermediate iodide had been largely formed, or that the mixture contained an extraordinary amount of the red iodide. The washing with alcohol was then continued, and the filtrate at intervals examined by dropping it into water, the production of a precipitate indicating the presence of red iodide. The formation of turbidity remaining undiminished, I was led to believe that alcohol could not purify this lot. Very little satisfaction was obtained by referring to authorities, and at last I concluded that as the Edinburgh process for preparing red iodide of mercury consisted in part by crystallizing it from a hot solution of chloride of sodium, this might also answer for purifying the green iodide, consequently I boiled the refractory mixture with a strong solution of chloride of sodium, and succeeded admirably in removing the poisonous red compound. After this I never employed alcohol, but always washed the green iodide with a hot solution of chloride of sodium for purification. I found this to be the most economical, expeditious, convenient, and thoroughly efficient operation that could possibly be devised.

In the manner of preparing the red iodide I resorted almost at the outset to a very important modification of the ordinary way. The unnecessarily great amount of water employed is a disagreeable feature when the process is applied in the production of large quantities. Knowing that red iodide of mercury is only sparingly soluble in a strong solution of chloride of ammonium, I introduced this latter salt into the formula, so as to obtain a very concentrated solution of corrosive sublimate, and in this manner get rid of an enormous quantity of water. The strong solution of the chloride of mercury made with the aid of the ammonia salt is mixed with a similarly concentrated solution of iodide of potassium, and the heavy precipitate of the red iodide subsides rapidly. Pints of water accomplish here what formerly gallons only could effect. My process is given below :—

℞	Corrosive Sublimate	4 parts.
	Iodide of potassium	5 ,,
	Chloride of Ammonium	2 ,,
	Water, a sufficient quantity.	

If not already in powder, pulverize the ammonia salt coarsely. Then put the mercury chloride into a convenient Wedgwood mortar and crush it (this can be easily and quickly done) ; add to it the hydrochloride of ammonia, and pour on three or four parts of water, triturating until the salts have dissolved. Now dissolve the iodide of potassium in five or six parts of water, and pour it into the first solution, collect the precipitate on a strong filter, wash it thoroughly with water and dry it in the open air.

RESTORATION OF CHLOROFORM WHICH HAS BEEN INJURED BY AGE.*

BY E. B. SHUTTLEWORTH.

Although the nature of the changes induced in chloroform by the agencies of time, light, moisture, and atmospheric exposure, have never been precisely determined, I am inclined to think that by far the most general and injurious products of decomposition are chlorine and hydrochloric acid. In samples of imperfectly rectified chloroform, as that of ordinary German manufacture, these impurities are, after the lapse of some months, easily recognizable; and in the course of one or two years, an aqueous layer, containing these products in solution, may often be found floating upon the chloroform. Traces of sulphuric acid quickly induce this change. When that liquid has been employed as the purifying agent, and has not been completely removed by repeated washings and rectifications, the product will very soon give sharp indications of chlorine, or some of its acid compounds. In the process of purification, adopted in the British Pharmacopœia, the chloroform, after treatment with acid, is mixed with lime and chloride of calcium, and is at once rectified. I think the keeping qualities of the product would be much improved by agitating the chloroform, before being rectified, with a solution of carbonate of soda, followed by water.

In regard to the restoration of that which has become spoiled, I would recommend that the chloroform be well agitated with a dilute solution of hyposulphite of soda. It should then be separated by means of a glass funnel from the supernatant liquid and again washed; this time with simple water. After being separated, the chloroform should be passed through filtering paper to free it from traces of moisture, when it will be found much improved and comparatively sweet; good enough, in any case, for external use.

In the manufacture of chloroform I have found that one washing with hyposulphite of soda is more effectual than three with simple water. The quantity of hyposulphite used may be so small as to be of no injury to the succeeding charges of chloroform, to which it is customary to add former washings.

There are, of course, certain other impurities of chloroform, whether chlorinated or not I cannot say, which the hyposulphite will not remove. These are of a more stable character, and as they possess a higher boiling-point than chloroform, may be separated by distillation, or by treatment with sulphuric acid in the usual manner.

* From the *Canadian Pharmaceutical Journal.*

PRELIMINARY NOTICE OF A NEW SALT OF QUININE.*

QUININE MECONATE.

BY PETER TOWNSEND AUSTEN.

As a salt of quinine and meconic acid has not to my knowledge been before described, I attempted to prepare one.

If an alcoholic solution of meconic acid be added to an alcoholic solution of quinine, a white, curdy precipitate is formed. The precipitate is soluble in hot water, being deposited on cooling in beautiful crystals. The water solution gives reactions for both quinine and meconic acid. The first curdy precipitate on drying forms a mass resembling dried glue, the next precipitate forms minute scales of a silken lustre. Finally, small crystals are obtained. When filtered and dried on bibulous paper, the salt has a peculiar sheen, resembling minute fish scales.

A direct estimation of quinine was made as follows :— A weighed portion of the dried salt was dissolved in water by the aid of heat, the quinine was precipitated by ammonia and dissolved in ether. The ethereal solution was separated from the ammoniacal liquid and washed with water by means of a stopcock funnel, after which it was evaporated and weighed. Though the greatest care was observed in the washing, a loss of quinine occurred.

Salt.	Quinine.	Found.	Calculated.
·25 grm.	·137 grm.	54·8 per cent.	56·66 per cent.

The composition of the salt is then most probably

$$C_7H_2(C_{20}H_{24}N_2O_2)''O_7,$$

which corresponds to the silver salt

$$C_7H_2Ag_2O_7.$$

* From the *American Chemist.*

The Pharmaceutical Journal.

SATURDAY, JUNE 21, 1873.

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

THE PERFUMED SPIRIT CASE.

"THE receiver is worse than the thief," was the expression used by Baron BRAMWELL in the Court of Exchequer, on Saturday last, when summing up in the case of the CROWN *v.* CARMOUCHE, and commenting upon the conduct of those wholesale perfumers who had purchased spirit of wine from the defendant considerably under the market price. The evidence of one or two of these witnesses was sufficiently damaging to themselves to leave the impression on the mind of judge, jury, and audience that as far as their business was concerned they were ready to purchase plain spirit of wine without permit or certificate, and have it designated on the receiving note "perfumed spirit," provided they could get it below the market price. The details of this interesting case may, perhaps, be more forcibly seen if the evidence given on Saturday be thrown into a narrative, and to do so it will be necessary to deviate a little from the course then pursued in calling witnesses for the prosecution.

MR. WATTS, manufacturing chemist, was induced to purchase a cask of spirit of wine from Mr. CARMOUCHE, 36, Mark Lane. The price was to be 17*s.* 6*d.* a gallon, and for the amount a three months' bill was to be given. At the time of purchase the market price of alcohol of a corresponding strength was 18*s.* 10*d.*, so Mr. WATTS at once came to the conclusion that something was wrong, and he immediately put himself in communication with the Inland Revenue officers. They tasted the spirit and found it free from essential oils, in fact, ordinary spirits of wine, and with this description of spirit a certificate should have been sent. Mr. WATTS wrote for a certificate, but Mr. CARMOUCHE declined to give one, on the ground that as it was perfumed spirit a certificate was not required. For the purpose of discovering where the stock of the so-called perfumed spirit was kept, Mr. WATTS, in compliance with a request from the Supervisor of Inland Revenue, ordered another cask, which was delivered on June 10th 1872. When this cask arrived, officers were on the premises ready to seize it if the spirit was not perfumed, and it being plain spirit only, the cask, horse, cart, and man were placed under detention. The man then said where the cask of spirit had been sent from, and eventually the officers found themselves at the Albion Works, Bow Common. Here they could find proof of the place having been used as a distillery. There were large vessels for holding wort, and on the side of one of them they found what was afterwards proved to be dried yeast. A still could not be found, but the appearance of the premises indicated that a still had been fixed and afterwards carelessly removed. They went on with their investigations, and learned that a person named REYNOLDS was a partner with CARMOUCHE. This man entered into particulars respecting his firm, and threw much light on what had been done at the Albion Works. Almost by accident these persons came together. CARMOUCHE, after a little time, introduced to REYNOLDS' notice the manufacture of eau de Cologne, and the large profits to be made in this business, and if REYNOLDS is to be believed, he was informed that spirit of wine was not exciseable if a small quantity of essential oil was added to it. On the faith of these statements the works were taken in the name of a man called COPELAND. Mr. CARMOUCHE purchased a second-hand still in Brussels, which was afterwards set up at the Albion Works, and in November, 1871, the manufacture of illicit spirit commenced. From the large number of puncheons of molasses used the quantity of alcohol actually manufactured must have been very great, and as only a comparatively small quantity of alcohol was seized, much of what was made must have gone into consumption. REYNOLDS at once said, when asked, that essential oils were added to only a small quantity of spirit made, the other was sent out in the state in which it ran from the still.

So matters went on at the Albion Works till about May, 1872. The owner of these works had been told that essential oils were made there by his tenant, and as the place was not insured he was anxious that it should be, and made a proposal to the insurance office. A surveyor was sent but was refused admission, on the ground that such very valuable processes were being carried on that no stranger could be admitted, for fear the secret of the manufacture should be made known. This visit frightened the firm. They removed the still at once, and thus it was that the place was in confusion when visited by the Inland Revenue officials. CARMOUCHE managed to get all the profits into his own pocket, if REYNOLDS is to be believed. In fact, all about the place seem to have been made his tools. Being a foreigner, it has been no inconvenience to him to leave the country, and whilst REYNOLDS has found his way to the Prison at Holloway, CARMOUCHE is supposed to be in Belgium, enjoying the proceeds of his frauds on the firm and the Revenue. A penalty of £13,687 5*s.* was imposed upon him on Saturday, but if it had been as many millions it would have been the same both to the CROWN and the defendant, for we may be sure he will never pay a penny of the fine now he has fled the country.

From what Mr. WATTS did it will be seen there were some slight difficulties in getting rid of the spirit, and some of the reasons given by Mr. CARMOUCHE for being able to sell it so cheaply were certainly plausible, but not such as to satisfy any person desiring to buy in a legitimate way. To one person he said the cheapness of his spirit was due to the fact that although the duty on perfumed spirit imported had been recently raised from 14*s.* to 16*s.* 6*d.* a gallon, yet in Harwich and some other small ports it could still be imported at 14*s.* a gallon. This lame tale passed muster, and the person referred to at once gave an order for the so-called perfumed spirit, which was admitted to be only very slightly altered in character by the addition of a small quantity of essential oil, and not such spirit as could be denominated perfumed spirit.

Other spirit manufactured at the Albion distillery was sent by rail to Edinburgh to be converted by Messrs. SMITH into "sweet spirit of nitre." The Messrs. SMITH, like Mr. WATTS, had their suspicion aroused by the fact that the spirit was always sent by rail and not by water. If it had been sent by water the cost of carriage would have been reduced to about one-fourth of the cost by rail, and from this fact, coupled with the further fact that the spirit was called perfumed, and sent without certificate, when it was plain spirit, they also put themselves in communication with the Inland Revenue department, and six casks were seized in consequence. When all the circumstances of this case were known, there was no difficulty in finding a reason for the casks being sent by railway. If they had been forwarded by water the Customs authorities at Leith might have examined the contents of the casks and seized them, but when forwarded by rail there was no risk run, as the spirit would be delivered at its destination without question, being sent only from one inland town to another.

We can see from the transactions thus rapidly passed under review how easy it would have been for any person understanding his business, who had made purchases such as we have described, to have concluded that Mr. CARMOUCHE was either defrauding the revenue or not acting honestly to those from whom he bought the spirit. The difference between the market price and the selling price of the spirit purchased by Mr. WATTS may at first sight appear trifling; but if we look a little more closely into the matter, the difference will be seen to be extraordinary. The strength of this spirit was 57·0 overproof, and the Customs' duty would have been 16*s.* 4*d.* a gallon, leaving 1*s.* 2*d.* for the short price of the spirit, a price which any man in the spirit trade must know was simply absurd for the article in question. The difference therefore between the selling and market price was 2*d.* per gallon more (viz. 1*s.* 4*d.*) than the short price of the spirit offered to and purchased by Mr. WATTS, a difference which when compared with the short price of spirit is by no means contemptible, and such a margin of profit to a distiller would prove a fortune to him in a very short time.

We must say a word more about perfumed spirit as defined in the Customs laws. It is that spirit which can be used for perfumery only; and evidently this definition refers to eau de Cologne, lavender water, and such like perfumed spirit, which is so defiled by the addition of essential oils as to be rendered unfit for use as a beverage. This is the reason that such perfumed spirit is sent from the Custom House without permit or certificate, because it was never contemplated that such spirit could be used for anything but perfumery. The spirit sent out by CARMOUCHE could be used for almost any purpose, and as this fact was so palpable to Baron BRAMWELL, he placed on the same footing the seller and purchaser of spirit which was sold as perfumed spirit, but which although containing little or no essential oil, was not accompanied by certificate, and was sold much below market price.

PHARMACY IN THE FLOWERY LAND.

WHATEVER may be the truth of the Chinese assertion that gunpowder, the mariner's compass, and the art of printing were known to that people millenniums before they were invented in Europe, there is no doubt that of certain therapeutic agents they possessed a knowledge antecedent to our own. The dietetic value of animal juices they early recognized. From an interesting paper read before the North China Branch of the Royal Asiatic Society at Shanghai by Dr. D. J. MACGOWAN, we learn that they had a preparation somewhat similar to Liebig's extractum carnis, called "mutton wine," which they credited with a host of therapeutic virtues, and particularly with a restorative and invigorating action on the stomach, the kidneys, and the testes. Dr. MACGOWAN, after describing its mode of preparation, forms an estimate of its medicinal properties, and records a case in which its efficacy was proved beyond a doubt. He further informs us that the Chinese recognize no distinction between medicine and food—between the materia medica and what he calls the materia alimentaria. They hold all portions of animals, brute as well as human, to possess therapeutic value in medical treatment; while in preparation these portions are made to undergo simply a culinary manipulation.

From another interesting paper read by the same physician before the same learned body, we gather that the Chinese had some inkling of the virtues of fish-liver oil in phthisical ailments. To the oleaginous secretion of the shad—nay, even to the flesh of the shad itself—they ascribed virtues similar to those which have gained for the *oleum morrhuæ* so much repute as a counteragent or even cure in tuberculosis. These are of an alterative and stimulating kind, and in the hands of Chinese practitioners have proved efficacious in precisely the same circumstances in which cod-liver oil is indicated among ourselves. Dr. MACGOWAN tells us that the shad is almost identical with the *Clupea* as caught on the American seaboard. In Shanghai it has a name which in English means "periodical" fish, from the fact that it enters the Yangtze and tributary waters in May, and remains "in season" for about four months. The earlier the week in which it is caught, the higher the price obtainable for it. It is an article of tribute to the Emperor, and, after him, the principal officers of the state have the next claim.

Dr. MACGOWAN has other and interesting facts and coincidences to give us with respect to the pharmacy of the Flowery Land. We hope he will prosecute the researches he has so ably begun, and furnish materials for a work on Chinese therapeutic agents which will not only be instructive and attractive in itself, but prove of signal assistance to the medical missionary in the fulfilment of his twofold function.

THE GUACO PLANT.

IN the progress report of Dr. SCHOMBURGK, the colonial botanist of South Australia, for 1872, just received, he mentions the introduction of the *Mikania Guaco*, Humb. and Bonpl., so highly spoken of by Baron HUMBOLDT as a sure cure for snake bites from the most poisonous kinds. "During my travels" (observes Dr. SCHOMBURGK) "in South America, this plant was spoken of everywhere as an infallible remedy. I myself had no opportunity of testing its effects, although we were so unfortunate as to lose two of our men from snake bites, not having the herb with us, which is only found growing on the banks of rivers. "For a long time the knowledge of the antidotal qualities of the guaco remained a great mystery and was confined to a few inhabitants of South America. However, the medical qualities of the guaco are now generally known in all countries where it is found. The part of the plant which is used for the snake bite is the sap or a tea distilled from its leaves.

"The frequent accidents and loss of life occurring from snake bites in Australia, especially during the last few years, induced me to introduce this valuable plant. Notwithstanding that Professor HALFORD'S method (injecting ammonia into the wound) is highly spoken of, and has indeed already saved many lives, we should try also the Mikania. When the young plants are strong enough I will send some to Professor HALFORD in Melbourne to test the nature of the plants."

IN the course of a case which came before Vice-Chancellor Sir JAMES BACON last week it was incidentally mentioned that two ladies had amassed a fortune of £100,000, out of profits derived from the manufacture and sale of a secret preparation named "black drop."

Transactions of the Pharmaceutical Society.

EXAMINATION IN LONDON.

June 13th, 1873.

Present—Messrs. Allchin, Barnes, Carteighe, Cracknell, Gale, Haselden, Hills, Linford, Martindale, Schweitzer, and Umney.

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

MODIFIED EXAMINATION.

Thirty-four candidates were examined. *Eight* failed. The following *twenty-six* passed, and were declared qualified to be registered as "Chemists and Druggists:—

Althorp, Henry	Chester.
Butler, Edwin	London.
Edkins, John	Walworth.
Gill, William Henry	Bromley, Kent.
Hall, Joseph	Wellington, Salop.
Henderson, Robert Hood	Maidstone.
Hewson, Joseph Frankish	Islington.
Holttum, Richard	Maidstone.
Jenkins, Alexander	London.
Kershaw, William	Halifax.
Laurence, Henry French	Pimlico.
Matthews, Frederick William	Birkenhead.
Miller, Samuel	Pateley Bridge.
Morris, Morris Davies	Wrexham.
Pascall, Frederic George	Limehouse.
Phillips, Charles	Birmingham.
Shaw, John	Ashton-under-Lyne.
Simon, Richard	Liverpool.
Storm, Elliott Baxter	Stockton-on-Tees.
Taubman, Robert	London.
Tice, Richard	Islington.
Tily, Charles Alfred	Kentish Town.
Tyler, George	Southwark.
Webster, John Henry	London.
Williams, William Frederick	Stepney.
Wilson, Franklin	Hull.

ERRATUM.

Page 981, col. ii. line 32, in the list of Associates of the Society elected on the 4th June, *for* Bracher, Walter Phipps, Grantham, *read* Bracher, Walter Phipps, Bath.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

RECENT PROCESSES FOR THE MANUFACTURE OF GAS FOR ILLUMINATING PURPOSES.*

BY T. WILLS, F.C.S.

(*Continued from p.* 1007.)

This last-mentioned process has been submitted to the investigation of two eminent independent scientific men, both having a large acquaintance with the processes of gas manufacture. The value of such investigation cannot well be over-estimated, and it would appear desirable that in all such cases similar investigations should be resorted to, for it rarely happens that an inventor is able to perceive the weak points of his own invention, and still more rarely is he able to grapple with and surmount them by the use of his own scientific knowledge, while at the same time it is not too much to say that many processes and schemes have been allowed to dwindle and die because the good and useful points which they contained have not been perceived amongst so many erroneous views and ideas. A searching

* Read Wednesday, May 21, 1873.

and clear examination of any particular invention ought to be regarded as exceedingly valuable testimony.

The following are some of the more important points brought out by the examination of the above described process by Messrs. Keates and Odling. The experiments conducted by these gentlemen were made upon two scales, the first a manufacturing one, in which the process was in use for the manufacture of gas for the public consumption; and the second upon a much smaller one, in which, however, the various apparatus was necessarily under more perfect control, and hence some points were capable of clearer elucidation. The highest yield of gas obtained directly from the coal was 9775 cubic feet, the temperature of distillation being between 1300° and 1400° F. The quantity of oil and tar obtained from one ton of coal varied considerably with the nature of the coal used; thus, Silkstone coal gave 16·4 gallons of tar and oil per ton, Clay Cross Main 11·9 gallons, and Pelaw Main 13·9 gallons, or a mean of 14 gallons. The highest yield of gas which was obtained by the continued distillation and redistillation of the oily tar was 29 cubic feet per gallon. The mean lighting power of the gas produced from coal was 23·0 candles, and of that obtained from the tar 25·0 candles. The quantity of coke used to maintain the heat in the various parts of the apparatus was about 33 per cent. of that produced, and in the event of the distillation being repeated until complete separation into pitch and vaporizable matters takes place, this amount would be much exceeded. It must also be remembered that the time occupied in the distillation of the coal is just double that allowed when ordinary high heats are employed. The most successful experiment as yet made with this process has shown that from one ton of coal it is possible to produce 9500 cubic feet of 23-candle gas by a careful regulation of the temperature, and from 14 gallons of oil (the mean produce of one ton of coal) 600 cubic feet of gas of an illuminating power equal to 25 candles. Against this result must be placed the considerably increased time occupied for the distillation, and the increased consumption of fuel. It would appear, therefore, from these figures that the second process of distilling the oil is of very little practical utility. The expense attending the production of an equal quantity of gas of a scarcely less illuminating power from coal being far less than that attending the distillation of the oil or tar. Indeed the experimenters themselves consider that the oil would be more valuable as a marketable article than as a material for the manufacture of gas. That this process is capable of yielding a larger amount of gas of high-illuminating power, and of a character as permanent as that of gas ordinarily produced from cannel coal, is, without doubt, satisfactorily proved; and the one point for the entertainment of gas engineers seems to be the relative simplicity and economy of producing coal-gas of a high illuminating power in the ordinary way by the distillation of a rich, and consequently more expensive coal, or of the adoption of this process of distilling an ordinary gas-coal at a low heat, with a correspondingly longer exposure.

Another arrangement has been patented which, to some extent, embodies the above idea, although with some considerable modifications; thus the processes of distillation and re-distillation are carried on simultaneously. The two heated tanks for the heating of the tar and oil of the previous invention are dispensed with, and heated iron pipes, in reality continuations of the retorts, placed parallel with them, and heated by the same fire, filled with some porous material, such as pumice or coke, are substituted. The tar formed, which is not so large in amount as that obtained in the ordinary manner, is thus further decomposed by its passage over the large heated surface, and the gas so produced helps to increase the ordinary yield. If coke be used for the porous material, it speedily becomes converted into a pitchy cinder in appearance, almost identical with the charcoal after its exposure in the previous process, and forms a very fair fuel for the heating fires. There is, however, a difference in this invention, which, although not claimed as part of the patent, yet forms an important point in it, and this is that a jet of super-heated steam is driven into the retort, and brought into contact with the heated coal. During the carbonization a portion of this steam undergoes decomposition in the presence of the red-hot coal; its oxygen uniting with the carbon to form carbonic oxide, and its hydrogen being liberated as gas, it was expected that this hydrogen would also unite with a portion of carbon to form some gaseous hydrocarbon, but this is not possible, as the highest temperature attainable in a retort of this description would be far too low to bring about such a direct union, but an indirect benefit may arise from this injection of steam, and that is, that the gases formed from the coal may be more quickly removed from the heated mass, and being at the same time somewhat diluted, the tendency to form more complex bodies will be partially destroyed, and, consequently, the production of the tar and oil will proportionately cease. The previous heating of the steam is no doubt necessary in order to prevent undue condensation, but its being heated to redness, as mentioned in the specification, would prove a difficult and probably unprofitable operation, and would certainly be impossible to accomplish by merely bringing it into contact with the heated sides of the retort. The result of introducing a jet of steam into the retort during the making of gas may be said to have been successful to the extent to which it has been tried, but the amount so introduced requires very careful regulation. A very full and complete trial was made by a number of eminent men some years ago upon a plan very nearly allied to this—viz., that which was known by the name of "White's hydrocarbon process," in which steam was introduced into the retort with the heated coal, and the following points appear to have been satisfactorily proved:—

1. An increase in the produce of gas from a given weight of coal was obtained.
2. An increase in the illuminating power of the gas afforded by a given weight of coal.
3. The amount of tar and other oily products was considerably diminished.

It is a generally accepted fact that the quicker coal be carbonized in gas-making, provided it be done effectually, the more successful will be the operation. In the ordinary process this end is far from being reached, the carbonization gradually proceeding from the exterior layer of coal directly in contact with the heated bed and sides of the retort towards the centre and more protected portions; and as a consequence of this, the heavier and more condensed, and in some respects more valuable gases, coming from the interior part of the fuel, have to pass over the more thoroughly carbonized and hotter outer portion, and will thus suffer a further decomposition before leaving the retort. Many plans have at various times been adopted to obviate this evil, such as exposing the coal in exceedingly thin layers, or forming the bed of the retort of a constantly moving stage, upon which a thin layer of coal in small pieces is constantly exposed to a uniform heat. Some of these methods have been successful, but have had in most cases to be abandoned on account of greater complication of machinery, and hence greater difficulty in continuous working. A plan—probably the simplest that has yet been introduced—has recently been brought forward, the principle of which is as follows:—The retort in this case is set in a vertical position, and through its centre revolves a broad and somewhat deep screw, put together in sections, the thread of which is placed at an angle of 45°, and which comes nearly into contact with the sides of the retort. Through a hopper at the top, coal is supplied, in pieces of small but regular size; the inclination of the thread of the screw impels these pieces against the heated sides, where comparatively rapid carbonization takes place, and the rate of revolution of the screw is so regulated, that by the time the fuel has arrived at the bottom of the retort the process is complete, and coke of a somewhat inferior quality is discharged into a suitable receptacle. The yield of gas is greater by this means, and of higher illuminating power, the amount of tar being correspondingly less; the difficulties encountered appear, as in previous methods, to be chiefly mechanical, the great friction to be overcome by the working of the screw requiring considerable power, the wear and tear thus becoming also greater. Further, the exposure of the iron to such a continuous high temperature renders it extremely brittle, a quality enhanced no doubt by the presence of sulphur, which causes a superficial conversion of the iron into sulphide. That the process itself is to a great degree successful, will be seen from the following results:—

Coal Carbonized.	Quantity of Gas obtained.	Illuminating Power of Gas.	Amount of Tar.
1 ton	11,040	16 candles	8·5 gallons.
1 ton	10,160	17 candles	—
1 ton	12,000	16 candles	—

The fact of the existence of a large number of hydrocarbons of great volatility, the vapours of which, when ignited, burn with exceedingly luminous flames, has been a very great incentive with inventors to produce some scheme whereby these vapours might be used to confer luminosity upon a combustible non-luminous gas, or further, inflammability, coupled with luminosity, upon a non-combustible and negative gas. The Patent Office contains the record of many such schemes, which, for some reason or other, have failed to fulfil their originators' hopes and desires. Much misapprehension has arisen upon this matter. Too much has often been expected from such schemes; but, on the other hand, a large amount of unreasonable contempt has been poured out upon all projects of the kind, both extremes being avoidable by a short consideration of certain well-known physical laws. It should be remembered by the opposers of the possibility of there being any good in such ideas, that to a great extent, larger than is generally thought, the luminosity of coal gas itself is dependent upon the presence of the vapours of such volatile substances, which are held in a state of solution in the gas, but which still remain condensible bodies; and we shall see presently that the loss in illuminating power which coal gas undergoes on exposure to a low temperature, is really due to the condensation of such substances. These remarks apply to the principle of carburation, and not to any special means of applying that principle.

This idea of carburation is not by any means new, having been started almost at the same period that lighting by coal gas in the ordinary way was introduced; but it was not until the opening up and working of the American oil wells, by which a supply of very light petroleum oil or spirit was obtainable, that any scheme in this direction was found to have any chance of success. In 1862 a patent was taken out in France by a M. Mongruel, which proposed to pass air through an exceedingly light and inflammable spirit, the air thus becoming charged with a certain amount of a highly luminous hydrocarbon vapour, in such a quantity as to render the mixture inflammable, and to allow of its being burned as an ordinary combustible gas. This idea was introduced into England by a company known as the Photogenic Gas Company, which received some amount of support at the time, but, from some cause or other, did not prove a success.

The various inventions brought into notice since that time for the purpose of carburetting air and other gases have been based upon precisely the same principle, but have differed considerably in the apparatus employed. A general distinction may be made here—more for the sake of separate examination than from there being any fundamental difference between them—between those processes which propose to use air as the vehicle or medium for holding in solution the hydrocarbon vapour, and those in which a combustible but non-luminous gas acts in such a manner; in either case any remarks upon the quantity of vapour taken up, and its character, when held in solution, will apply to both. Many erroneous statements have been made on this matter for the want of a little scientific knowledge; for instance, in some cases patentees themselves have declared that a union takes place, other than mechanical, between the gases of the air and the vapours of certain hydrocarbons, which results in the production of such gases as olefiant gas, or acetylene, an utter absurdity and impossibility which would be evident to any who would consider under what circumstances, and under what circumstances only, such gases are produced. A vapour of any hydrocarbon whatever will, whether it exist by itself or whether it be diffused through another gas or gases, always be such a vapour, and will invariably exhibit the properties characteristic of it; and, moreover, if diffused through a gas, will be found condensible once more to the liquid from which it was formed, if proper means be applied. An illustration occurs in the case of aqueous vapour, which always exists in greater or less quantity diffused through the air; but this vapour is still the vapour of water, exhibiting all its properties, and capable once more of assuming the liquid state on a sufficient reduction of temperature. Another view equally erroneous is, that a given bulk of air or gas will take up and hold in solution an almost indefinite quantity of vapour, and some extraordinary statements have been made as to the large amount of this quantity. Now, from what has been said in the earlier portion of this paper, it will be readily understood that this point is capable of experimental proof, and is not determined either by chance or accident. Every liquid body has a maximum tension of its vapour, and this point is as fixed for any particular substance as its specific gravity or its boiling point. If, therefore, a given space, filled either with air or other gas, contain a quantity of vapour at its maximum tension, that space will be saturated with such vapour, and it will be found impossible to cause it to hold ever so slight a quantity in excess of that already existing; as, however, this tension is lower for lower temperatures, a space that is saturated at a higher temperature will become over, or supersaturated as the temperature falls, and hence must deposit a quantity of vapour in the liquid state. When experiments are made with a view to test this result, the temperature of the *gas* should be the observed temperature and not the temperature of the vessel containing it, as the conducting power of a gas for heat is so bad that it takes a considerable time for any quantity of it to fall from a higher to a lower temperature. It will be seen, then, that the fixing of the maximum tension of the vapour from a liquid for different temperatures will give us an exceedingly good indication of the quantity of the vapour which may exist diffused through any space of air or other gas. A statement was made at the outset, which, for the sake of clearness, is repeated here, viz., that the medium in which the vapour is diffused has no effect whatever upon the quantity so diffused, a vacuum, or equal volumes of all gases, taking up the same quantity of the vapour of any liquid. The boiling-point of a liquid is far more intimately connected with its vapour tension than its specific gravity; indeed the boiling-point depends upon the vapour tension, for when this tension equals in amount the pressure of the atmosphere, a body is said to boil, and does at that point enter into ebullition. A great tendency has been shown by inventors to reduce the specific gravity of the hydrocarbons which they use, with a view to obtain bodies of very great volatility, and to some extent the boiling-points of such bodies have been disregarded; probably this has not led them much astray, because, as it happens, the substances mostly used for these purposes, the light petroleum spirits, have low specific gravities and low boiling-points, the two being reduced at the same time, but if almost any other class of hydrocarbons had been dealt with, the specific gravity would have proved no guide to the volatility of the compound; thus, in the case of the following bodies, alcohol, benzole, and bisulphide of carbon, which have respectively the specific gravities 0·719, 0·85, and 1·272, the vapour tensions, and consequently the boiling-points, follow just the contrary order, and the body possessing the greatest density is really the most volatile. The vapour tension of alcohol, at ordinary temperatures, viz., about 15° C., is equal to the depression of the mercurial column to the extent of 30 mm., the boiling-point of alcohol, being 79° C.; the vapour tension of benzole, in the same manner, is 55, and the boiling-point of the liquid 78° C., and of bisulphide of carbon as high as 250, with a boiling-point of 48° C.; low specific gravity is, therefore, not always coupled with low boiling-point and great volatility.

A law was enunciated by Dalton, which, though since proved to be only approximately true, nevertheless enables us to obtain a rough idea of the vapour tension of any liquid if we know its boiling-point, which was this:—"The vapours of different liquids have equal tensions at temperatures equally removed from their boiling-points." Thus, the boiling-point of alcohol being 79°, the vapour tension of alcohol at 50° ought to be equal to the vapour tension of water (with a boiling-point of 100° C.) at 71°, which is approximately correct. Now, the boiling-points of the light petroleum spirits used in the carburation of air are pretty well known, and some of them are expressed in the following table, together with the specific gravity of the spirit:—

Boiling-Points of Light Petroleum Spirit of Different Specific Gravity.

Specific gravity.	Boiling-point.
0·600	4° C.
0·628	30 „
0·669	68 „
0·699	92 „
0·726	118 „
0·741	136 „
0·757	160 „

The spirit more commonly employed has a specific gravity of about 0·650, having a boiling-point of 58° C. In the following short table the vapour tension of this spirit has been calculated, by the above approximate law, for several different but often experienced temperatures.

Table of Maximum Vapour Tension of Petroleum Spirit of a Sp. Gr. ·650 at different Temperatures.

Temperature.		Vapour tension.
−10° C.	(14° F.)	43·5 m.m.
0 „	(32 „)	81·0 „
+10 „	(50 „)	132·0 „
15 „	(60 „)	167·9 „
20 „	(68 „)	203·0 „
40 „	(104 „)	301·8 „

These vapour tensions, therefore, express the maximum proportionate quantities of the spirit which can exist dissolved in air, or other medium at those temperatures; thus the quantity of vapour dissolved at 15° C. (60° F.) or the temperature of a tolerably warm day, is just about double that which will be dissolved at 0° C. (32° F.) or the freezing point of water; the reduction of the temperature from 15° to 10° C. (60° to 50° F.) is coupled with a loss of about one quarter of the amount of hydrocarbon vapour. These points are capable of direct experimental proof, and all claims and statements made by inventors may be brought with perfect justness to such results. We may perhaps state the above table in a still clearer way, by converting the figures representing the vapour tensions into the percentage of vapour present in any bulk of gas at any particular temperature. It will then stand thus:—

Table of Percentage of Vapour of Petroleum Spirit of a Sp. Gr. ·650, present in Air or other Medium at different Temperatures.

Temperature.		Percentage.
−10° C.	(14° F.)	5·7
0 „	(32 „)	10·7
+10 „	(50° F.)	17·5
15 „	(60 „)	22·0
20 „	(68 „)	27·0
40 „	(104 „)	39·0

Now, for an "air gas" scheme to be successful, the air must hold in solution a sufficient quantity of vapour at the lowest temperature to which it may possibly be exposed as shall confer upon it both inflammability and an adequate luminosity, and this really means that at a higher temperature it will hold in solution a much greater quantity than is necessary in order to obtain such a result. In many cases, doubtless, this is the case.

The quantity of vapour held in solution at any one time, no matter at what temperature the observation be made, will be found to be just that quantity which would be found sufficient to saturate the air or gas at the lowest temperature to which it has been exposed; hence any lowering of the temperature after carburation should be carefully avoided, as a loss would thereby be incurred of a quantity of vapour which would not be restored on the temperature becoming again higher; this, of course, applies only to the gas or air after it has left the *liquid* hydrocarbon, and is not in contact with it.

The liquid hydrocarbons, which at present are almost exclusively proposed to be employed for the purposes of carburation, are the light oils and spirit which form the first distillate in the preparation of paraffin oil from the crude American mineral oil. As this light spirit is too volatile and inflammable to be burned in any sort of lamp at present in use, and no other commercial application has been discovered, very large quantities of it are disposed of as an entirely waste product, obtainable at a merely nominal cost. Whether the difficulties of importation, or its taking its position as a marketable product, will materially affect the estimates at present put forward for the continuous acquirement of large quantities, will remain hereafter to be seen.

(*To be continued.*)

Parliamentary and Law Proceedings.

"PERFUMED SPIRIT."

Court of Exchequer, June 14. *Sittings at Nisi Prius, at Westminster, after Term, before Baron Bramwell and a Special Jury.)*

THE ATTORNEY-GENERAL *v.* CARMOUCHE.

The Attorney-General, the Solicitor-General, Mr. Locke, Q.C., and Mr. Pinder were counsel for the Crown. The defendant did not appear.

This was an information filed by Her Majesty's Attorney-General to recover from the defendant certain penalties for breaches of the Excise Laws. The information contained forty-six counts, and treble penalties were sought to be enforced on each count. The defendant was a Belgian, carrying on business at the Albion Works, Bow Common, and at Mark Lane, and at the former place was engaged in the business of an ordinary distiller, without having a licence to carry on that business. His advice notes described the spirit as "perfumed spirit," and his labels on his casks also described the spirit to be such. Several witnesses who had dealt with the defendant, and were now called as witnesses for the Crown, proved that there had been in some instances a perfume placed in the spirit, but they would not swear that it was what is known in the trade as "perfumed spirit to be used for perfumery." It appeared that a Mr. Watts, of the firm of Batley and Watts, carrying on business in Whitecross Street, purchased a quantity of "perfumed" spirit from the defendant, and, suspecting from the price of it that all was not fair and above board, instituted inquiries, and communicated with the Excise, and so brought about the exposure of the defendant's frauds upon the Excise. Mr.

R. Bannister, of the Inland Revenue laboratory, produced four samples of spirit which had been seized, and declared them to be plain spirit of wine, and he also examined six samples taken from spirits supplied by the defendant to a firm in Scotland, and found them to be spirits of wine, containing no essential oil, and neither perfumed nor medicated. Nearly the whole of the spirit sold by the defendant was about 58 over proof. He sent several casks of spirit labelled "perfumed spirit" to a firm in Scotland to be converted into sweet spirit of nitre, and this spirit, upon information supplied by the firm, was seized by an Excise officer, and was declared to be ordinary spirit of wine. At the request of the Excise the firm gave an order for some spirit to the defendant, and the officers, upon its delivery, succeeded in tracing the defendant's illicit still.

At the conclusion of the case for the Crown his lordship shortly summed up, saying that the jury were no doubt satisfied upon the evidence adduced on behalf of the Crown that the defendant had carried on the business of a distiller without a licence to do so, and had been selling illicit spirit. The defendant was not present to defend himself, and if he had been, what could he have said? There was ample evidence to show that he had an illicit still and worked it. In some cases the jury would, perhaps, be satisfied that the spirit was disguised to evade the duty. It perhaps would not be very agreeable for some of the persons who had had dealings with the defendant to hear him (the learned judge) remark that there was much truth in the old adage that the receiver was worse than the thief. If no persons had purchased spirit of the defendant he could not have carried on his business. Mr. Watts was to be greatly commended, but he had done no more than his duty as an honest man. The amounts sought to be recovered were large—large enough, it was to be hoped, to keep the defendant out of this country for the remainder of his days.

The jury being of opinion that the Crown was entitled to the verdict generally, a verdict was entered accordingly upon each count for duty and treble penalties, which amounted in the aggregate to a sum of £13,687 5*s*.

Prosecutions under the Adulteration Act.

COCOA.—MUSTARD.—PEPPER.

Several cases of prosecution under the Adulteration Act, which have taken place recently, offer points of special interest, as tending to show what will be held to be an adulteration, the extent to which a dealer is responsible for a knowledge of the purity of the articles which he sells, and the formalities necessary to be observed in procuring samples for analysis. The following are reported in the *Grocer* for June 14:—

At the Kingston County Police-court, three tradesmen of Walton-on-Thames appeared before the bench on summonses which had been issued against them for alleged infringements of the Food Adulteration Act. Mr. Humphries and Mr. John Coldwell, grocers, were charged with having sold adulterated packets of cocoa; and the charge against Mr. Robert Ridges was that he had sold two ounces of adulterated mustard. The charges were preferred by Inspector Bunyard. In the course of the forenoon, whilst the general cases were being heard, and before the above-named summonses came before the Court, Mr. Humphries applied for the postponement of his case until the following week, on the ground that Mr. Wontner, solicitor, who had been engaged to defend him by Messrs. Dunn, Hewett, and Co., the manufacturers of the cocoa which he was charged with having adulterated, was unable to attend that day. The magistrates consented to the application.

The case against Mr. John Coldwell was then proceeded with. Mr. Haynes, solicitor, appeared on his behalf. The charge against the defendant was that he had sold a packet of Taylor's cocoa which was labelled "soluble cocoa," and on which was also the following:—"This admixture contains no injurious ingredient." Inspector Bunyard, in support of the charge, stated that on May 19 he purchased a packet of cocoa at the defendant's shop, for which he paid 2*d*. After purchasing it he took it to Dr. Stevenson, the analyst for the district, and directed him to analyse it. He subsequently obtained Dr. Stevenson's certificate. The witness produced the packet he had purchased, which was labelled "Taylor's Soluble Cocoa."

Mr. Haynes: When you purchased the cocoa you knew it was soluble cocoa?

Witness: It was so stated on the label.

Mr. Haynes: Well, then, you were well aware that it was not pure cocoa, for pure cocoa is not soluble?

Witness: Yes, I suppose I was.

Mr. Haynes: Of course you were.

Mr. Bell (clerk to the magistrates): It did not state on the label that it was pure cocoa?

Witness: No.

The analyst's certificate was here put in, which stated that the cocoa submitted for analysis contained a mixture of cane sugar and sago, but that it was not injurious to the health of persons eating or drinking it.

Mr. Haynes, on behalf of the defendant, contended that the charge against him could not be sustained for several reasons. In addition to the fact that the analyst had certified that the article sold was not injurious to health, which under the Act of Parliament he was required to do before a conviction could take place, there was the further fact that on the face of the statement on the label on the packet there was no intention whatever to pass the article off as pure cocoa, and of that fact the inspector was perfectly aware at the time he made the purchase and took the article to the analyst.

Colonel Terry, in giving the decision of the bench, said it was perfectly manifest that the cocoa was not sold as pure cocoa, and there was a difficulty in arriving at the conclusion that it was deceptively sold as an adulterated article, inasmuch as the label on the packet bore evidence that it contained other ingredients beyond that of pure cocoa. In the case of a person named Kelly, at Liverpool, who was acquitted the other day by the magistrates on the charge of having sold adulterated butter, the Court of Queen's Bench had decided that the magistrates were wrong, and that the defendant ought to have been convicted on the ground that the butter was adulterated, whereas the defendant represented it as butter only, and in that case Mr. Justice Blackburn remarked that an acquittal would have been justifiable had he stated that it was not pure butter, or that there was a mixture with it of other ingredients, thereby inferring that, although an article might be adulterated, a fine for selling it ought not to be imposed if a representation to that effect were made at the time of the sale. In this case it was clearly represented on the label of the packet that the article was not sold as pure cocoa, but that it contained a mixture of other ingredients. Under these circumstances the charge must be dismissed.

Mr. Bell, clerk to the magistrates, after the decision in the first-named case, called the attention of the bench to the charge preferred against Mr. Humphries, which in the course of the forenoon it had been agreed should be postponed until next week. He suggested that, after the decision which they had just given, it might be desirable to dispose of it at once. He submitted to the bench, for their inspection, the packet for the sale of which Mr. Humphries had been summoned, which was labelled "Dunn's Digestive Cocoa," and on which it was also stated "this article contains nothing but fecula and sugar." Looking at that label, it appeared to him that the prosecution had not a leg to stand upon.

The Chairman, having inspected the packet, said it appeared to him that the evidence on the face of the packet was even stronger against the probabilities of a conviction than in the last case. The label on the packet not only said that it contained nothing injurious to health, but it also stated what articles it did contain. However, the hearing of the case had been postponed, and he would ask Mr. Humphries whether he wished that the arrangement should stand and the case be gone into next week.

Mr. Humphries said he certainly had no desire whatever to be compelled to attend the court again if the bench then wished to dispose of the case. The bench having consulted with the clerk, the Chairman said it appeared to the magistrates that it would be useless to go further into the case, as a conviction was highly improbable. The summons was accordingly withdrawn and the charge dismissed.

[We understand that Messrs. Dunn, Hewett, and Co., the manufacturers of the cocoa, for selling which Mr. Humphries had been summoned, were prepared to have offered a strenuous defence had the case proceeded, and that in the event of a conviction they would have appealed to a higher court.]

Mr. Robert Ridges was charged with having sold two ounces of adulterated mustard. Inspector Bunyard stated that he went to the shop of the defendant, and asked the price of mustard, when the defendant replied that it was 1*s.* 8*d.* and 1*s.* per lb. Witness asked for two ounces of that at 1*s.* per lb., and he was served with two ounces, for which he paid 2*d.* There was no label upon it. When he bought it he told the defendant he was going to have it analysed. He took it to Dr. Stevenson, who analysed it, and gave him a certificate, which stated that the mustard contained a mixture of flour and turmeric, but that these substances were not injurious to the health of persons partaking of them. [The certificate and the packet of mustard were here put in.]

The defendant, in reply to the charge, said that he did not sell it as the best or as pure mustard. It was sold in the same state as that in which he received it. He did not sell it as unadulterated mustard.

The Chairman said the bench acquitted him of any fraudulent intention, but they were of opinion that there had been an infringement of the Act. They advised him in future to label all the mustard he sold which was mixed with other ingredients. The bench were not disposed to inflict a heavy fine, but he must pay the costs of the summons and the expenses.

It was stated that these amounted to about £1.

At the Dorking Public Hall, Mr. Arthur John Wyld, grocer, of Dorking, was summoned under the Adulteration Act for selling two ounces of pepper which were alleged to be adulterated. Mr. White appeared for the defendant. From the evidence of a police-constable it appeared that on the 29th of April the officer went to the shop in private clothes and purchased two ounces of pepper, not saying for what purpose he wanted it. The constable handed it to Superintendent Page, who sent a portion of it to Dr. Stephenson, of Guy's Hospital, for analysis. Dr. Stephenson's certificate was now handed in to the chairman of the bench, stating that the sample was adulterated by an admixture of refuse, or husks of linseed and rice flour, but that the same adulteration was not injurious to health.

Mr. White, on behalf of the defendant, said although he had some technical objections to take, his client did not wish to get off by a side-wind, as he conscientiously believed the pepper was not adulterated. He only kept two kinds of pepper, which were supplied by Messrs. Borwick, of London. He had taken a sample of the same pepper as was sold to the constable to Dr. Hassall, the eminent analyst, whose certificate he now produced, stating that the pepper was not adulterated, and he contended that that was an answer to the case on its merits. Independently of that, he had three points to raise. The first was that under the Act of 1868, 23 & 24 Vict., cap. 68, which is incorporated with the new Act of Parliament, the purchaser was bound to inform the seller of his intention to have it analysed, and to afford him reasonable opportunity of seeing the article handed over to the analyst, so as to guard against the article being tampered with between the time it was purchased and the time it was analysed. That was a very necessary provision, as otherwise no tradesman would be safe. In this case the article was purchased on April 29, and it was not until just a month afterwards that his client had any information of its having been analysed. His next point was that Superintendent Page, under the 6th section of the Act, ought to have purchased the article himself, and that it was a stretch of power for him to send a deputy in private clothes. It was never intended that there should be any sly or underhand way of executing the Act, and the inspector, who was the person specially appointed by the Act, should himself go into the shop openly to make his purchase, just as he would go in to inspect the weights and measures. Finally, he contended that there was no proof of guilty knowledge on the part of his client, who sold the pepper as he received it from the manufacturer, and certainly believed it to be pure.

The Chairman remarked that Justice Blackburn had decided that the guilty knowledge might be inferred.

Mr. White said that Justice Blackburn made that remark only in reference to the case immediately before him. Whatever Justice Blackburn might have said, they were bound to go by the Act of Parliament. There were some cases where, from the low price of the article, the seller must know it to be adulterated; but it was very different in cases of tea and pepper which were bought at the regular prices from respectable firms, and which the seller had a right to suppose were pure; at any rate, he would not know to the contrary without paying £2 2*s.* to have every article analysed.

The magistrates retired, and after a few minutes' consultation the chairman said that the magistrates had decided on dismissing the case, on the ground that no intimation had been given to the seller of the intention to have the article analysed, as was required by the 3rd section of the 23 & 24 Vict., which was certainly incorporated with the new Act. The case against Mr. Wyld was dismissed accordingly.

Review.

Du Corps des Pharmaciens Militaires, son Rôle dans les Etablissements Hospitaliers aux Armées Actives et près de l'Administration Supérieure de la Guerre. Par le Dr. C. Roucher, Pharmacien Principal de l'Armée. Paris: Baillière. 1873.

To hear of a class of men who are "satisfied with their present position," and "do not seek any new personal advantage," is quite refreshing in the present stage of the struggle for existence. When, however, we find these words used by the spokesman of a body of pharmacists, the pleasantness of the surprise is increased, and only it is tempered by regret at the certainty that evidently he is not speaking on behalf of English pharmacists. In fact the words are used in reference to a class of men who unfortunately have no representatives in this country, the French corps of *pharmaciens militaires*. At present, although there are certain regulations in existence requiring that navy dispensers shall possess the "Major" or "Minor" qualification of the Pharmaceutical Society, and some attempt has been made to induce properly qualified men to enter that service, there exists no similar provision as to the army. We believe we are right in saying that there is no way by which a pharmaceutist with military tastes, who wishes to place his special acquirements at the service of the State, may do so without entering as a private, in the hope that *when* he reaches a certain rank a vacancy *may* occur in the office of compounder of medicines, to which he *may* be appointed. But in France it is not so, and it is to be hoped that in Great Britain the time will come when the benefits of skilled dispensers, which are at last being gradually provided for the pauper in the workhouse infirmary, may be extended to the British soldier when in hospital.

The general projected reorganization of the French army, including, among other departments, those relating to the health of the soldier, appears to have brought with it some danger that the pharmaceutical service would be subordinated to the medical. This has induced Dr. Roucher to issue the *brochure* bearing the title at the head of this notice, in which he seeks to maintain the acquired rights of the body as being identical with the interests of the army, stating that if it were otherwise he would not hesitate to sacrifice persons to things, for that servants are made for the service and not the service for the servants. One introductory remark is worthy of quotation as having a general application in matters of this kind, that while on the one hand it is useless to pretend personal interests entirely disappear before the general interest, on the other it is not sufficient for the State to appeal to the spirit of generosity and sacrifice, without recompensing worthily those from whom it accepts service.

As a contribution towards the spread of information necessary for the proper appreciation of the important service which can be rendered to the State by a body of men like the French military pharmaciens, we quote from Dr. Roucher's pamphlet an account of some of the principal duties which they perform. The military pharmaceutical service embraces, besides that relating to the regiment, the veterinary service of the army, prisons, penitentiaries, etc., the colonial service, and investigations connected with the war administration relative to food, dress, and encampment. The military pharmacien is required to see to the supply of medicines wherever there is a soldier ill or a military physician has a remedy to prescribe. He has to guarantee the quantity, and especially the quality of the medical supplies; to verify the genuineness of substances used for food, and to assist in the solution of problems which lie within the domain of the physical sciences. He has to study economy in the purchase of medical substances, to superintend their preparation and preservation, and to render an exact account of all the material confided to his care by the State. In the hospital his daily duty is to examine all the medical prescriptions to see that they conform to the formularies laid down by the Council of Health; also that the mixtures or compounds prescribed in them follow the rules of the pharmaceutical art, and that they do not through momentary inattention, ignorance, or negligence, contain dangerous doses. The pharmacien is expected to reply to questions of the medical men respecting the quality or properties of new or little known medicines; to suggest means of preparing new remedies suggested by extraordinary cases or the progress of the healing art; to be able to demonstrate to them the purity and good quality of the substances used, and to indicate possible substitutions. He is also consulted respecting the food and drinks by which the patients are nourished. Finally, he must be able to analyse morbid products interesting in the history of disease, and a knowledge of which is of importance to the physician. All this work requires an acquaintance with not only the substances which are comprised in the official list of the military hospitals, but the whole field of natural history, materia medica, physics, and chemistry. Some objection appears to have been taken to the necessity for the presence of the pharmacien with the army in the field, on the ground that after a battle the medicines used are of the simplest description, requiring but little skill to prepare them. But as the author forcibly remarks, even these require supervision, and the presence of a skilled pharmacist leaves the medical man at liberty to attend to duties more in accordance with his calling. But besides this duty the pharmacien of the divisional ambulance has to renew the stock of the medical and surgical canteens, and to provide supplies on the march to the veterinary service, which requiries larger quantities of drugs than the medical service, and is second in importance only to it. In fact, the valuable services rendered by the French military pharmaciens were gratefully recorded at the time of the Crimean war, and during the more recent campaign against Germany.

Dr. Roucher, however, does more than national service in claiming for the pharmaceutist a position in relation to medical men considerably beyond that generally conceded to him. Although English pharmaceutists as a whole have not yet acquired the same *locus standi* as scientific men as their continental brethren, it is incontestable that skilled pharmacists, educated as highly and with a knowledge as wide as that possessed by medical men, are becoming yearly less exceptional. And to quote the words of our author, "Either medical men will have to renounce the support of the pharmaceutical chemist in their forward march, or they will have to share with that powerful auxiliary the honour of progress in this domain of the medical sciences, where they can never venture alone. Comprehended or not, this sentence is absolute." Three years ago, Professor Huxley questioned the propriety of burdening the mind of the medical student with a knowledge of materia medica, except so far as it related to therapeutics, and threw a doubt upon the permanence of its retention in the memory. The opinion of M. l'Inspecteur Jeannel, quoted in this pamphlet, is quite in accord with this. He says that after being at the same time doctor of medicine and pharmacien militaire, teaching during sixteen years materia medica to both medical and pharmaceutical students, and well acquainted with the too feeble stock of chemical and pharmaceutical knowledge possessed by a doctor of medicine, he is persuaded that the incompetence of medical men as to pharmaceutical compatibilities and the preparation of medicines is nearly absolute. And the author, who, after several years of professional duties and special persevering study, laments that he is not so good a pharmacist as he would be, adds his testimony that, had he to retrace his steps, if he wished to be a doctor he would study medicine, and if a pharmacist he would devote himself exclusively to the pharmaceutical sciences.

But *revenons à nos moutons*. It is interesting, with the memory of recent events fresh in our minds, to note that the man aspiring to be a *pharmacien militaire* cannot enter the service until he has spent three years at practical pharmacy, passed through a full course of three years at the schools, and taken his degree as *bachelier ès sciences*. The service has always attracted a high class of men, and some of them have borne names of which not only France but the scientific world is proud. Without neglecting their more modest functions, they have always been associated with scientific progress, they have been represented at the Institute, at the Academy of Medicine, in the chairs of the Faculty, and everywhere where science hás shone. We shall conclude our notice with a list of a few of the principal, expressing the hope that the time will come when the pharmacist in this country also will receive more general recognition as a man who can render valuable services to the State.

The *Corps des Pharmaciens Militaires* has counted among its members:—

Guéret, known by his labours in reference to *Cruciferæ*, for which he received several academical prizes.

Bayen (1725–1798), an original investigator who examined by chemical analysis substances hitherto unknown. His valuable researches upon the calcination of metals overthrew the famous theory of phlogiston, and prepared the way for Lavoisier.

Deyeux, the colleague of Parmentier, who made improvements in the manufacture of cheese, and with Vauquelin and Thénard performed numerous analyses of mineral waters.

Parmentier (1737–1813). Some of the services of Parmentier to science have recently been recorded in this Journal (*ante*, p. 537). It is worthy of note that his profound study of the food question in connection with his duties prepared the way for the introduction of the potato, with which tuber his name is in France indissolubly connected.

Alyon (1758–1816), the author of many works on botany and chemistry.

Chaumeton (1775–1819), who produced several works on natural history.

Bertrand, who died in 1826, leaving several valuable works on pharmacy.

Sérullas (1774–1831), a bold and indefatigable investigator of the secrets of analysis, whose numerous discoveries gained for him the chair of chemistry at the Jardin des Plantes, left vacant by the death of Langier.

Laubert (1762–1834), the friend of Joubert and Championnet, whose labours on the cinchonas prepared the way for the discovery of quinine.

Lodibert, who investigated the gaseous products applicable to medicine. He obtained caryophyllin from the clove at a time when the active principles of plants were little understood, and thereby gave a new impulse to the study of the alkaloids.

Besides the above might be mentioned Alexander Brogniart, Bruloy, Brault, André, Tripier, and many others belonging to the past history of the body, whilst the names of many of its living members are familiar as household words to the readers of this Journal.

BOOKS RECEIVED.

NOTES OF A COURSE OF NINETEEN LECTURES ON NATURAL PHILOSOPHY, delivered at Guy's Hospital during the Session 1872–73. By G. F. RODWELL, F.R.A.S., F.C.S., etc. London: J. and A. Churchill. 1873. From the Publishers.

THE PHILOSOPHY OF EVOLUTION. (An Actonian Prize Essay.) By B. THOMPSON LOWNE, M.R.C.S., F.L.S., etc. London: Van Voorst. 1873. From the Publisher.

Obituary.

Notice has been received of the death of the following:—

On the 2nd April, 1873, Mr. William Clark Miller, Chemist and Druggist, of Stirling Road, Glasgow.

On the 10th of June, 1873, Mr. David Aymer, Chemist and Druggist, of Tutbury, Staffordshire.

We are requested to state that the death of Mr. Gibson, of Hull, took place on the 9th June, instead of 9th May, as stated on p. 1008.

Notes and Queries.

[342].—SPICED CONDIMENT FOR CATTLE.—Can any correspondent favour me with a formula for spiced condiment for cattle?—R. R.

[343].—PRESERVED VEGETABLES.—*C. Marshall* wishes for information respecting the different processes and ingredients used for keeping the bright colour in pickles, fruit, jams, and jellies, and also in vegetables, when preserved in hermetically-sealed cans.

[344].—CALICO WATERPROOFING.—"*Wales*" would be obliged for a good recipe for rendering calico waterproof without staining and at little cost.

ALKALIES IN BURNS.—In a letter to the *Medical Times and Gazette* (May 17th), Dr. Dalzell states that in looking over the papers of a deceased friend (an analytical chemist) he has found a memorandum to the effect that liquor potassæ applied to a burned or scalded skin never fails to remove pain in a few minutes. The lotion is to be applied with a feather, and the injured part left uncovered. The *rationale* of the cure is stated to be as follows:—"Scalds, burns, and bruises occasion decomposition of the blood of the injured part. In all animal decomposition (especially in that of blood and coagulable lymph) nitrogen is given off, and combines with the oxygen, forming, perhaps, hyponitrous acid, which occasions much of the pain felt. If an alkali such as liquor potassæ be applied, it aids the formation of nitric acid and combines with it. Nitrate of potash (a cooling salt) is thus formed, which aids in abstracting the heat, and by this and the antiseptic constringing action of the alkali on the animal textures, the decomposition is speedily arrested, and nature is left at liberty to repair the injury." When a large surface is denuded of cuticle, or a very capillary part is injured, Dr. Dalzell considers it necessary to dilute the alkali, or apply it in the form of a soap, by mixing about two parts of liquor potassæ with two parts of olive oil. In some cases he has been obliged to dilute it still further.

HYDROCHLORATE OF TRIMETHYLAMINE.—The following formulæ for the administration of hydrochlorate of trimethylamine are given in *L'Union Pharmaceutique* (vol. xiv. p. 129). It is stated that as much as one gram of the hydrochlorate may be given daily, so that the doses appended to each formula may be varied by the medical man according to the case he has to treat:—

Mixture.

Hydrochlorate of Trimethylamine .	0·50 grams.
Eau de Tilleul*	100·00 „
Syrup of Bitter Orange Peel . . .	30·00 „

Dose, a tablespoonful daily. Each spoonful will contain 75 milligrams of the hydrochlorate.

Solution.

Hydrochlorate of Trimethylamine .	5 grams.
Distilled Water	195 „

Dose, a tablespoonful in a litre of decoction of couch-grass daily. Each spoonful will contain 50 centigrams of the salt.

Syrup.

Hydrochlorate of Trimethylamine .	20 grams.
Syrup of Bitter Orange Peel . . .	990 „

Dose, a tablespoonful in a litre of decoction daily. Each spoonful will contain 50 centigrams of the salt.

Pills.

Hydrochlorate of Trimethylamine .	2·50 grams.
Guimauve Powder (root of *Althæa officinalis*)	7·00 „
Honey	*q. s.*

Divide into one hundred pills, and as the salt is very hygroscopic, coat with balsam of tolu. Each pill, weighing 10 centigrams, will contain 25 milligrams of the hydrochlorate. Dose, two pills every two hours.

Appointments.

GERRARD, A. W., Pharmaceutical Chemist, late of Guy's Hospital, has been appointed Dispenser and Teacher of Pharmacy at University College Hospital.

WHARTON, W., late of St. Bartholomew's Hospital, has been appointed Surgical Dispenser to Guy's Hospital.

* *Eau de Tilleul* (Codex).—Prepared by distilling 1000 grams of dried lime (*Tilia europæa*) flowers with a sufficiency of water until 4000 grams of product are obtained.

Correspondence.

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

British Pharmaceutical Conference.—Meeting of 1874.

Sir,—I write to express a hope that no action will be taken on the resolution of the Executive Committee of the Conference respecting the place of meeting for 1874, until the subject has been more fully considered.

It follows from the language of that resolution that the whole of Ireland should be closed against the meetings of the *British* Pharmaceutical Conference, which is a serious conclusion to arrive at in committee, if, indeed, it is not a breach of geographical propriety.

I have no wish to argue the point upon the scanty information now before us, and will only say that for all that we yet know, the reasons for departing from a good precedent appear exceedingly unsubstantial.

Richard W. Giles.

Clifton, June 16th, 1873.

Pharmaceutical Education.

Sir,—I have observed with considerable interest the appointment by the Council of a Committee to inquire into the condition and necessity of continuing the School of Pharmacy in Bloomsbury Square. As an old student of the school permit me to say that, for a man who has thoroughly qualified himself in shop routine and dispensing, the attendance at the lectures delivered by our learned professors (and I speak from experience) is the most complete finish a pharmaceutist can possibly desire. That the fees should be raised I am perfectly sure, for I have it on the testimony of several students who have attended the courses of lectures during the last few years, that the classes (very unlike the old ones) are very noisy, and men who go there to study are often so interrupted that on two occasions students have complained to me that if matters got much worse it would be scarcely worth their while to attend at all. Now higher lecture fees and an absolute power vested in those excellent lecturers to cancel the permission to attend of any student misconducting himself in any way would, I believe, give the classes greater popularity than they now possess.

The word "cram" has been used pretty freely lately, evidently with a very different meaning. To teach chemistry and botany by a system of cram may deprive students of the very many advantages arising from regular attendance and attention to the professors' lectures. But what I object to is, that the examiners in practical dispensing and pharmacy cannot tell a well-taught and experienced dispenser from a man who has scarcely ever prepared medicine in his life, but who has gained the cue necessary to meet the questions of the examiners, by making a few emulsions, etc., whose destiny is the sink, and pills divided and silvered, only to decorate the dust-heap. I know that fifteen years ago students dreaded the dispensing counter of the examination room more than any other, and I believe that twenty years ago practical dispensing was not enforced at all. How is it now?

For the diploma of the Society to possess any "money value" at all, it must ensure that the man who holds it is competent to be left in full charge of a dispensing establishment, without *risk* or *inconvenience*. It is in this practical point that cram is so utterly reprehensible. For when is a man asked in his business the Natural Order of a medicinal plant? or whether medicines are cells or contents of cells? or the composition of a chemical? *True, he ought to know them all;* but to do so a student of ten years' standing (for we must always be students) would have to turn to a recent class-book or his recent knowledge to answer correctly and according to the last turn of the scientific votaries' kaleidoscope. Carbonate of ammonia or ammonium may contain carbamate too. But a man who puts one dram of that salt into a three-ounce bottle with one dram and a half of citric acid, and deliberately fills it with water, when in a hurry for the medicine, exhibits a want of training and experience more to be deplored than the profoundest knowledge of chemical memory can make amends. And during the last six years in a shop in a large provincial town, where several assistants were buzzing behind the counter, I have had to beg for and obtained a mortar, and have mixed the medicine myself on the customers' side of the counter. A medical man not long ago asked me what was the best thing to make three grains of reduced iron and two grains of powdered rhubarb into a moderately-sized pill, for he assured me he had it made of all sizes, in London too. I have heard it solemnly stated, even at Bloomsbury Square, that glycerine and fats will mix on no conditions whatever. These are of the genus of facts that damn chemists in the eyes of medical men, and furnish the mould on which flourish the moss that grows on dead men's skulls, who in life were distinguished by a thorough knowledge of their business, and above all, by a high moral rectitude; and the Pharmaceutical Society will fail in its function if, by its influence and teaching, it does not extend among its members that confidence so well deserved, but centred in comparatively few, by physicians, medical men, and the public.

George Mee.

79, *Grosvenor Road, Highbury New Park, June 13th*, 1873.

"Hospital Sunday."

Sir,—The 15th of June, 1873, has come and gone. "Hospital Sunday" has been weighed in the balance and, happily, has not been found wanting. The great experiment of appealing to the pocket from the pulpit for aid in ministering to the suffering and the sick, who, at the same time, in the hard battle of life, take their rank with the needy and the poor (in addition to other means to the same end, though on widely different grounds), has been attended with a most encouraging success. The idea, transferred from the provinces, has been readily adopted by the great metropolis, and "Hospital Sunday" will now become a permanent institution amongst us. For replenishing, in great part, the funds of our large hospitals and infirmaries, "annual festivals" are held in which the stomach is appealed to, and after-dinner speeches are made which rarely fail to elicit a most praiseworthy and successful endeavour to supply the "urgently needed" assistance. But in the scheme of "Hospital Sunday" not a single stomach is involved or asked to take a part. Should that capricious member rebel on the morrow, the festival, so to speak, of the preceding day will be entirely innocent of the cause. Upon far higher grounds than this did the religious community of London on Sunday last pour their treasures of silver and gold into the official plate as politely handed from pew to pew. The one sentiment sought to be inculcated throughout—putting aside for the moment all points of doctrine which unhappily divide and split up the various phases of faith, until the truth ever lies "deeper and deeper still"—was involved in the aphorism or text, "Inasmuch as ye have done it unto one of the least of these my brethren, ye have done it unto me." The heart and the affections formed the channel through and by which the lesson was to be learnt and the grand effort made. "By all your hopes of happiness hereafter," said, in effect, one eloquent preacher—"by all that you hold dear in your moral and religious life—by the example and the acts of the Saviour himself—by the sympathy and Christian love you owe one to another, I call upon you this day to do your duty." How nobly the response came to this and similar appeals is now well known.

But the question has a scientific not less than a religious aspect. There are many ways of healing the sick, and some of them very curious, not to say novel or remarkable. Theories are plentiful but results are few. It was not long since that an enthusiastic *savant*, presumably of a materialistic turn of mind, proposed to test the efficacy of *prayer* by isolating a hospital ward for the purpose, and then subjecting the results to a careful analysis. If this is to be the direction of our scientific and medical studies, surely other institutions than hospitals, equally significant, will flourish amongst us. Far better acknowledge our utter inability to comprehend the phenomena of health and disease, and commend, in all humility and with suitable aspirations, our sick and suffering poor to the great Parent of Good. Accompanying this with as large an amount of material aid as we can afford, and thus encouraging the application of such scientific and truly valuable knowledge as the study of medicine may impart, we shall be reducing to practice one of the noblest duties we can be called upon to perform. This is not the moment to criticize the working of our many hospitals and infirmaries, but certain it is that (like all matters wherein human agency is concerned) they are not an unmixed good. We scarcely know the harm they do with their sharp-bladed and highly polished instruments, their youthful tyros, and their hundreds of gallons of nauseous physic. "Two tablespoonfuls three times a day" by the pint and the quart is still the *sine quâ non* of the hospital consulting-room and the hospital ward. There is an old saying, too, which perhaps may be commended to many of these institutions, namely, "Waste not, want not." Again, are not hospitals antagonistic to the pecuniary interests of prescribers and dispensers of medicine who are unconnected with them, and who require, in the ordinary course of things, to be remunerated for their talent and their labour? All this and much more may reasonably be set down on the "off" side. Nevertheless, making these and all necessary deductions, if need be, a large balance for good resides in the fact that the best efforts of our ablest men are directed to bringing back the sufferer stricken down by a cruel fate into the arena of life, able therein to battle successfully with the stern realities around him. Here, then, is a great truth which, if we are not reached by the *preacher's* appeal, ought, without doubt, to command our sympathy and secure our material support. That the chemists of London, notwithstanding the apparent rivalry of hospitals, have helped liberally and cheerfully in this good work, there cannot be a question; and whilst the hospital ward with its trained supervision is an institution in our midst, ever ready to do battle with sickness and disease, we say unhesitatingly let the duty remain alike to all, for even so shall the good cause progress, and a sympathetic voice be heard far and near, wishing God-speed to "Hospital Sunday."

"How far that little candle throws its beams!
So shines a good deed in a naughty world."

June 17*th*, 1873. W. W.

A Potential Charm in Drugs.

Sir,—From the letter of "G. W." it appears the age of superstition is not past.

During my apprenticeship, in the West Riding of Yorkshire, now more than forty years ago, I acted for some time as amanuensis to a local astrologer, or "wise man," as he was called, and who was celebrated for removing "spells" from cattle and evil wishes from human beings; he was also much consulted in love affairs. Many of his customers were of a respectable class.

"For removing the spell from cattle, take sulphur 2 oz., nitre 1 oz., aqua fortis 1 oz., spirit of salts 1 oz., devil's dung ¼ oz., cold spring water 1 quart; put all into an iron pan over hot ashes for half an hour; dig a hole in the ground two feet deep, pour in the contents of the pan and fill up the hole." If the case was a very bad one, a sheep's heart was also to be buried.

For taking off an evil wish, use the same articles, adding 1 oz. of powdered hell coke (pumice stone) and ½ oz. dragon's blood, also (wrapped in paper) 9 new pins, 9 new needles, and 9 thorn pricks; read a chapter in the Bible and repeat the Lord's Prayer; the whole to be completed between eleven and twelve o'clock at night. First thing the following morning a powder was to be taken, and repeated in nine days if the person was not cured. The powder consisted of jalap ½ dram, calomel 5 grains. If the incantation sometimes failed to operate, the powder never did! My master used to caution the "doctor" that the powder was much too strong for females, but his reply was that the d—l took as much driving out of a woman as a man.

Love charms, for bringing back faithless swains, were packets containing a small square of parchment marked with cabalistic figures, worn next the heart for one moon, and repeated for three moons, if necessary. These amulets were said to be very successful, but whether from the potency of the "charm" or that "the quarrels of lovers lead to the renewing of love" I leave your readers to decide.

Jas. Baynes.

Hull, June 17*th*, 1873.

G. H. Jones.—To be frightened by the external appearance of a book is but a poor preparation for the study of its contents. If not able or willing to work systematically and thoroughly at the book in question, the index at the end would point out the portions of the work treating of the subjects mentioned in the syllabus of the examination.

W. L.—Apply to the Secretary at the College of Surgeons.

H. Campbell.—We answer your present question in the hope that after a few lessons on numeration you will be able to decide similarly difficult questions yourself. If A, B, and C, and no other, preceded D in a list, D would be the fourth on such list.

C. X.—A candidate who obtains a certain percentage of the marks allotted to the questions would be passed.

W. R. F.—It would not be practicable to do what you speak of, but an emulsion may be prepared by suspending the oils in a strong solution of soap.

R. Sturton.—Microscopically, dextrin can be detected in sugar by moistening a portion of it with ordinary spirits of wine, and then looking for the starch granules under the field of the microscope. Chemically, its presence can be discovered by taking 100 grains of the powdered sugar, dissolving it in the smallest quantity possible of lukewarm water, then adding to the sugar solution one ounce of concentrated hydrochloric acid, and afterwards 8 oz. of methylated spirit. If dextrin be present there will be a flocculent precipitate almost at once; if absent, the solution will remain clear. To prove the presence of the dextrin the precipitate can be washed with methylated spirit till free from sugar, then redissolved in water and again precipitated, washed, and boiled with a few drops of sulphuric acid to convert the dextrin into sugar, and then tested for sugar with the ordinary copper test. Alcohol is better than methylated spirits, but it is more expensive. The reason why alcohol must be used for the microscope is, that in commercial dextrin the starch cells remain intact. These cells are immediately soluble in water, but insoluble in alcohol. The starch granules can easily be distinguished from the bold sugar crystals, as the former are nearly all round or oval, with the exception of rice, maize, and oats.

R. E. S.—Marking Ink.—We cannot give a reason for the brown colour. Perhaps a better result would be obtained with the following:—

Nitrate of Silver,	
Bitartrate of Potash, ana	℥j
Solution of Ammonia	℥iv
Archil	℥ss
White Sugar	ʒvj
Powdered Gum Arabic	ʒx

Rub the nitrate of silver and bitartrate of potash together, then add the ammonia, the archil, and the other ingredients. Linen marked with this ink will require to have a hot iron passed over it, or the part marked must be held to the fire until the marks have assumed a jet-black colour.

"*Corolla.*"—M. C. Cooke's 'Manual of Botanic Terms,' published by Hardwick.

"*Lavender.*"—It would not be possible to hold the colouring-matter of the Sp. Lavand. Co. in solution in water without making the mixture alkaline, in which case the quinine would be precipitated.

"*An Apprentice of the Society.*"—Details of the preparation of artificial alizarine from anthracene may be found in the *Journal of the Chemical Society* and in the specifications of the patents for the various processes relating to the subject.

D. Amos.—From what you state about "water on the brain" it is probable that the disease referred to is what is commonly called "gid" or "sturdy," and is due to the presence of *hyatids* on the brain, the result of sheep or cattle swallowing the ova from the tapeworms passed by dogs and deposited on the grass. See an article on the subject in the 'Edinburgh Veterinary Review,' vol. i. p. 301.

"*Indignans.*"—Inquiries are being made respecting the subject of your letter.

Army Hospital Corps.—We are indebted to an anonymous correspondent for a copy of the regulations respecting enlistment in the above corps.

Communications, Letters, etc., have been received from Messrs. Fannin, Pocklington, Garside, Duguid, P. Kelly, Lomas, Marshall, Macdonald, "Lamium," "Botanist."

MATERIA MEDICA OF THE UNITED STATES' PHARMACOPŒIA.

BY E. M. HOLMES,

Curator of the Museum of the Pharmaceutical Society.

(*Continued from page* 1011.)

Nomenclature.—A list of the alterations in the names of chemical compounds has been given on a former page. There is, however, one change in the signification of a name which may be noticed here. Alum has hitherto been understood to mean sulphate of aluminium and potassium, and the corresponding salt of aluminium and ammonium has been known as ammonia alum. This is now reversed in the U. S. Pharmacopœia. When alum is ordered in a prescription, the dispenser is required to use ammonia alum, and to dispense potash alum only when prescribed under the name of aluminii et potassii sulphas. This change probably arises from the fact that a large proportion of the alum now met with in commerce consists of ammonia alum. Fortunately the medical properties of the two are sufficiently alike to render the change of little moment.

The term "folium" as applied to *Aconitum*, *Belladonna*, *Hyoscyamus*, and *Strammonium*, has been changed to folia. The word semen however is not altered in those cases in which it occurs, viz., *Colchicum*, *Hyoscyamus*, and *Strammonium*. This want of uniformity is very arbitrary—the one has certainly as much claim to be placed in the plural number as the other. In some cases, the specific names have been altered in consequence of the introduction of others bearing the same generic name; thus *Asclepias* has now become *A. tuberosa*, in consequence of the introduction of two new species of *Asclepias* unto the secondary list. *Conium* is now altered to *Conii folia*, a change which has been made necessary by the addition of *Conii fructus* to the primary list. *Extractum cannabis* is now called *Ext. Cannabis indicæ*, an extract of *Cannabis americana* having been introduced into the preparations. It is unfortunate that this rule of distinguishing between two articles of the same generic name has not been followed in every case. A contrary procedure has taken place with regard to the following, the descriptive terms being omitted:—

1864.	1873.
Ulmus fulva	Ulmus.
Sesami folium, Benne leaf	Sesamum, Benne.
Sassafras radicis cortex	Sassafras.
Blackberry root	Blackberry.
Black oak bark	Black oak.
White oak bark	White oak.
Wild cherry bark	Wild cherry.

The compilers of the Pharmacopœia have carried this pruning process to a considerable extent; thus it will be observed that abbreviations have been made wherever possible, with the result, in several cases, of rendering the meaning somewhat doubtful. This may be complimentary to the common sense of the American people, but it makes no allowance for the fact that American prescriptions are sometimes prepared in other countries, where the abbreviated descriptions might possibly be misconstrued, and that therefore the terms used should be as explicit as possible. Thus *Prunum* is described as the fruit, and therefore either fresh or dried fruit might be used, although it is evident from the preparations that dried fruit is intended, and *Piper*, *Cubeba*, and *Pimenta* are described as unripe fruits, although no one would think that the green fruits were intended to be used.

But sassafras in this country would mean the whole of the root and not the root-bark; and *Ulmus* would mean *Ulmus campestris*, which is not nearly so mucilaginous as *U. fulva*. If syrup of blackberry were asked for by an American resident in a provincial town in England, the probability is that syrup of blackberry fruit would be unhesitatingly supplied, that being a favourite domestic medicine for aphthæ, etc., but it does not possess the tonic and astringent properties of the American preparation. These useless abbreviations have been carried to their utmost extent in the case of *Coptis*, the only description appended to which, if description it can be called, is *Coptis trifolia*. The root of this plant was officinal in the last edition, but whether the same part of the plant or the whole herb is to be used now is not at all clear.

The instances above given are perhaps not of any great importance, but the principle of curtailed description is a bad one. This is more especially evident when the same name is common to two or more plants, as in *Castanea*; or when different parts of the same plants are officinal in other pharmacopœias. If a description is necessary it is well that it should be accurate and lucid. While it cannot be expected that a pharmacopœia should take the place of a work on materia medica, and give a full description of the history and properties of each drug, it is only reasonable to expect that the same facilities should be afforded for attaining excellence of quality and freedom from adulteration in the organic as in the inorganic part of the materia medica. A short but practically useful description of what the roots, leaves, and barks should be, and of the means by which their quality and freedom from adulteration or admixture could be readily estimated, is in some measure necessary to ensure uniformity in dispensing.

The following names have been altered thus:—

1864.	1873.
Cranesbill	Geranium.
Fleabane	Erigeron.
Canada Fleabane	Canada Erigeron.
Hemlock	Conium leaves.
Henbane seed	Hyoscyamus seed.

This is a slight improvement in accuracy. The name of fleabane is applied to several different plants. Hemlock is a name applied also to the hemlock spruce. There is not, however, that I am aware of, any similar reason for changing the well-known name of henbane seed to hyoscyamus seed. The change of cranesbill to geranium can scarcely be called an improvement, for the one name is not more distinctive than the other; one of the other names in common use, such as spotted geranium, would have been better. A few names have been altered in deference to the progress of science, thus:—

1864.	1873.
Cytisus scoparius.	Sarothamnus scoparius.
Artemisia contra	Artemisia Cina
Cocculus palmatus, *DC.*	Jateorrhiza palmata, *Miers.*
Cinchona, an undetermined species	Cinchona succirubra

It may here be noticed that calumba root is attributed to two species, *Jateorrhiza palmata*, Miers, which is the same as *Cocculus palmatus*, De Candolle, and *Jateorrhiza calumba, Miers,* which is the *Cocculus palmatus* of Wallich, but not of De Candolle. In the British Pharmacopœia the two species mentioned are, *Jateorrhiza calumba,* Miers, and *J. Miersii,* Oliv. Jateorrhiza Miersii is the name given by Oliver to *J. palmata,* Miers. The difference arises from the B. P. names having been taken from Oliver's work, while those of the U. S. P. were taken from that of Miers.

Changes in Description.

1864.		1873.
Acacia,	concrete juice	Gummy exudation.
Tragacanth	,, ,,	,, ,,
Ammoniacum	,, ,,	Gum resinous exudation.
Myrrha	,, ,,	,, ,, ,,
Galbanum	,, ,,	Gum resin.
Gambogia	,, ,,	,, ,,
Benzoinum	,, ,,	Solid balsam.
Scammonium	,, ,,	Resinous exudation.
Mastiche	,, ,,	Concrete resinous exudation.
Pix Burgundica,	prepared concrete juice	Prepared ,, ,,
Pix Canadensis	,, ,,	,, ,, ,,
Copaiba	juice	Oleoresin.
Terebinthina Canadensis	,,	Liquid oleoresin.
Terebinthina	,,	Concrete oleoresin.
Balsamum Tolutanum	,,	Semi-liquid balsam.
Balsamum Peruvianum,	prepared juice	Empyreumatic liquid balsam.
Styrax	,, ,,	Balsam.
Cassia Marilandica,	leaves	Leaflets.
Ergota,	diseased seed	The *sclerotium* of *Claviceps purpurea,* replacing the grain of *Secale cereale.*
Vanilla,	prepared unripe capsule	Prepared unripe fruit.
Ol. Lini,	oil	Fixed oil.
Ol. Ricini	,,	,,
Ol. Tiglii	,,	,,

The new descriptions are much more accurate than those which they replace. For instance, the term exudation does not represent the juice of a plant, but only a part of its constituents. A little more uniformity, however, would be an improvement; thus myrrh and ammoniacum are termed gum resins, while galbanum and gamboge are called gum resinous exudations. If the word exudation is necessary, there is no reason why it should not be applied equally to myrrh and ammoniacum. The same want of uniformity is shown in the B. P. with regard to these articles; mastic is called a concrete resinous exudation, but scammony, which is certainly a concrete substance, is incorrectly described simply as a resinous exudation. Scammony is, however, strictly speaking, a gum resin, since it contains about 6 per cent of gum, and is very properly so described in the B. P. Canada balsam is termed a liquid oleoresin, but copaiba simply an oleoresin, although the latter is generally much more liquid than the former. Balsam of tolu is described as a semi-liquid balsam, while styrax which has an equal claim to the title is simply called a balsam.

A few other descriptions will also require attention when a new edition is again issued. *Jalapa,* described in the last U. S. Pharmacopœia as a root, is now called a *tuber.* This is not correct; jalap is a *tubercule,* and is rightly described as such in the B. P. The term tuber should be restricted to an underground *stem* enlarged by a deposit of starchy or other matter for the nutrition of the plant, and the term tubercule applied only to *roots* which are enlarged in a similar way. The peculiar substances alluded to by Mr. Martindale, including alcohol amylicum, camphora, castoreum, cera flava, cetaceum, fermentum, guaiaci resina and moschus, have no better claim to be considered peculiar than a number of other articles of the materia medica, and there can be no reason why they should not be as well defined as they are in the B. P.

Oleum amygdalæ dulcis is now altered to *oleum amygdalæ expressum,* and is described as the fixed oil obtained from the kernel of the fruit of *A. communis.* This is an improvement on the last edition, in which it was said to be derived from *A. communis,* var. *dulcis,* the fact being, that it is chiefly obtained from the var. *amara,* which is pressed for this purpose before distilling the essential oil, on account of the comparative cheapness of the bitter almond. *Fœniculum* is now directed to be obtained from the *F. dulce,* instead of *F. vulgare* as in the last edition. The former is considerably more aromatic and pleasant to the taste than the latter. There are two varieties met with in commerce, one short and somewhat pointed, and the other longer, more obtuse at the ends, and rather thicker at one end than the other. The long variety is the best, but of this fact no notice is taken here.

Rheum.—Rhubarb is now, by the description of its geographical source, limited to the Asiatic varieties and thus the use of inferior kinds is excluded. At the time that the U. S. P. was published the true source of *Rheum* was not known and therefore it is still attributed to *R. palmatum* and other species.*

Filix mas is now more correctly described as the rhizome covered with portions of the stipes, and the following directions are now added. "When used only such part of the rhizome as has retained its green colour should be employed, and the stipes being inert should be removed." These directions would have been more intelligible if the fresh rhizome freed from the stipes had been directed to be used; if the stipes be inert, there can be no reason why it should be official.

Opium is now described as being obtained by incision and spontaneous evaporation. This is an exception to the general rule, being a longer description than that given in the last edition. Opium is also now directed to be dried before analysis. This is an improvement, for it is impossible to give a fair estimate of the percentage of morphia unless this be done. According to the P. B. six to eight grains of morphia should be yielded by 100 grains of opium, but as good opium yields from 10 to 13 per cent. the percentage mentioned in the U. S. P. (10 per cent.) is not at all too high.

In the secondary list the following alterations have been made in the descriptions given :—

1864.		1873.
Carthamus	flowers	Florets.
Geum	root.	Rhizome.
Heuchera	,,	,,
Phytolaccæ	bacca, berries	Fruit.
Rottlera,	powder and hairs	Glandular powder and hairs.
Tormentilla	root	Rhizome.

It seems rather inconsistent to change the word berries into fruit and not to change the Latin *bacca* into *fructus.*

The following changes have taken place with regard to the parts of plants that are official :—

* See *ante,* p. 301.

1864.		1873.
Lobelia.	herb	Leaves and tops.
Mentha piperita,	,,	,, ,,
,, viridis	,,	,, ,,
Marrubium	,,	,, ,,
Monarda	,,	,, ,,
Cataria	leaves	,, ,,
Dulcamara	stalks	Young branches.

The above changes make very little practical difference, but the following may be classed among the improvements in the present Pharmacopœia, as the parts now ordered contain the greater part of the active principles of the plants.

1864.		1873.
Guaiaci lignum,	wood	Heartwood.
Papaver,	ripe capsules	Nearly ripe capsules.
Quercus alba,	bark	Inner bark.
,, tinctoria	,,	,,
Rosmarinus,	tops	Leaves.
Rubus,	root	Root bark.

In the secondary list a few alterations have also taken place:—

1864.		1873.
Achillea, herb and flowers		Leaves and flowering tops.
Melissa,	herb	Leaves and tops.
Solidago,	leaves	,, ,,
Tanacetum	,,	,, ,,
Viola (pedata)	,,	Root.

THE USE OF NUT OIL IN PHARMACY,

AND ESPECIALLY IN

THE PREPARATION OF UNGUENTUM HYDRARGYRI NITRATIS.*

BY M. FALIERES.

In a brief review of former formulæ for the preparation of citrine ointment, the author calls attention to the large increase which has taken place in the relative proportion of the nitric acid to the mercury. The proportions indicated by Baumé, in 1785, were nitric acid 128 parts, mercury 96 parts, lard 1000 parts. The mercury has been gradually decreased until, in the Codex for 1866, where equal parts (500) of olive oil and lard are ordered, the nitric acid is 100 parts, and the mercury 50. Thus the proportions which originally were 4 of nitric acid (sp. gr. 1·28) and mercury 3, have become nitric acid (sp. gr. 1·42) 2, and mercury 1.† Without blaming the progressive diminution of the metal, since even with this reduction the medicament still remains very powerful, the author objects to the great excess of acid. Suggestions have been made to remove the excess of acid by washing the ointment with a large quantity of water, and then adding an equal weight of almond oil, but have been rejected in consequence of the length and difficulty of the operation, and it being far from certain that the whole of the acid excess would be thus removed.

The author having had occasion to make a comparative investigation of pure olive oil and the oil of the ground nut (*Arachis hypogœa*), found that the arachis oil possesses a great aptitude for the nitric solidification. Hence he conceived the idea of suppressing entirely the lard in the preparation of nitrate of mercury ointment. The product so obtained appeared to present such marked advantages as to induce him to make known the process.

Mercury	5 parts.
Nitric Acid (sp. gr. 1·42) ...	10 ,,
Nut Oil	100 ,,

Dissolve without heat the mercury in the acid; pour the mercurial solution into the oil, agitating from time to time with a glass or earthenware spatula. After two or three hours, according to the quantity operated upon, and at a temperature of about 20° C, the mixture begins to take a milky consistence, which lasts for about an hour, then thickens to that of a soft butter. This latter stage lasts at least two hours, during any portion of which time the ointment may be poured out. The mass spreads with perfect regularity in a paper mould; the thickness of the layer is uniform, and there is no separation between the oily and mercurial elements, showing that the combination is complete. The product does not set so rapidly as the official one; at the end of ten or twelve hours it is easily divided by a wooden knife, but this is more conveniently done after it has stood for twenty-four hours; its consistence is then similar to that of cacao butter in the summer. Two or three days afterwards it appears to attain its maximum of firmness, and some has been kept upwards of two months without showing any appreciable difference in its consistence. Compared with the Codex preparation, the author considers that the ointment made with nut oil has greater cohesion, is not friable, and appears much better adapted for friction, as it melts and spreads upon the skin with greater facility.

M. Falières is of opinion that no serious exception could be taken to the change of fat excipient which he proposes. The progress attained in the manufacture of arachis oil has provided a white, bland, tasteless article, which is, commercially speaking, neutral. Perfumers, who are not, like pharmacists, bound by a formal code, make large use of the ground nut oil in the manufacture of pomades, cold cream, etc. A perfect type of a non-drying oil, it absorbs relatively small quantities of perfume; it requires the least wax, spermaceti, or stearine for its solidification, and finally may be kept almost indefinitely without turning rancid. The author promises at some future time to show in detail the advantages that may be obtained from the use of nut oil in a large number of pharmaceutical preparations.

* 'Bull. des Travaux de la Société de Pharmacie de Bordeaux,' vol. xiii. 165.

† In the B. P., where more olive oil is used, the proportions are nitric acid 3, mercury 1.

CHRONIC POISONING BY CHLORAL HYDRATE.

BY DR. LUDWIG KIRN.

In an article in the *Allgemeine Zeitschrift für Psychiatrie*, to an abstract of which, appearing in *The Practitioner* for the present month, we are indebted for the following notes, the author calls attention to the changes which the long-continued use of chloral hydrate sometimes produces in the organism. Experience has shown that the individual tolerance of patients for this drug varies within very wide limits, and he states that although at one time he administered it for the most part daily as a hypnotic, in doses of 30 to 60 grains, or occasionally 75 to 90 grains, he would now rarely go beyond the dose of 30 grains. Its calming and hypnotic influence have proved to be exceedingly variable. Whilst upon many patients the commencing dose of 30 grains continues for a long time to produce the desired effect, and for others only a gradual increase of this quantity is required, there are cases in which but slight results are obtained, although the dose be increased to 60 grains. In many patients, same dose sometimes succeeds and sometimes fails.

But the article deals more particularly with the morbid phenomena which appear sooner or later in the course of continuous employment of this hypnotic. The most prominent of these symptoms are connected with the skin, and consist of more or less extensive erythemata and pustular or papular exanthemata. Schüle speaks of chloral producing a tendency to fluxionary hyperæmias and increased heart action, early manifested in the head by an intense erythema, occurring first in spots, but afterwards more diffusely, and which in more pronounced cases extends downwards to the trunk. This chloral-rash remains latent until set going by some stimulus to the vascular system, but then appears with an intensity proportionate to the extent of chloralization. This opinion is confirmed by the author, who states that he is acquainted with a series of patients in whom the chloral rash can be produced with the certainty of an experiment. For instance, in a paralysed patient, who took 30 grains of chloral every night, ten minutes after she had drunk her beer there occurred increased action of the heart and spots of roseola upon the forehead, nose, cheeks, and neck, which quickly coalesced into a patchy erythema, with swelling and heat of the affected parts, which symptoms disappeared in about an hour. The same symptoms appeared still more strongly in a young and previously healthy woman affected with mania, who every night took 30 to 45 grains of chloral (although she had not previously suffered from congestion of the face). As soon as she took a glass of beer there was strong pulsation of the arteries, and the whole face was swollen and of such an alarmingly deep colour that the use of wine and beer was forbidden. At present the author but rarely allows alcoholic drinks to patients who are being treated with chloral. In another young woman suffering from mania, who took 30 grains of chloral at night, four ounces of wine were sufficient to induce the chloral-rash.

The effect is not always limited to congestion and erythema of the skin, but other skin affections are occasionally produced. Female patients, who had taken 60 grains of chloral daily, first had erythema of the face, and later a papular rash on the arms, with red bases. In some nettle-rash occurred.

The swelling, accompanied or not by rash, which has been noticed in the face after continued use of chloral, may equally occur on extensive portions of the body. In several patients a swollen condition of almost the whole body was noticed, which might be ascribed to serous infiltration of the skin from stasis of blood. With these affections of the skin must be associated affections of the mucous membranes.

Reimer observed in a series of patients, especially after the use of morphia and chloral together, that after slight external pressure there was congestion in circumscribed spots with much lowered sensibility, which quickly disappeared if the pressure was soon removed. Under less favourable circumstances, the red spots swelled and assumed a darker colour; vesicles were soon developed which might even run on to sloughing.

An important symptom noted in a series of cases of the long-continued use of chloral is an interference with respiration, which may remain slight and scarcely troublesome to the patient, or may become positive dyspnœa. Schüle observed a patient who, after long use of chloral, used regularly to suffer after meals from a sense of oppression which made going up stairs extremely difficult, and even interfered with speech, although there was no chest disease to account for this. The symptoms persistently recurred in spite of all treatment till the chloral was left off, when the oppression entirely disappeared. A lady, prostrated by long sufferings, suffered from attacks of extreme dyspnœa, which had increased to asphyxia; at the same time the face was swollen, the facial muscles paralysed, and there were also all the signs of cerebral effusion. Every remedy had failed, and the patient seemed on the brink of the grave. The physician therefore recommended the discontinuance of a daily dose of 45 grains of chloral which had been given as a hypnotic; whereupon all these highly alarming symptoms vanished in an almost magical way, the cerebral disturbance ceased, and the respiration quickly resumed its normal type.

In another group of cases both the quality of the symptoms and their greater or less extension in the organism indicate a distinct change in the composition of the blood. Dr. Crichton Browne reports that a woman, aged 69, suffering from periodical mania, had 20 grains of chloral thrice daily. On the fourth day a redness was developed on the skin of the chest and shoulders, which did not vanish on pressure. On the sixth day the eruption had extended over the whole trunk and limbs, livid spots and deep red patches alternating; the lips and the mucous membrane of the mouth were excoriated, the gums spongy, the tongue blistered and ulcerated, the breath fœtid. The general state was one of great depression,—pulse 120. On the eleventh day the ulceration of the mouth had extended further; the lips were covered with crusts; the petechial eruption was diminished on the chest and abdomen—the spots were yellowish with patches of white skin between them; the spots on the arm lost their redness later. On the fifteenth day there was a sort of general desquamation; fissures of the skin over the sacrum, and in the neighbourhood of the joints. From that time convalescence proceeded, and ordinary health was restored.

A woman, aged 46, suffering from cardiac disease, hemiplegia, and dementia, took 15 grains of chloral three times a day with a calming effect. On the nineteenth day of the treatment numerous purple-red spots appeared in the neighbourhood of the left elbow; on the next day many similar spots were seen on the shoulders and forearms, which coalesced with the others. On the twenty-first day livid spots came on the face; the left arm swelled and became hard; on its reddened surface appeared a multitude of minute points of a much deeper colour, which did not diminish on pressure. Next day there were dark purple spots and discolorations—some small, round, and circumscribed, others broad and irregularly shaped—on the legs and abdomen, and in stripes on either side of the vertebral column. Simultaneously with the petechiæ there were great prostration, tendency to somnolence, weakness and excitability of the pulse, sore lips, thickly-coated tongue. On the twenty-third day the spots and discoloured patches had extended in every direction, and the previously bright red spots had assumed a deep purple colour. Finally, signs of lung-congestion appeared, with gradual failure of power, and death, after several fainting fits, on the twenty-sixth day. At the autopsy numerous ecchymoses of every shape and size were observed more or less on all parts of the skin; the right lung was congested and œdematous, the heart dilated and its valves thickened; over the right central hemisphere there was a large arachnoid cyst containing fluid blood.

Other cases are quoted by the author, and the article closes with a notice of a case which occurred before the effects of chloral hydrate were yet known, and in which the use of the medicine was continued much longer than it would be now the symptoms are recognized. It was that of a young man in whom, on the ninth day of chloral treatment, a rash of groups of red spots appeared which soon became confluent. This was followed by a rise of temperature (on the twenty-third day to 106·7°), œdematous swelling of the face, cheeks, eyelids, and ears, eczema, shedding of the hair, and falling off of the nails of hands and feet. After the sixth week abscesses formed on the shoulders and armpits. The author considers that the symptoms described must be defined as those of chronic blood poisoning. There was, however, no other external cause than the administration of chloral, which for ten weeks had been given in nightly doses of 45 to 60, or even 75 grains. After a certain saturation had been produced by accumulation the symptoms began to spread, and finally they assumed the complete picture of a chronic blood-poisoning.

FRANGULIN AND FRANGULIC ACID.*

BY A. FAUST.

The bark of the *Rhamnus frangula* is digested for three days with 90 per cent. alcohol at 25°–30°; from the extract the alcohol is partially distilled off, and then lead acetate is added to the residue as long as a precipitate falls: the filtrate from this is precipitated by basic lead acetate, and the precipitate disseminated through alcohol and decomposed by sulphuretted hydrogen; the resulting liquid yields crystals of frangulin on cooling after filtration while boiling hot.

Casselmann describes frangulin as crystallizing under the microscope in quadratic tables; the author could not discern these tables either in his own preparation or in a specimen prepared by Casselmann, the two samples melting at 226° and 225° respectively, instead of 249° as stated by Casselmann. It forms a lemon-yellow crystalline mass after recrystallization from hot alcohol, and is soluble in alkalies with a deep cherry-red colour; when boiled with hydrochloric acid it splits up into glucose and *frangulic acid:*

$$C_{20}H_{20}O_{10} = C_{14}H_8O_4 + C_6H_{12}O_6.$$

Hence the author ascribes the formula $C_{20}H_{20}O_{10}$ to frangulin, instead of the sub-polymeric formula $C_6H_6O_3$ attributed to it by Casselmann.

Frangulic acid is most conveniently prepared by boiling the bark with rain-water for an hour, then adding caustic soda equal to one-twentieth or one-thirtieth of the weight of bark taken, and boiling again for several hours; the resulting liquid extract is supersaturated with hydrochloric acid, and boiled for some hours, whereupon the frangulic acid separates and can be collected on a cloth filter; the dried and pulverized precipitate is boiled with alcohol, and the hot alcoholic solution precipitated by lead acetate (which scarcely precipitates frangulic acid); the filtrate is precipitated with basic lead acetate, and the precipitate disseminated through alcohol and decomposed by sulphuretted hydrogen; and the resulting liquid is heated to boiling and filtered hot, the acid then separating from the filtrate on cooling. This treatment with lead salts, etc., is repeated several times; and the purified acid, after being dried and boiled with benzene to separate sulphur, is finally recrystallized several times from hot alcohol. Different samples of bark differ much in the quantity of frangulic acid obtainable from them; in one case, 50 lbs. yielded only a few grams.

Frangulic acid melts at 252°–254°, and sublimes partially at lower temperatures; it is but little soluble in hot water, and is insoluble in cold water and alum-solution; alkalies dissolve it, with a red colour, removed on boiling with zinc-dust; on treating it with red-hot zinc-dust anthracene is produced in small quantities; it crystallizes with $1\frac{1}{2}$ proportions of water, the last $\frac{1}{2}H_2O$ being only removed at 180°.

THE MEANS OF DETECTING AND ESTIMATING BROMIDE IN IODIDE OF POTASSIUM.†

BY ALFRED E. TANNER.

It occurred to me that the above subject would be well worthy attention at the present time, for not only are the processes for detecting and estimating bromide in iodide few and imperfect, but it also seems to me a very probable adulterant, inasmuch as there is a great difference in price between these two salts, and the difficulties attending the detection of bromide when mixed with iodide are considerable.

Cl, Br, and I, so resemble one another in their chemical characters and reactions, that it becomes a difficulty by no means easily surmounted to distinguish them when in the presence of one another, and this is especially the case with the two latter, and as a sample of KI may contain 75 or more per cent. of KBr and yet be indistinguishable from the pure article when tried by the pharmacopœia tests, it needs little further to point out the desirability of investigating this subject; and before I go further, I must confess that I fear I have accomplished little towards doing away with the difficulties. What we require is a test presenting no great difficulties of application by the ordinary pharmacist, and one which shall indicate with a fair degree of accuracy the object sought to be attained. Of course it is well known to chemists that $PdCl_2$, when added to a neutral solution of an iodide containing bromide, will remove the whole of the I without affecting the Br, but $PdCl_2$ is a rare and most expensive reagent to use, and would scarcely pay the pharmacist who examines usually but small parcels of iodide at a time. This, although I believe to be the most accurate, we must consider out of the question. Recent chemical works tell us that a mixture of $FeSO_4$, two parts, and $CuSO_4$, one part, added to a neutral solution of an iodide, in the presence of bromide and chloride, and the mixture neutralized with NH_3, will remove the whole of the I without affecting the Br or Cl. In my hands, at least, the practice of this process has been attended with only partial success, for I have found it impossible to remove *the whole* of the I; the difficulty therefore remains as great as ever; it is probable, however, that further experiments with this test may yet prove it adequate to the purpose. I rather suspect the Cu_2I_2 to be slightly soluble in the solution from which it is precipitated; we must therefore seek some salt to add to the mixture to prevent this. The following is the reaction stated to occur:—

$$2\,KI + 2\,CuSO_4 + 2\,FeSO_4 = Cu_2I_2 + K_2SO_4 + Fe_2 3SO_4$$

A test proposed by Van Melekebeke (*Journ. Pharm. d'Anvers*, xxviii., 49, 1872) seemed to promise well, and from its great simplicity would have been a valuable one if successful. It depended on the fact that a saturated solution of one salt is capable of dissolving appreciable quantities of another salt. A saturated solution of KBr was therefore used, and to this the sample of KI, in powder, was added in small quantities at a time, when, if pure, it dissolved readily, but if KBr were present, the liquid being already saturated with this salt, it would remain undissolved. Repeated trials with this test have proved to me that it is quite useless. The author recommends you to take 10 c.c. of the saturated KBr solution, and to add to this 10 drops of distilled water; 1 gram. of the suspected salt, in powder, is then added, small portions at a time, which, if the iodide be pure, should at once dissolve; but 10 drops of distilled water is quite sufficient to dissolve 5 or more grains of KBr, and if no water be added, some KBr is very liable to be thrown out of solution by the shaking necessary. The next test I tried was one by M. Personne, published in the *Journal de Pharmacie*. It depends on the property possessed by $HgCl_2$ of precipitating a solution of iodide but not one of bromide, bromide of mercury being soluble. It is necessary to the success of this test that the iodide be free from KIO_3, KCl, and K_2Co_3.

I may mention here that KIO_3 is much more frequently present than is generally supposed, and traces of it may generally be detected in the best samples of iodide, and as this salt (KIO_3) is stated on pretty good authority to be of a poisonous nature, it behoves us to be on our guard against it; it is fortunately easy to detect by adding a little starch solution to the iodide to be tested, and then adding a small quantity of tartaric acid; a blue colour is developed more or less rapidly, by the liberated iodide acting on the starch, if the KI contains KIO_3, thus:—

$$5\,KI + KIO_3 + H_2C_4H_4O_6 = K_2C_4H_4O_6 + 5HI + HIO_3$$

and

$$5\,HI + HIO_3 = I_2 + 3H_2O.$$

* *Ann. Chem. Pharm.* clxv. 229; from the *Journal of the Chemical Society.*

† Paper read before the Liverpool Chemists' Association, May 8th, 1873.

1 gram $HgCl_2$ is dissolved to 20 c.c. with distilled water, of this solution 16 c.c. is capable of removing the whole of the I from 1 gram KI. If therefore the KI be mixed with KBr a proportionably less quantity of the mercuric solution will be required.

It is a somewhat curious fact, and one which I have nowhere seen recorded, that when exactly half the mercuric solution is added a permanent precipitate begins to form, and I consider it highly probable that the reaction which takes place is analogous to that which occurs in testing HCN by what is termed Liebig's process, in which a volumetric solution of $AgNO_3$ is added to a weighed quantity of HCN; and when exactly one-half the cyanogen is displaced, and permanent precipitate of AgCN commences to form, a soluble double salt is first formed and shown by the precipitate dissolving as fast as it appears until exactly half the solution has been used; the HCN is first made slightly alkaline with NaHO

$$AgNO_3+2\ NaCN=AgCN, NaCN+NaNO_3$$

and

$$AgCN,\ NaCN+AgNO_3=2\ AgCN+NaNO_3$$

and similarly with KI and $Hg\ Cl_2$

$$HgCl_2+4\ KI=(KI)_2HgI_2+2KCl$$

and

$$(KI)_2Hg_2I_2+HgCl_2=2\ HgI_2+2\ KCl$$

I prefer to make the formation of a permanent precipitate as the finishing point of the process; it is much more sharply defined than the point at which the precipitate ceases to form. Should it be preferred, however, to make use of this latter (and it is useful as a check on the first part of the process) the best way is to take a glass tube open at both ends, about 15 cm. in length and 5 mm. diameter, and to tie over one end a small piece of filtering paper; on moistening this and depressing the tube into the iodide solution, a few drops may be filtered off and transferred (by inverting the tube) to a porcelain slab and small test glass, and a drop of the mercuric solution added; it will then be instantly apparent whether the reaction is complete or not.

I append the result of my experiments with KI containing quantities of KBr.

Percentage of KBr in 1 gm KI	Precip. commenced.	Precip. ceased.
0	8·0 cc.	16·0 cc.
5	7·6 cc.	15·3 cc.
10	7·3 cc.	14·6 cc.
15	6·8 cc.	13·6 cc.
20	6·4 cc.	12·8 cc.
25	6·0 cc.	11·9 cc.
30	5·7 cc.	11·3 cc.

1 gram KI=81 gram $HgCl_2$

In conclusion, I would strongly recommend pharmacists to practise these volumetric processes, for they afford easy means of determining purity in many cases in a few minutes where the ordinary processes take as many hours.

CORAL ISLANDS AND THEIR ARCHITECTS.*

BY PROFESSOR ALLMAN, F.R.S.

The speaker commenced by giving an account of the structure and habits of the *Actinia*, or sea-anemone, as a type of the coral polype. He described it as a fleshy sac attached by a broad base at one end, and having at the opposite end a mouth surrounded by a wreath of tentacles or feelers. He showed that its stomach consists of a smaller sac suspended in the larger, and opening at one end by the mouth, while at the other end it opens into the surrounding cavity of the larger sac. This free opening of the stomach into the general cavity of the body is a character of great importance, and is possessed by no other group of animals than that to which the sea-anemone belongs.

The group so constituted is named *Cœlenterata*, a designation derived from the Greek, and intended to express the peculiarity of structure here referred to. This curious open stomach is kept in its place by a set of vertical fleshy plates, which radiate from it to the surrounding walls of the great cavity of the body. Now, the various parts of the sea-anemone are under the control of a definite number, by which its symmetry is regulated. This is the number six; and the radiating plates just mentioned are thus either six in number or some multiple of six, and so also the tentacles, when freely and normally developed, are either six or one of the multiples.

While the sea-anemone is immersed in the waters of the sea, and is surrounded by the conditions which promote its health and well-being, it will display its beautiful crown of tentacles and spread itself out like an expanded flower, often brilliantly and beautifully coloured. But let danger threaten, let a finger rudely touch it, and it will instantly draw in its tentacles and contract itself around them; and then, instead of the expanded flower, we may believe we have before us the same flower in the bud.

The speaker then pointed out how *Caryophyllia*, which may be found upon various parts of our own shores attached to rocks at low spring-tides, and which essentially agrees in structure with the sea-anemone, has the power of separating carbonate of lime from the sea-water, and of depositing this mineral, particle by particle, in its tissues, so as to become in great part calcified; in other words, how it has the power of forming a true skeleton of coral.

Now the *Caryophyllia*, with its skeleton of coral, instead of remaining simple and solitary, like the sea-anemone, may throw out buds like a plant, or may complicate itself by partially dividing into two or more segments, and will thus be converted into a compound colony of coral-producing polypes, each polype having its own mouth and stomach and tentacles and radiating plates; and each, while providing for its own wants, contributing at the same time to the general well-being of the colony. The form of this colony will depend on the disposition and mode of growth of the buds, or of the new polypes produced by the splitting of the old ones; for if all these remain closely impacted together, there would result such massive corals as are familiar in *Astræa* and *Meandrina*; while if they become more or less separated from one another and grow out into branches, we should then have a branched coral like a *Dendrophyllia* or a Madrepore. Now it is such animals as these Astræas and Meandrinas and Dendrophyllias and Madrepores which form the reefs and coral islands to whose history the discourse is devoted.

It must not, however, be supposed that all coral animals are reef-builders. The well-known red coral of commerce, for example, never accumulates in reefs or banks. This coral also, as well as many other non-reef-building kinds, differs in some subordinate points of structure from the true reef-builders; and instead of having its symmetry controlled by the number six, it is the number four by which the disposition of all its parts is regulated.

Having thus given an account of the nature of the coral animal and its mode of forming coral, the speaker proceeded to describe the home of the reef-builders. This region forms an irregular zone, extending for some distance at each side of the equator, but never going farther from it than about 30° of latitude. There can be no doubt that this coral zone is limited by temperature, and it has been pointed out by Dana, on what appears to be good evidence, that its northern and southern boundaries are formed by the isocrymal lines of 68°, or those lines which may be drawn through the parts of the ocean where the mean temperature of the coldest month of the year is 68° F. These isocrymal lines, however, greatly deviate

* Abstract of lecture delivered at the Royal Institution March 14, 1873.

from the parallels of latitude; for while in some places they are separated from the equator by 30° of latitude, in other places they are strongly pressed towards it by the influence of the cold currents from the poles.

The extent of the coral formations within this area has, ever since the seas began to be explored, struck the navigator with astonishment. Along the western coast of New Caledonia is a reef of 400 miles in length, and along the north-east coast of Australia is one of more than 1200 miles; while it is to the labours of the reef-building polypes that almost all the beautiful islands which stud the tropical portion of the Pacific, and many of those in the Indian Ocean, are mainly due.

The speaker then drew a picture of the aspect of the ocean, and of the most striking members of its fauna in the region of coral reefs. He directed especial attention to the most superficial zone of the tropical ocean—that zone where sea and air and heat and light combine and concentrate the conditions of intensest animality, amid which becomes developed a most beautiful and marvellous fauna; where Medusæ and Siphonophores wander at their own wild will, propelled through the clear waters by the pulsations of crystal bell or of broad, many-coloured disc, or in vast fleets are floating over the sea with sail extended to the breeze; where Pteropods flit on wings through the water like butterflies through the air; where Beroes catch the sunlight on their sides and flash it back in all the brightest hues of the rainbow; where Salpæ play in long undulating chains of crystal, and Pyrosoma, no less clear and crystal-like by day, becomes a cylinder of fire by night. What exuberance of life! What intensity of happiness! What unnumbered hosts basking beneath the tropic sky, or breaking the mirror of the sea with their gambols, or yielding to the impulse of the gentle trade-wind, or lighting up at night with phosphorescent gleam the dark waters of the deep!

Now, the coral-builders share with these bright and active hosts the prolific surface zone of the ocean. But their area is also a deeper one, and for many a fathom downwards their flower-like discs and banks of living coral may be traced by the sounding-lead and the dredge.

This extension downwards, however, is not unlimited. The ocean varies with its depth in its physical characters and in the conditions of life which it presents, and the coral-builders find the conditions suited to their welfare within a limited and definite range. This range never extends beyond a depth of from 20 to 30 fathoms, so that no living reef-building coral is ever found at a greater depth than this.

Within the upper portions of this area the coral fauna may be witnessed in all the perfection of its highest development and life; for there the sea is transparent as the purest beryl, and down fathoms deep below the boat the eye can penetrate through the liquid crystal to where the coral bank spreads around, and a scene of marvellous beauty becomes revealed. For there beneath the sea is a garden: carnations, and asters, and anemones, and gorgeous cactus-flowers seem there to expand their glowing petals; flexile shrubs root themselves in the crevices of the rocks, and envelop their branches in bright clusters of flowers, like the mezereon bush in the month of March. What profusion of forms! what richness of colouring! crimson, and golden, and purple, and emerald-green, and snowy white,—no garden of the upper air can surpass that garden of the sea in loveliness. But, stranger than all, every petal is replete with sense; every flower and every shrub is an animated being;—touch it, and it shrinks; feed it, and it digests; it rejoices in the warm sunlight, and feels happy in the caress of the ocean tide.

Now the animated flowers of that wonderful sea-garden spend no life of idleness—day after day, night after night, they are at their work! they are the builders of coral, the architects of islands, the ceaseless labourers by whose untiring energy have been rescued from the ocean thousands of miles of habitable land.

Having thus examined the workers, and become acquainted with their home, the speaker proceeded to consider the nature of their works, and this subject would be best treated under the following heads:—

1. The forms and structure of the reefs.
2. The mode of their construction.
3. Their relations to man.

The Forms and Structure of Coral Reefs.—Coral formations have been divided into three classes: the Atoll, or Lagoon Island, the Barrier Reef, and the Fringing Reef.

The Atoll is the type of the Coral Island. It presents the appearance of a circular or irregularly-formed ring of coral rising out of the bosom of the ocean, generally clothed with a rich tropical vegetation of cocoanut palms, pandanus, and pisonia, surrounded by a wreath of white foam where the sea breaks upon its outer margin, and having a lagoon or lake of still water in the interior.

The ring of coral is usually discontinuous in one or more places, and through the channels thus formed ships can generally sail into the calm central lagoon, which will then afford them, no matter how rough may be the external sea, a safe and commodious harbour.

It is scarcely possible to conceive of anything more lovely than one of these Lagoon Islands, with its graceful palm-trees and its groves of pisonia, the still, quiet lake within, the restless landless ocean without, and the glowing sky of the tropics stretching over all,—where

> "Droops the heavy blossomed bower; hangs the heavy fruited tree;
> Summer isles of Eden lying in dark purple spheres of sea."

Some of the small uninhabited Atolls especially seem almost as if they had been the work of enchantment. Even the wild creatures which dwell there appear to realize the wonders of the fairy tale, and make us almost believe that they lie under the spell of a magician. The United States' explorers assure us that in some of these islands the birds were so little alarmed at the presence of man, that they allowed themselves to be taken off the branches of the trees as if they had been their flowers.

When the Atoll is examined more minutely, it is found that the depth of the central lagoon may be about ten or twenty fathoms; a pure coral sand or fine white coral mud covers its bottom; the flexible and shrub-like species of coral root themselves in its sides, and millions of strange creatures nestle in their branches, or creep over the coral rock, or dart through the waters of the lagoon.

On the outer side of the ring of coral things are very different. The reef here usually extends outwards for some distance as a flat platform, with but a slight depth of water over it; the depth then suddenly increases, and immediately afterwards the sounding-lead sinks into the fathomless ocean where no bottom can be felt. One of the most remarkable features in an Atoll is thus the extraordinarily rapid rate at which its outer side sinks into the ocean; and this fact must especially be noted, for it will aid us in our attempts to explain the formation of the island.

When masses of the coral of which the reef is composed are brought up from various depths between the surface and twenty or thirty fathoms below it, these fragments are generally found to be alive. From much greater depths, however, the sounding-lead will continue to bring up fragments of coral which it has detached from the sides of the reef; but whatever fragments are brought up from greater depths than at most thirty fathoms are invariably found to be dead. This fact is in accordance with what has been already said regarding the limited range in depth at which the coral animal can live; and it is another very important one, which must be also kept in mind as necessary in enabling us to understand the mode of formation of the island.

If a correct idea of the nature of an Atoll be now conveyed, there will be no difficulty in understanding the two remaining classes of coral formations.

The Barrier Reef consists of a ridge of coral resembling that of an Atoll, but running parallel to the shores of a continent, or surrounding those of an ordinary island, and in either case at such a distance as to include between it and the land a deep channel of still water.

A Fringing Reef differs from a Barrier Reef only in being smaller, and scarcely including any channel between it and the land, which it thus merely fringes with a skirt of coral rock.

Mode of Formation of Reefs.—When it was first known that so many of the islands in the Pacific and Indian Oceans owed their existence to the energy of coral animals, it was believed that the coral-formers commenced their labours upon the flat bottom of the sea, at unknown and unfathomable depths, and that they thence worked continuously upwards to the surface. This hypothesis, however, is inconsistent with the now well-established fact of the limited range in depth of living coral.

The circular form of the Atoll suggested also another hypothesis, which maintained that the coral animals established themselves round the crater of some submarine volcano, and that, thence working upwards, they necessarily repeated on the surface of the sea the circular form of their foundation. Now this hypothesis would involve the highly improbable supposition that there exist throughout the region of corals innumerable volcanic craters, and that all these are nearly at the very same level, namely, that which alone is suited to the energies of the living coral; while its improbability is rendered still further apparent by the fact that there is no known volcanic crater whose diameter approaches in dimensions to that of many Atolls.

For the beautiful theory which is now universally accepted—the only one, indeed, which is consistent with all the known phenomena, and one of the most important with which the physical history of the earth has of late years been enriched—we are indebted to Mr. Darwin.

The theory of Darwin is founded on two incontestable facts,—the one purely pysiological, the other purely physical.

The physiological element in the theory of Darwin consists in the fact already insisted on, that the coral animals cannot live at unlimited depths, that they need the presence of light and of other conditions which they can obtain only near the surface, and that from twenty to thirty fathoms below the surface is the greatest depth at which the reef-building polypes can continue to live.

But we have also seen that the outer walls of the coral reef have been followed downwards into depths very much greater than this; and though the coral forming those deep portions is always found to be dead, it is plain that it must have been at one time living, and some additional fact is therefore needed in order to reconcile its occurrence at these great depths with the established limited range of living coral. Here, then, comes to our aid the physical element in the theory. It is this: That while the ocean maintains the same level from age to age all over the world, the solid land is subject to repeated oscillations of level, rising in one place and sinking in another, and this sometimes to an extent of many thousands of feet.

Having demonstrated the reality of this phenomenon by reference to numerous well-known geological facts, such as the sinking of the southern shores of Scandinavia and of the western shores of Greenland, and the rising of the northern shores of Scandinavia and of Siberia, the speaker proceeded, with the aid of diagrams, to apply, as Darwin had done, the two groups of phenomena, physiological and physical, to the explanation of coral formations.

He showed how a mountain, rising out of the sea in the form of a precipitous island, in the region of the reef-builders, will present on its shores the conditions suited to the coral-polypes, which will there attach themselves, building downwards until they arrive at depths too great for the perfect exercise of their functions, and upwards until the surface of the sea sets bounds to the further elevation of their structures. A reef of coral will thus be spread all round the shores of the island, and will constitute the formation known as a Fringing Reef.

But the island is supposed to be in a region of subsidence, and has begun to sink slowly into the sea, carrying with it the already-formed fringe of coral into depths incompatible with the well-being of the polypes. Urged, however, by an unerring instinct, the reef-builders continue their labours upwards simultaneously with the gradual depression of the land, and thus the reef is always extending itself towards the warm sunlit surface of the sea, where all the conditions of coral life exist, while the lower parts have passed downwards into depths where the formers of coral must cease to live.

The reef has thus grown larger; and as the coral is produced in greater force on the outer edge, where the reef is exposed to the open ocean, with all the conditions in which the animals forming it delight, this part is sooner brought to the surface than the inner part, where the growth of the coral is still further interfered with by the accumulation of fragments which the waves tear from the reef, break down into coral sand and coral mud, and carry inwards towards the land. A deep channel is thus formed between the outer part of the reef and the shores round which the coral has attached itself, and what was at first a Fringing Reef becomes in this way converted into a Barrier Reef.

In the meantime fragments of coral broken off by the waves are gradually piled upon the upper surface of the reef, which is thus in time raised above the sea in the form of a long stretch of dry land, separated from what still remains of the original island by the intervening channel of still water, and capable in the course of time of affording, by the decomposition of its surface, a soil in which terrestial plants may take root.

But the changes do not end with the formation of a Barrier Reef; for the work of subsidence goes on, and the ancient land continues to sink deeper and deeper into the sea, carrying the coral-polypes down with it into the dark, ungenial ocean depths, where they must inevitably perish. And now at last the highest point has disappeared, all has sunk beneath the sea, and a wide waste of landless waters rolls unbroken over its summit.

The island architects are not, however, to be baffled. As the lower parts of the reef sink into depths where they must perish, the upper parts are simultaneously extending themselves as a bank of living coral towards the surface, which at last they reach in the form of a more or less circular reef, on which the waves once more break, and which includes within it a sheltered lagoon, now free from even the last remnant of included land; and the Barrier Reef becomes thus converted into an Atoll.

Now it will be here noted that throughout the whole of the changes which have been thus traced, the thickness of the bed of living coral is a constant quantity, extending always from a little below the surface of the sea to that fixed plane beyond which if the coral be carried it ceases to live, while, on the other hand, the mass of dead coral is continually increasing with the subsidence of the land.

It is also evident from what has now been said that the Atoll points out the spot where an ordinary island had become submerged, and that the whole region of Atolls and Barrier Reefs has been gradually subsiding. A subject of great significance is thus suggested by the study of the phenomena of Coral Reefs; and the conclusion is irresistibly forced upon us that in the region where now the Pacific Ocean separates the Old World from the New there lay in former times a continent with its mountain peaks and table-lands; that all has since sunk beneath the sea, except its highest table-lands and the summits of its highest mountains; that within the region of the reef-builders the coral has gathered in its encircling reefs round these last remnants of the ancient land; while an Atoll marks the spot where a mountain peak of that old continent has totally disappeared beneath the ocean.

In those regions which lie beyond the warmer area of the coral, the land may yet have sunk and left no sign; for the reef-builders could not live in the colder waters, and there was nothing else to tell the tale.

The Coral Island in its relations to Man.—But the Atoll whose formation we have been following is not yet dry land. It is still a submerged reef over which the waves roll, for the polypes cannot extend their works into the upper air. Further changes therefore still await it. Fragments torn from its outer side by the waves are piled upon its surface, and it rises higher and higher from the sea; the decomposing coral covers the reef with a fertile soil, to which the wind and the ocean currents may bring the seeds of plants from other lands, and a graceful vegetation clothes in time its sea-girt shores.

And thus the Atoll becomes fitted for the sustenance of terrestrial animals and man. Sea-birds in multitudes find shelter there, and land-birds from distant shores see in it a country where they may dwell; while the drifted trunk of the forest tree, to which the lizard and the insect still cling, is cast upon its strand to begin the peopling of its woods with still other forms of life.

Some large fruit-eating bats too have discovered it; but no other mammal has ever formed part of the aboriginal fauna of the Coral Island.

Its latest occupant is doubtless man; but whence he came, from what original stock he migrated, we have no positive evidence to determine.

If we except the Feejee group and some of the other high coral-encircled islands which lie at the extreme west of the area, and in which the inhabitants are Negrittos, characterized by their black skins, frizzled hair, and repulsive features, we shall find a great uniformity of type to prevail over the rest of the Pacific coral region, a type with lighter skin and straight or wavy hair, and one which points towards an affinity with the Malay races of south-eastern Asia. We are not, however, on this account to suppose that the islands were necessarily peopled by direct migration from the Asiatic shores. If we suppose that the high islands, with their encircling barrier reefs, represent the last remnant of a submerged continent, it is quite possible that these islands may have retained the last remnant also of its population. But whether this be so or not, it is certain that the Atolls must have been independently peopled, either from the surrounding islands or from some more distant continent. The Atoll rose from the bosom of the ocean destitute of terrestrial life, and many a century must have passed before the presence of man broke the solitude of its shores. We may well believe that at last some savages, drifted out of their course by adverse winds, had run their canoe upon the strand and had taken possession of the land of the polype. The fish of the lagoon, the mollusca of the shore, the fruits of the wood, afford them their subsistence; they have discovered that a pit dug a few feet deep into the coral rock will reach a reservoir of fresh water accumulated from the rains which had percolated through the more superficial porous structures; the friction of two pieces of dry timber yields them fire; while their spears, fashioned by a piece of sharp stone found entangled in the roots of some drift-wood, facilitate the acquisition of food, and make the struggle for existence more easy.

And so years pass on, and the descendants of the first accidental settlers have peopled the island; but though experience may have taught them many things, though an imperfect division of labour may have been adopted and a rude state of society established, the aboriginal dwellers have rather adapted themselves to the physical conditions among which they have been thrown than raised themselves above them, and centuries pass away and leave them little changed. For, after all, the Coral Island is but ill fitted for human development; without a hill to break the uniformity of its surface, without a stream to hollow out a valley, without a single metal, without a mineral beyond the unvaried calcareous coral rock, without a mammal other than the bird-like bat, the native, cut off from all communication with other lands, will have few ideas; while his wants, few and easily satisfied by the spontaneous produce of the island, will afford little motive for exertion, and little stimulus to development; and it is later times, and other lands where civilization has already spread, where knowledge has already advanced, that must carry civilization and knowledge to the Coral Island.

And so centuries still roll on, until at last from these other shores the destined race has landed on the island—a race with higher powers, a more cultivated intellect, and an increased capacity for improvement—the bearer of a new force, of a civilization with all its good, and alas! with all its evils too: but the good is greater than the evil, and so the lower yields to the higher phase of intellect; more perfect social relations are introduced; laws are instituted; the savage rites of a degrading superstition give place to a more elevated and a purer creed; no longer with that narrow policy which does not look beyond the limits of its own strand of coral, a common interest has united island to island, and a national life has dawned upon the archipelago of the polype; deficiencies are supplemented by the products of other lands; the breadfruit, and the banana, and the yam are cultivated; the fruits of the woods, and the pearl-shell, and the trepang of the lagoons are sought after by the trader; the relations of commerce are established, and the Coral Island takes its place in the great community of Nations.

DETECTION OF THE SUBSTITUTION OF CARBOLIC ACID FOR CREASOTE.*

BY JOHN A. CLARK.

The author refers to the communication from Mr. Morson on the substitution of carbolic acid for creasote, in which he states that there is no good test for distinguishing between the two, but proposes the use of glycerine, in which carbolic acid is easily soluble, but creasote insoluble. The author thinks that a far better test is the alcoholic solution of perchloride iron (or tr. ferri perchlor. B. P.), which, when added to an alcoholic solution of creasote, produces a "dark greenish-blue" colour, but with an alcoholic solution of carbolic acid only a "light brown" colouration. By this test one part of creasote in 500 parts carbolic acid can be easily detected. The adulteration of creasote by carbolic acid is more difficult to detect, but can be ascertained in the following way: Boil a few drops of creasote with nitric acid (about 2 drs.) until red fumes are no longer evolved; this yields a solution which, when neutralized with solution of caustic potash, gives *no precipitate*, the creasote forming oxalic acid. Carbolic acid, when treated in the same manner, is very violently acted on by nitric acid and forms picric acid (trinitro-phenylic acid), which, when neutralized with solution of potash, give a "yellow crystalline" precipitate. One part of carbolic acid in fifty parts creasote can be readily detected in this way.

THE BARTON CHEMICAL MANURE WORKS.

The loss sometimes sustained by large landholders and farmers in consequence of the worthlessness or inferiority of some of the so-called artificial manures and cattle-feeding materials, that are put into the market, has led the agriculturists of North Lincolnshire and Yorkshire to form a limited liability company for the manufacture of artificial manures, and ultimately the production of oil cake for their own use. Works have been erected at Barton Waterside, near the haven and within easy access of the Manchester, Sheffield and Lincolnshire Railway Station. The property of the company is more than four acres in extent—about one half of which is at present built upon. The buildings are fitted with the most approved appliances.

* From the *Canadian Pharmaceutical Journal.*

We take from the *Eastern Morning News* a few notes of a visit made to the establishment.

On entering the building the visitor is struck by the absence of the sickening smell present in many manure works. There are plenty of endless bands in the air, working a vast number of wheels whose arrangement at first seems rather intricate, while on the floor are scattered about large heaps of a stone-like substance, something harder than granite and heavier than lead, and other mounds of what might be taken for small pebbles. The large heavy stones are known in commerce as pyrites, while the pebbles go by the name of coprolite, and from these two seemingly unprofitable objects a most rich and valuable manure—superphosphate of lime—is manufactured. From the pyrites one of the constituents of the manure—sulphuric acid—is derived. The company at present import the pyrites used from abroad. As this substance reaches the works in lumps, sometimes as large as a couple of paving stones, it has to be first subjected to a bruising process. This is effected by a Blake's patent crusher, which breaks the lumps into pieces about the size of ordinary road metal, doing in four or five seconds as much bruising work as a man could do with his hammer in half-an-hour. The pyrites thus rendered more manageable falls from the crusher into a well, whence it is raised by an elevator, similar in principle to a dock dredger. In this state it is used for charging the kilns—twenty-four in number—and the fumes of sulphurous acid resulting from the burning are conveyed into large chambers, where they are converted into sulphuric acid.

The coprolite, which has much the appearance of dusty little stones, is essentially of the same chemical composition as bone. Scientific men speak of it as the vestiges, which are ordinarily of an evanescent character, of some sort of amphibious animals belonging to a pre-adamite period. These curious remains were left on the sand at that remote age, and have come down to our own day, though the race of animals is itself extinct. The company derives its supply of coprolite from Cambridgeshire, and the yield, when ground, is about 58 per cent. of phosphate of lime. The coprolite is first passed between two rollers, by which operation it is reduced to the dimensions of very small pebbles. These are hoisted by an elevator, and thrown into ordinary hoppers, which supply different pairs of millstones. The coprolite leaves the millstones in a state of fine powder that soon finds its way into the throat, and is passed into a creep or kind of long narrow box with a spiral movement inside, by which it is forwarded to another elevator, and lifted up to the room where the final operation—that of mixing with the sulphuric acid—is performed. The quantities have to be measured to a nicety. The ground coprolite is what is known as tribasic phosphate of lime, being made up of ordinary lime and phosphoric acid, in the proportion of three to one. When the sulphuric acid is brought to act upon this phosphate, monobasic phosphate of lime and sulphate of lime are produced. These, together, form the chief chemical manure in the manufacture of which the Lincolnshire Farmers' Company are at present engaged. This product leaves the mixing machine in a liquid state, flowing into large dens underneath, capable of storing immense quantities. The manure is dry and ready for transport in a few hours after manufacture. The hydrofluoric acid accumulating in these storing dens is a most deleterious and obnoxious neighbour. It is drawn off into a chimney, where it is thrown down by water, and thence runs off in the common sewers. Any annoyance to neighbours or injury to vegetation is thus easily obviated. Should the manure set and become too hard with keeping, a disintegrator, consisting of two wheels revolving in opposite directions at the rate of 500 revolutions a minute, soon pulverizes and renders it quite ready for the farmers' use. The usual appliances for grinding half-inch bones, and manufacturing dissolved bones, etc., are also complete. The entire machinery is driven by a beam engine working up to 140-horse power, with a couple of boilers.

THE SHOP HOURS' REGULATION BILL.

MEETING AT NORWICH.

A meeting of the tradesmen of Norwich was held on Friday, June 13th, at the Guildhall, to consider Sir John Lubbock's Shop Hours' Regulation Bill, and, if thought desirable, to adopt a petition to Parliament against any objectionable clauses in that measure. The Mayor, who presided, in his opening remarks said that the spirit of the legislation of the present day was getting rather too sentimental, and was neglecting the feelings and requirements of the trading interests. The trading classes were competent, by bye-laws and mutual arrangements, to make things agreeable to themselves and their *employés*. By interposing to prevent the further progress of this Bill great public service would be done, and he was of opinion that it would be for the interest of all to continue in the old jog-trot road rather than adopt any violent changes.

It was moved by Mr. A. R. Chamberlain, seconded by Mr. Copeman, and resolved unanimously—"That this meeting, while fully sympathizing with the public feeling in favour of shortening the hours of labour in retail shops, is decidedly of opinion that Sir John Lubbock's Shop Hours' Regulation Bill will not secure that object, and should it become law will improperly interfere with the conduct of retail businesses, and press most unjustly upon those tradesmen whose trade compels them to employ persons coming under the provisions of the Act."

It was moved by Mr. Caley, seconded by Mr. Snowdon, and resolved—"That legislation suited to the factory or workshop, where work commences at the specified hour, and is continuous up to the hour for meals, and again to the end of the day, is altogether inapplicable to shops, where assistants are often for hours unemployed, or only partially employed, as the character or state of trade may permit."

It was moved by Mr. Wild, seconded by Mr. Edwards, and resolved—"That it is the opinion of this meeting that, should the Bill become law, it will very seriously injure many persons employed in shops coming under the provisions of the Act, as it will not only curtail to a very large extent the employment of female labour, as well as that of young men under twenty-one years of age, but it will also discourage the training of apprentices in the various trades to which this Bill applies."

In the course of the discussion, Mr. J. D. Smith pointed out that it was impossible for the public service that chemists' shops should be closed for one half-day in the week.

A petition embodying the foregoing resolutions was adopted, and ordered to be forwarded to Mr. J. J. Colman, with a request that he would support it in his place in Parliament.

FIRE AT NEWCASTLE.

On Friday afternoon, June 13, an alarming fire broke out on the premises of Mr. H. B. Brady, pharmaceutical chemist, Mosley Street, Newcastle. While one of the assistants was engaged on the second floor with an apparatus containing an inflammable chemical, the substance suddenly ignited, and set fire to surrounding combustibles—lint, pill boxes, oilskin, etc. In an incredibly short space of time, dense black smoke issued from the front windows, and a woman who was in the topmost room of the building engaged in cleaning, afraid to make her way down by the staircase, appeared at the small window, a height of about sixty feet, and in the presence of an excited crowd of people, crept along a narrow parapet about two yards in length to the slanting roof of the adjoining premises. Here she was laid hold of by a pair of strong arms and carefully put through an attic window, amid the cheers of the mob. The engine from the Manors Police Station was immediately upon the spot, but the flames were extinguished without its aid. The damage caused was fortunately not very great.

The Pharmaceutical Journal.

SATURDAY, JUNE 28, 1873.

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

THE BENEVOLENT FUND.

AMONG the official notifications appearing in the advertisement columns of this week's Journal is one relating to the Benevolent Fund, to which we desire to call especial attention.

The inability of the Council to elect more than one annuitant on the Benevolent Fund this year, which was reported in the minutes of the last meeting, must have caused general regret to the readers of this Journal.

The correspondence which has appeared in our pages recently on this subject is proof, we trust, that the prosperity of the Fund is deemed a vital matter by members of the Society; but those who have constantly joined in the cry "Give! give!" *from* the Fund, must now, to render that possible, reverse their cry, and urge all to give *to* the Fund.

We know that in the opinion of some persons, annual subscriptions and donations might fairly be employed in paying annuitants, as well as in giving casual assistance to the needy. This point was indeed urged by one speaker at the General Meeting, but others speedily condemned the suggestion, and entirely endorsed the more cautious system adopted by the Council.

It seems to us that those whose kindly feeling we must honour, even while combating their imprudence, do not take into account either the existing Bye-laws regulating the Fund, or the amount of its annual income, and the increased demands on it.

On reference to Sect. xix of the Bye-laws, it will be seen in Clause 2 that "Donations in aid of the Benevolent Fund *shall* be invested in Government or real securities; *and no part of the invested capital of such Fund shall be distributed among the recipients of relief.*"

The words which we have italicized plainly show the original intention, on the one hand, of providing an inalienable Fund to give settled assistance, and on the other, of leaving only the annual subscriptions at the disposal of the Council for making casual grants, supposing the interest to be absorbed as it now is by Annuitants.

Now it must never be forgotten that when once an annuitant is elected he is morally assured of an annuity for life. The Council for the time being are Trustees in charge of his maintenance, and nothing should be allowed to shake his confidence in them. Supposing, however, that the monthly grants equalled in the year the annual subscriptions, to what source could these Trustees look for the means of meeting their liabilities?

Here we shall be told there is no fear on this point; that the more you give the more you will receive. But pounds, shillings, and pence are hard matters to deal with, and we have therefore taken the trouble to ascertain exactly how the case stands; not by looking to past years, because the applications for aid in past years afford no safe data on which to calculate the future. Naturally, as the Society grows older its members grow older also, and the number of needy men may be fairly expected to increase. Again, the field for distribution has been at least trebled by the eligibility of "*all persons who may have been, and have ceased to be, Members or Associates of the said Society, or who may be or have been duly registered as Pharmaceutical Chemists or Chemists and Druggists, and the widows and orphans of such persons.*"

The amount of subscriptions received during the first six months of the present year is £634 19*s.* 10*d.*, while the casual grants made by the Council within the same time amount to £235 15*s.* When in addition it is remembered that by far the greater part of the subscriptions are paid in the beginning of the year (with the annual subscriptions of membership), whilst the applications for relief may go on even in an increasing ratio to the end of the year, we think there seems but little prospect of a surplus which would justify the Council in electing more annuitants than the interest on capital would warrant.

We commenced by saying that the inability to grant more than one pension would be regretted by all. To us it is a lamentable circumstance. Of course no comparison can be made between the Benevolent Fund of a small special class and the greater institutions which give relief *generally*, and thus fairly claim *general* support. The former is a fund to be distributed solely among the needy of one class, and is consequently dependent almost exclusively on the members of the same class, while the latter are so universal in their benefits as to be deemed worthy of advocacy from the pulpits of the whole country. Still we cannot but think that the chemists and druggists of Great Britain, numbering about fourteen thousand, could, without much personal sacrifice, at least treble the annual subscriptions to a Benevolent Fund from which any of them might in adversity receive assistance. On a previous occasion in publishing the list of contributions to the Benevolent Fund of the Society, we pointed out the disparity between their gross amount and the numbers of the trade, and urged upon the consideration of our readers that contributions to this Fund, the benefits of which were available to the whole trade, should be very much more general than they were. GOD grant that the time of need may never come! But we know that in His inscrutable Providence adversity does fall to the lot of some; and we know, too, that although He sees good to afflict, it is acceptable to Him that we endeavour to relieve each other in the afflictions cast upon us. Can we fairly say we have done this to the utmost of our ability, or even to the extent of our duty, when we find that the Council, on investigating the cases of distress brought before them, have marked five in which it is desirable to give permanent assistance, and the funds at their disposal permit only of that assistance being given to one.

THE SHOP HOURS' REGULATION BILL.

At this advanced period of the Parliamentary session repeated postponement of the consideration of a Bill may fairly be regarded as indicative of failure or abandonment. Especially under present conditions may this be inferred, and as regards the particular measure now referred to, perhaps there could not be a more appropriate fate. In another part of the present number we print a petition presented to the House of Commons last Tuesday, praying the House to reject the Bill. This petition is signed on behalf of the Pharmaceutical Society by the President, Mr. T. H. Hills, and it sets forth in support of its prayer several grounds which appear to be unanswerable so far as the Bill affects chemists and druggists.

The report on a previous page of the meeting at Norwich serves to show what is the opinion as to this Bill on the part of the trading community, and we trust the opinions expressed in the resolutions passed at that meeting will be appreciated by the promoters of this measure so far as to prevent any repetition of similar efforts of hyper-legislation.

While thoroughly admiring the good service already rendered by Sir John Lubbock in securing for the hard-worked classes of clerks and shopmen some addition to their opportunities for relaxation and enjoyment, we cannot shut our eyes to the fact that there is a wide difference between setting apart certain days in the year as general holidays and shortening the hours of employment in shops and offices. Both objects may be highly desirable in the abstract, but they require different means for their attainment. To establish a bank holiday, independent individual action would probably be of little avail, and a legislative enactment is almost a necessity. On the contrary, individual action is in the other case precisely the influence which is most likely to be effectual. If a few persons in the drug trade resolutely persevere in closing their shops at an earlier hour than has been the custom, the result will be not only to educate public opinion into a recognition of the propriety of such a course, but also to convince those who keep late hours that they are rather losers than gainers by adhering to the old plan.

Such influences have been successful in making the Saturday half-holiday almost as much an institution as the Bank Holiday. And for some time past a similar course has been pursued in regard to the early closing of druggists' shops, as we have from time to time had occasion to point out in these columns.

In the interest of the efforts thus being made we heartily wish for the total abandonment of Sir John Lubbock's present Bill, as being the course most likely to bring about the very desirable objects which we have no doubt he had in view when he introduced the measure into Parliament.

A DISHONEST DIPSOMANIAC.

It frequently falls to the lot of pharmacists to be under the disagreeable necessity of rising from their beds to supply an urgent call for drugs for the relief of some poor sufferer, and as a rule the duty is performed with as much cheerfulness as could be expected under the circumstances. But the letters printed on page 1048 show that some circumspection is required, even in yielding to the dictates of humanity, for several pharmacists at the West End have suffered inconvenience through an impostor availing himself of their kindness to satisfy his abnormal cravings. We hope the publication of these letters will have the effect of putting the members of the trade on their guard, so that the next time he attempts to repeat the fraud he may meet the reception he merits.

ACCIDENTAL POISONING AT A HOSPITAL.

At page 1046 will be found the report of a case of accidental poisoning, in which the dispenser at the Royal Berks Hospital at Reading substituted hydrocyanic acid for hydrate of chloral.

The Birmingham *Daily Mail*, in reporting this case, says an overworked official has just misadventurously slain a patient, adding that it came out in evidence that the dispenser—a steady, well-conducted, efficient man—had to make up more than two hundred prescriptions a-day, and that to discourage such miserable economy the verdict should have been "Killed by the niggardliness of the Hospital Board."

EXPORT OF CINCHONA BARK FROM COLUMBIA.

There was a large increase in the export of cinchona in 1871 from Santa Martha over the previous year. The official returns give a total of 3,415,149 lbs. in 1871, valued at £133,791, against 1,846,643 lbs., valued at £63,770, in 1870. Shipments of this article have latterly been on a largely increasing scale for the United States. For the five years 1865–69 the average annual quantity sent to New York was below 300 serons, whilst the shipments to that port in 1870 reached over 2000 serons, and rose to 8500 in 1871. The following were the shipments to other countries,—to Great Britain 11,100 serons in 1870, and 14,400 in 1871; to France 1100 serons in 1870, and 2100 in 1871; to Germany 660 serons in 1871.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

June 18th, 19th, and 20th, 1873.

Present—Messrs. Allchin, Barnes, Carteighe, Cracknell, Gale, Hills, Linford, Martindale, Schweitzer, Southall, and Umney.

Dr. Greenhow attended on the 20th on behalf of the Privy Council.

MAJOR EXAMINATION.

Nine candidates were examined. *Three* failed. The following *six* passed, and were declared duly qualified to be registered as Pharmaceutical Chemists :—

*Cleaver, Edward Lawrance	London.
*Plowman, Sydney	Boston.
Woods, Joseph Henry	Warrington.
Kirton, Christopher Henry	Hull.
Woolldridge, George	Birmingham.
Pound, Henry William	London.

MINOR EXAMINATION.

Forty-eight candidates were examined. *Twenty-five* failed. The following *twenty-three* passed, and were declared duly qualified to be registered as Chemists and Druggists :—

	*Griffiths, Francis	Weston-super-Mare.
	*Cotterell, William Burbidge	Dover.
Equal	*Griffiths, Edwin Harpham	Hanley.
Equal	*Gwynne, David William	Swansea.
	Hitchcock, Edmund Lilley	Oxford.
	Maynard, Henry Robert	Brandon.
	Gallier Robert	Tunbridge Wells.
Equal	Duffus, Alexander	London.
Equal	Vickery, Alice	Camberwell.
Equal	Holdgate, Arthur	King's Lynn.
Equal	Williamson, Thomas Umbers	Coventry.
Equal	Robinson, Edward Henry	Chichester.
Equal	Thornton, Edward	Walsall.
	Adams, William	Barnstaple.
	Beverley, Robert Henry	Nottingham.
	Burman, Charles Clarke	Liverpool.
	Kemp, George	Birmingham.
Equal	Marks, Frederick Comerford	Wantage.
Equal	Pitts, Thomas Cruso	Norwich.
	Leach, Isaac	London.
	Bathe, William	Chippenham.
	Barritt, Frederick Alfred	Croydon.
	Righton, James	Southport.

The above names are arranged in order of merit.

* Passed with Honours.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The twelfth general meeting was held at the Royal Institution, May 8th, 1873, the President, Mr. E. Davies, F.C.S., in the chair.

Mr. Thomas Williams, F.C.S., called attention to the coating of paint which covers some of the canisters containing the preserved meat from South America and the colonies. The paint on one which he had purchased contained red lead, and after having been carefully opened by the vendor, he found that 50 grains of red lead had got into the meat.

In reply to an inquiry by Mr. Simpson, he said that there was no necessity to paint the tins, that they were painted after their arrival in this country, to give them a more saleable appearance. He found that only one firm used red lead, other tins being painted with silicate of iron paints, which were comparatively harmless.

Mr. Taylor suggested that it would be better to lacquer the tins.

Mr. J. Abraham then read the following paper :—

NOTES ON COMMERCIAL DILUTE HYDROCYANIC ACID.

The dilute hydrocyanic, commonly called prussic, acid of the Pharmacopœia is composed of 2 parts of hydrocyanic acid and 98 of water. It is made by distilling together a solution of ferro-cyanide of potassium and a dilute sulphuric acid. The product is of uncertain strength, because the whole of the hydrocyanic acid is not necessarily condensed. The real relative quantity obtained must be ascertained, and the liquid made to correspond to the standard. The correctness of the preparation will depend upon the accuracy with which this is done. But, however carefully it may be accomplished, the resulting acid may afterwards be found defective.

It is liable to decomposition, especially if exposed to light (though our Pharmacopœia does not mention this), and to loss of strength by exposure to the air, owing to the greater volatility of the hydrocyanic acid than of the water. Especially must this be the case when the contents of a small bottle are used up by little and little during a considerable period of time.

The strength of eight specimens procured from different sources, was ascertained by Dr. Tilden, and the result of his examination will be found in the PHARMACEUTICAL JOURNAL for July 29, 1871. His report exhibits a scale ranging in percentage of real acid from 2·183 to 0·483—four of the specimens being under 1 per cent.; the true standard, as I have mentioned before, being 2.

During the latter part of last year I obtained specimens of the acid from four wholesale houses, the percentage of real acid I found to be—

2·11
2·02
1·64
1·30

instead of 2.

Compared with the pharmaceutical standard the strengths are :—

$$\left.\begin{array}{r}105{\cdot}5\\101{\cdot}\\82{\cdot}\\65{\cdot}\end{array}\right\}\text{ per cent.}$$

This is not nearly so great a disparity as is exhibited by the table of Dr. Tilden, but it is so great that I think dispensing chemists should be put on their guard.

The Pharmacopœia says, that 100 grains of the acid precipitated with a solution of nitrate of silver will yield 10 grains of dry cyanide of silver. The application of this test requires time, for unless the precipitate be thoroughly washed and dried,—and nothing but time can ensure this,—it is delusive. Moreover you cannot safely diminish the quantity operated on, unless you employ a delicate balance. The Pharmacopœia gives a further and very beautiful volumetric test. We are told that 270 grains of the dilute acid, rendered alkaline by solution of soda, requires the addition of more than 1000 grain measures of volumetric solution of nitrate of silver, before a permanent precipitate begins to form. If the acid under examination requires only 900 grain measures, then the strength is only $\frac{9}{10}$ of the proper strength—if it requires 1100 grain measures, then the strength is $\frac{11}{10}$, and so on.

The experiment is directed to be performed by means of a burette, holding 1000 grains, divided into 100 equal parts; but such quantities as these do not suit a dispenser who perhaps only buys an ounce or two at a time, as is, I suppose, the case with many. The experiment may however be performed equally well with smaller quantities and appropriate instruments.

This 100 grain tube filled as a Mobs's burette enables me to experiment on quantities one-tenth of those named, and to obtain equally accurate results, because half a grain in this tube is as distinctly indicated as five grains in the other,—indeed rather more distinctly. Filled by suction through an elastic tube, the result is obtained more easily and quickly.

In using a large tube, one is apt to get impatient and to add the test too rapidly—at least I am—and then one has to begin again. These smaller tubes holding 100—300—500 grains, in which every grain is shown, are far more convenient because you can without any great exercise of patience watch the effect of every drop which you let fall. But those who have not these tubes have the minim tube with elastic ball, which I introduced as an improvement on Alsop's more than twenty years ago. (PHARMACEUTICAL JOURNAL, 1851-2, page 268.)

An experiment with this would be far better than none, and carefully made would give almost accurate results.

Add 27 minims* to a little solution of soda or of potash (for the latter will do equally well), and the number of minims of volumetric solution of nitrate of silver, which must be added before a permanent precipitate begins to form, indicates at once without calculation the percentage of strength compared with that of the Pharmacopœia. As a check this is perhaps sufficient, but the volatility of the substance should be remembered, and accurate experiments must be performed in flasks.

Mr. A. E. Tanner afterwards read a paper on "The Means of Detecting Bromide in Iodide of Potassium," which is printed at p. 1033).

A discussion followed, in which the President, Drs. Cooke, Symes, Messrs. Mason, Redford, Shaw, and others took part.

The President then read the following valedictory address:—

"In coming before you this evening to bid you farewell, as your president, at least so far as our general meetings are concerned, I feel a difficulty in selecting a subject which will fitly close my official connection with the Association. No event of engrossing interest has marked the present year of my presidency, and I must fall back on the familiar topics of our aims in meeting together, and the manner in which these have been carried out. Whatever views we may hold with regard to cooperation in business matters, its application to increasing the store of our knowledge must commend itself to every mind. As iron sharpeneth iron, so doth the countenance of a man his friend, is our implied motto, and the more each one will contribute his talent or mite of experience to the common fund the greater will be the treasury which we shall accumulate. In the past session we have listened to practical and theoretical papers, both the business and science side of our daily avocations have been drawn upon for subjects of discussion and thought, and now a long recess will give us opportunities for the application of the facts which have come under our notice. I trust that at least some of us will remember that the future must be provided for, that another session will soon be here, and that the Secretary will be much aided and his anxious mind greatly relieved if he can begin with a goodly list of papers promised. There can be no doubt that as years roll on the difficulty of finding new subjects increases. The obvious topics have been disposed of, and we must employ more thought and research in treating those which do not directly fall in our way. It is so in all branches of science; in chemical research much labour is now needed to arrive at novelty, as any one will be convinced who studies the chemical journals and is almost overwhelmed with the complexity and intricacy of the new compounds, of which the mere names are sufficient to terrify the student. Still, we must go on,—it will never do to despair. It is quite certain that we have not found out everything yet, and new things will always be found to be said on old topics.

"In some respects we have progressed; the library has been enriched by bound volumes of the journals, and I hope that in this more accessible form we shall make acquaintance with the current scientific literature of the day. It will be well to keep this up regularly year by year, as experience has shown that many numbers of unbound periodicals are lost. Some other additions have been made to the library, and it is now a most valuable collection of scientific literature.

"With regard to our educational appliances, the chemistry class has been carried on since December, and is still going on. The time has arrived for establishing a botany class, and I hope that the notice on the circular will not escape the notice of members. A considerable number must join to render it possible for us to ensure the services of a competent teacher, and I trust that such a delightful study, when properly undertaken, will not fail to attract many pupils. I would urge all students not to trust to books; we are not favourably situated for practical study in the fields, but yet the commonest plants should be thoroughly examined, and this practical knowledge will not only be far more valuable than merely learning crabbed terms by rote, but will also stick closer to the memory, and be available when wanted.

"My suggestion as to the adulteration of drugs when I last addressed you has been proved a word in season. Whether a substitution of one thing for another is a legal adulteration, is a question as to which I am not lawyer enough to speak, but morally, in my opinion it is even worse. Sulphate of quinidine may be a useful alkaloid, and probably is, but to sell it for sulphate of quinine is totally indefensible, and has met a justly deserved punishment. I hope that it will not be possible to meet with any other case of the kind in Liverpool, and that if any chemist has any such deceptive stuff in his shop it will at once find its way to the sewers.

"During the session science has had to deplore the loss of one of her most devoted sons, Baron Justus von Liebig. Nothing was beneath his notice to which science could give any aid, and the almost inventor of organic analysis could write an article on the best way of making coffee. Purely scientific chemistry is most deeply indebted to him, and although all his views on agricultural and physiological chemistry may not be received by every chemist, those branches of the great subject to which his life was devoted would be greatly mutilated if all which he contributed to them were removed. To the public at large his name was familiarized by his preparation for infants' food, and mostly by extractum carnis. Whatever view may be taken eventually as to the exact action of this latter substance, in my opinion there is no doubt that it is a great addition to our restoratives, and will hand Liebig's name down to posterity.

"One of our own members, and one who contributed to our transactions has also passed away. The circumstances attending Mr. Hilditch's death are painful and mysterious. We might fairly have hoped, from the promise which he already gave, that he would have been a valuable member, and can only add our tribute of respect and esteem to those which have been so freely given in the land where he was a temporary resident.

"And now I must bid you adieu; thanking you for the confidence which you have reposed in me, and that for two years I have had no unpleasant word to hear or say. Whatever may have been my failings, I trust that it will be found that the interests or honour of the Association have not suffered in my hands."

Votes of thanks to the authors of the papers, and the President for his address, and the ability with which he had occupied the chair at the meetings, etc., concluded the business of the ordinary meetings of the session.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, June 19th, Dr. Odling, F.R.S., President, in the chair.

At this meeting which was the last of the season, nine communications were read of which the following were the

* Strictly, a shade more—27·09.

titles :—1. "Researches on the Action of the Copper-Zinc Couple on Organic Bodies." 3. "On Normal and Iso-Propyl Iodides," by J. H. Gladstone, F.R.S., and A Tribe, being a continuation, in the Propyl Series, of the authors' previous researches. 2. On the Influence of Pressure on Fermentation, Part II: The Influence of Reduced Atmospheric Pressure on the Alcoholic Fermentation," by Horace T. Brown; in which he stated that, under diminished pressure, the progress of alcoholic fermentation is retarded in a remarkable way. 3. "On Cymene from different Sources optically considered," by J. H. Gladstone, F.R.S. 4. "Note on the Action of Bromine on Alizarine," by W. H. Perkin, F.R.S. This reaction gives rise to *bromalizarine*, an orange coloured crystalline substance, possessing feebler dying properties than pure alizarine, the colouring principle of madder. 5. "On some Oxidation and Decomposition Products of Morphine Derivatives," by G. L. Mayer and C. R. A. Wright, D. Sc. 6. On the Decomposition of Tricalcic Phosphate by Water," by R. Warington. 7. "Communications from the Laboratory of the London Institution, No. XII: On the Nature and on some Derivatives of Coal-tar Cresol," by Dr. H. E. Armstrong and C. L. Field. 8. "On a new Tellurium Mineral, with Notes on a Systematic Mineralogical Nomenclature," by J. B. Hannay. 9. "Note on the Relation among the Atomic Weights," by J. A. R. Newlands. The President finally adjourned the meeting until after the recess, congratulating the members on the flourishing state of the Society and on the number and importance of the papers that had been read during the session.

SOCIETY OF ARTS.

Recent Processes for the Manufacture of Gas for Illuminating Purposes.*

BY T. WILLS, F.C.S.

(*Concluded from p.* 1022.)

With regard to these "air gases," all that remains is to state wherein the various plans differ in their mode of carburetting the air. The first of these recent schemes purposes to drive minute streams of air through a layer of spirit of a specific gravity of 0·670—this is accomplished by forcing air under pressure through a small tank of the liquid, having a false bottom of wire gauze; the passage of the air through the gauze divides it into innumerable fine streams, and causes it to come into close contact with the liquid material. The air, as it issues from the top of the tank, will thus be saturated with the hydrocarbon vapour. The depth of liquid through which the air passes is maintained constant by means of a somewhat ingenious float. It is further proposed, in this patent, to dissolve in the spirit a quantity of some more highly-condensed solid hydrocarbon; but it is open to very considerable doubt whether the effect of such addition could be very perceptible.

The illuminating power of this gas is very high, as high indeed as 30 candles, although this statement requires a slight qualification, as the lighting power of the flame is not expressed by it, but only the fact that if it were possible (which it is not) to burn the gas at the rate required by the photometric test, viz., five cubic feet per hour, this illuminating power would be obtained, it being a fact that a very much smaller amount of air-gas can be burned from the ordinary "London argand" burner, or from a batswing, to obtain the same size of flame than in the case of coal-gas; this effect is no doubt due to the greater density of "air-gas." It may be mentioned here that these air-gases do not burn at all well under pressure, and hence are only suited to burners which afford exceedingly free passage to the issuing gas, such as argands, there being a tendency with burners of the batswing and fishtail class for the air and vapour to separate, possibly explainable by the more rapid transpiration of the lighter substance through a narrow opening. The gas produced by this particular scheme possesses, as might be expected, a very fair degree of permanency at ordinary temperatures, and is capable of transmission through comparatively long lengths of pipe with little deterioration in quality. As an experimental trial, one side of the nave of the Crystal Palace has been recently lighted in this manner, with what success the public journals have testified, the spirit used for this purpose having a somewhat lower specific gravity than that mentioned in the patent. It is further stated that one gallon of oil will carburet 800 cubic feet of air, and the cost of this gallon of oil to be two shillings.

A second plan for obtaining the same result is a modification of the above, the special features of which are, in the first place, the required current of air being maintained by clockwork, and, secondly, the substitution of a considerable length of cotton-wool or other absorbent substance, kept saturated with the liquid hydrocarbon, in the place of bubbling the air directly through the liquid. The spirit used and the results obtained are very much the same as in the former case. This scheme also is being illustrated upon a somewhat extended scale, the small town of Great Marlow being at present illuminated by its means.

Perhaps this latter has one slight advantage over the former, inasmuch as the bubbling of air through a volatile spirit will promote its evaporation, to such an extent that the temperature of the liquid will be reduced exceedingly low, in some cases as low as the freezing-point, and consequently the temperature of the air will be very considerably reduced at the same time. Now any unnecessary reduction of temperature, either of liquid or air, should be carefully avoided, in order to keep in solution as much vapour as possible.

Yet a third plan has received some attention which possesses at least the advantage of simplicity, and this consists in using an ordinary gas-holder, with its tank, as a gas generator, to the exclusion of other apparatus. At the crown of this gas-holder is placed a valve, opening with ease inward, but closing the moment any pressure is applied to the holder. Underneath this valve are placed trays containing a shallow layer of a spirit, if anything, of somewhat lighter specific gravity than that used in other cases. As the gas-holder is mechanically raised, the entering air passes over the surface of the volatile hydrocarbon, becoming in this manner sufficiently charged to be immediately used as an illuminating gas, which may be consumed through most ordinary fittings. The illuminating power of the flame, expressed in the same manner as before, is from thirty to thirty-three candles. The spirit —of which one gallon, it is believed, will carburet 500 cubic feet—used in this process is said to be obtainable in an almost unlimited quantity, being driven off on the first heating of the crude product in the manufacture of American kerosene oil. At present this volatile distillate is allowed principally to evaporate into the atmosphere; but it is thought that, with very little extra expense or trouble, it may readily be condensed and imported. This spirit evaporates with extreme rapidity, as might be expected from its low boiling-point; and the vapour proceeding from it, as from other petroleum spirits, is an exceedingly heavy one, almost as heavy, indeed, as the vapour of ether; hence, when mixed with air, it renders the mixture considerably heavier than an equal bulk of air, and this has been taken advantage of in the construction of what is certainly an ingenious arrangement, intended to be used as a portable gas-lamp, or, in some cases, in place of the ordinary gaselier. A small reservoir, communicating by a pipe with an ordinary gas-burner, provided with a stopcock, is filled with shavings or wool, which material is saturated with the spirit. The air and vapour descend together through the pipe to the burner, and produce a flame apparently equal in all respects to ordinary gas, the air entering through a small hole at the top of the reservoir. It is stated that half a pint of oil will be sufficient

* Read Wednesday, May 21, 1873.

to saturate an amount of material to supply a light for nine hours.

It has often been thought that of a necessity these very volatile liquids must be much more liable to explosion than those of higher boiling-points; such, however, is not the case, not but that it is possible to cause them to explode, because the vapour of any combustible hydrocarbon, when mixed with that proportion of air which contains just sufficient oxygen to burn up the hydrogen and carbon, will burn throughout at once, producing thereby sudden expansion, which is nothing more than explosion; but the conditions necessary in order to obtain this result are more difficult to bring about in the case of these heavy vapours of very volatile bodies, as, just above the explosive point, the air and vapour simply inflame and burn, while just below it inflammation will not occur at all, from the presence of too small a quantity of vapour. This is contrary to the case of hydrogen gas, which explodes with ease when mixed with air in very variable proportions. The fear has been expressed that possibly, even after the complete mixture of such a heavy vapour and air, separation other than condensation to the liquid state might occur, that is to say, that a layer of heavy vapour might lie at the bottom and a layer of the lighter air at the top; but the law of the diffusion of gases, which states that gases and vapours, whatever their differences in density, will become and remain completely mixed, invariably prevents such separation, just as in the atmosphere the heavier oxygen is not found at the bottom, and the lighter nitrogen at the top, but the two are found together in practically the same proportions from wherever a sample of air is obtained.

If comparisons be instituted between gases made in the ordinary manner and these air-gases, they should be made under the same circumstances, and if this is done it will be found that coal-gas itself suffers, either on exposure to a low temperature or by long keeping—not in any way a surprising result, since it contains the vapours of benzole, toluole, etc., which are capable of being condensed to liquids. In this respect rich gases always suffer the most; thus, on continued exposure to a temperature of 0° C., or 32° F., gas made from cannel coal loses much more of its illuminating power than gas made from ordinary coal.

The employment of a combustible gas as the vehicle for holding in solution, and carrying, vapours of volatile liquids, appears at first sight to be a more rational, and, probably, a more successful method of applying the principle of carburation, for in the former cases not only has a sufficiency of vapour to be retained to confer luminosity upon the flame, but a further quantity must be present for the production of the flame itself, or we may express this difference by saying that in the one case the combustible gas is already manufactured, and requires only to be endowed with luminous properties by the hydrocarbon vapour; in the other the combustible gas has itself to be manufactured, and then, also, to acquire luminosity from the same hydrocarbon vapour, and therefore it will be perfectly clear that a non-combustible gas will require to hold a larger quantity of vapour in solution than a combustible gas, in order to attain the same amount of lighting power. This statement does not, of course, deny the possibility of a non-combustible gas, such as air, acquiring and holding a sufficient amount of vapour, but all other things being equal, a combustible gas has a distinct advantage in this respect, and probably such a gas might be carburetted with a hydrocarbon liquid, having a lower boiling-point, and hence less volatile than an incombustible gas, such as air. This advantage is also increased when air is employed as the vehicle, from the presence in it of one-fifth of its volume of oxygen which burns up—without other effect than increasing the heat of the flame—a proportionate quantity of vapour. The nature of the combustible gas used is not of any very great importance, and hence cheapness and economy in production become the chief guides for its manufacture. The possibility, without any great amount of trouble, of obtaining a quantity of hydrogen gas from water has always been a favourite theme with inventors, and many schemes for its practical utilization have been introduced; but one hardly expected to recognize in a "new gas" our old friend this water-gas once more; such is, however, the case, and a patent has lately been obtained for the carburation of this gas with some light hydrocarbon liquid. The plan is being carried out upon a small scale, and will doubtless very soon be tried upon a more extended one. The amount of attention that has been at various times bestowed upon this subject may be gathered from the number of patents obtained for the production of this so-called water-gas. The first appears to have been granted to Michael Donovan in 1830, a second to George Lowe in 1831, a third to Gilbert Saunders in 1833, and two others to Mr. Floret and Jean Baptiste Molerat about the same time, and many others, all differing by some slight modifications, but all dependent upon the decomposition of steam by red-hot coal, coke, or metal. This decomposition takes place with very great ease whenever steam is passed over such heated material. Hydrogen, carbonic oxide, and carbonic acid being produced, probably two different actions take place, as expressed by the following equations:—

$$H_2O + C = H_2 + CO$$
$$2H_2O + C = 2H_2 + CO_2$$

The amounts of hydrogen, carbonic oxide, and carbonic acid obtained are variable under different circumstances. An analysis of the gas obtained by passing steam over red-hot charcoal for some hours gave as a mean—

Carbonic acid	20	per cent.
Carbonic oxide	20	,,
Hydrogen	60	,,
	100	

Any form of carbon is capable of effecting this decomposition. If a metal, such as iron, be present, it adds to the quantity of hydrogen obtained according to the following action:—

$$4H_2O + 3Fe = Fe_3O_4 + H_8$$

This mixture of gases is inflammable, and burns with a non-luminous but hot flame, the heat of which would be increased if the carbonic acid were previously removed, the flame of hydrogen gas having a temperature of 3776° F. This heat of the flame is an undoubted advantage when the gas is carburetted, as the particles of carbon are thereby heated to whiteness; but, on the other hand, the presence in the gas of a quantity of carbonic oxide is as great a disadvantage, on account of its injurious and exceedingly harmful character. Carbonic acid is an injurious gas, but its action upon the system is not that of an active poison, but rather that of preventing the necessary amount of oxygen from entering the lungs, and hence death from its effect will be death from suffocation. On the other hand, carbonic oxide is an active poison, and recovery from its effect is much more doubtful; indeed, it is calculated that 2 per cent. in any atmosphere would prove fatal, a result that should cause great caution in the use of a gas containing it in any quantity.

In this recent process it is proposed to use retorts of the ordinary description, set, as usual, in benches of five, seven, or nine. All, except the upper one of each set, are filled with some carbonaceous substance, usually coke, together with some scrap-iron, or iron chairs, and heated up to a comparatively high temperature; steam—under pressure, generated from an ordinary boiler, and superheated by its passage through pipes set in and heated by the same furnace as the retorts—is introduced into the back of each retort, and has to traverse its whole length, passing through the red-hot coke and issuing from the front. During this passage the above decompositions take place. The upper retort is of a larger size, and is also filled with coke, but no steam is introduced into it; the gases formed and the remaining undecomposed steam from the other retorts passing through it together, this remaining quantity of steam being thus decomposed; and from this point the gas is treated precisely in the ordinary manner and stored in holders, it being in all respects a permanent gas. It is intended to utilize this gas by itself, as a heating gas; but its chief use is for illumination, and the necessary luminosity is obtained in the same manner as with air-gas, the gas being caused to bubble through some light spirit, any reduction of temperature by the rapid evaporation being avoided by maintaining the vessel containing it at a constant temperature by means of a steam-pipe. The illuminating power of the gas so obtained is equal to about sixteen or seventeen candles; and its permanent character is declared to be, and no doubt is, quite sufficient to render it of some practical utility. Let it, however, be borne in mind that no more union has taken place between the vapour of the hydrocarbon and the permanent gaseous mixture than in the case of the carburation of air, both gases taking up precisely the same quantity of vapour at the same temperature, and both being equally liable to be affected by changes of temperature, or other changes of circumstances. The whole of these carburetted gases are, of course, to a very large extent free from those impurities which are usually found in coal gas.

A suggested application of this principle of carburation, as an adjunct to the ordinary manufacture of gas, has many favourable points; for coal gas may most certainly be as successfully carburetted as either air or hydrogen and carbonic oxide, and it is quite possible to produce an exceedingly large yield of poor illuminating gas from coal, the luminosity of which might be brought up to the ordinary standard by partially carburetting the gas with some light hydrocarbon, the presence of a less quantity of vapour being requisite in a given bulk of gas, and hence a successful result would be more easily obtained, as the vapour would only have to raise the luminosity from a lower to a higher point, and not to do the whole work of illumination itself. A very large yield of gas from coal may be obtained by working at a high temperature, or at the ordinary temperature if a jet of steam be introduced into the retorts during the carbonization, it having been found possible to obtain by this latter method as much as 52,000 cubic feet from a ton of coal of an illuminating power equal to four candles.

In the preceding remarks an endeavour has been made to state and examine the claims of each of the processes brought forward in a clear and impartial manner. The extravagant statements and impossible theories sometimes put forward often obtain credence and support because those hearing them have seldom the necessary knowledge of the rudiments of chemistry or physical science to combat or disprove them; and very often such statements themselves are made in ignorance, and not with intent to wilfully mislead, by those who would be glad to state the truth if it were presented to them in a clear and succinct manner. Most schemes of this nature are open to conclusive proof with regard to their value and practicability, and in some cases this proof will be entirely to their advantage, and should not be shunned by their promoters. The introduction of so many new inventions just now, with regard to the manufacture of gas, indicates a great want somewhere, and if such a want exists it cannot be long before it is met and satisfied. Whether any of these present schemes are tending toward this satisfaction it is premature to say; this much may, however, be said, that hasty condemnation upon insufficient evidence is as much to be lamented and avoided as exaggerated and untruthful statements.

All mention of the commercial success of any of the above inventions has been avoided, as it was not intended, at the outset, to make this paper anything but an examination from a scientific point of view of such inventions. Doubtless there are those who are able to form an excellent judgment upon such matters as comparative cost of material, plant, labour, etc.; and this part of the subject must at all times have an exceedingly important influence upon any expressed opinion as to the profitable nature of such undertakings.

Parliamentary and Law Proceedings.

HOUSE OF COMMONS.

Shop Hours' Regulation Bill.

Tuesday, June 24.

The following petition against the Shop Hours' Regulation Bill was presented by Mr. W. H. Smith:—

"To the Honourable the Commons of Great Britain and Ireland in Parliament assembled.

"The petition of the Pharmaceutical Society of Great Britain humbly sheweth, that your petitioners view with considerable alarm a Bill now before your honourable House for regulating the hours of labour of children, young persons, and women in shops.

"Your petitioners represent the chemists and druggists of this country, who are compelled to supply at any time whatsoever, when required, medicines for the alleviation of human suffering and the saving of human life; and the provisions of the said Bill, which would render it compulsory to close the shops at which such medicines are usually obtained for half a day in every week, and prevent assistants and apprentices under twenty-one years of age supplying medicines in such shops on several days in the year, would cause great inconvenience and hardship not only to your petitioners, but to the public.

"Your petitioners venture humbly to express their feeling of dismay at seeing such attempts as are made by this Bill to draw sharp lines not only between masters and servants, but also between parents and children, and predict the worst possible consequences from such legislation.

"They therefore humbly pray your honourable House to reject the said Bill.

"And your petitioners will ever pray, etc.

"Signed on behalf of the Pharmaceutical Society of Great Britain,

"Thomas Hyde Hills, President."

Petitions against the Bill were also presented from Margate, Canterbury, and Ipswich, and one in its favour from Rochdale.

The second reading of the Bill is again postponed until Tuesday, July 1.

Prosecutions under the Adulteration Act.
Alum in Bread.

At the Nottingham Town-hall, on Tuesday June 24th, a baker of the town, named George Gill, was charged, under the new Adulteration Act, with selling adulterated bread and flour. On the 7th of May last the officer appointed under the Act went to the defendant's shop and purchased a loaf and a small quantity of flour, which he took to the borough analyst, Dr. Truman, who analysed them, and found alum in the flour to the amount of 10 grains to a 4lb. loaf, and in the bread at the rate of 26½ grains, thus rendering the articles injurious to health.

Mr. Belk who defended, urged that the defendant when purchasing the flour had no means whereby to detect the presence of alum.

The Town Clerk, who prosecuted, was willing to admit that, but contended that the Act of Parliament threw the responsibility of knowing that the articles they sold were pure upon the retail dealers, who could have their remedy in prosecuting the wholesale dealer and suing him for damages.

The bench took a similiar view of the case, but, as this was the first conviction under the Act, inflicted the mitigated penalty of 40*s*. Notice of appeal was given.

At Lambeth, on Tuesday, June 24, three cases under the Adulteration of Food Act were heard. Mr. Marsden, Vestry Clerk of Camberwell, attended to prosecute.

The first case was that of John Finch, baker, High Street, Peckham. A 2lb. loaf was purchased by Charles Wood, one of the inspectors. On being tested by Dr. Bernays, Professor of Chemistry, St. Thomas's Hospital, it was found to contain alum. The defendant said he had been twenty years in business, and never had used alum in making bread. He then called a man who had been in his employ, and who confessed that he had put alum in the bread unknown to his master. For doing so he had been discharged. Mr. Marsden then said he did not press the case, and the summons was dismissed.

William John Druce, baker, Wyndham Road, Camberwell, was summoned under the same Act. He pleaded "Guilty;" and said the flour supplied to him was bad. Dr. Bernays said the bread bought at the defendant's shop contained alum, and was injurious to health. Mr. Ellison inflicted a penalty of £5, saying he wished it to be understood that in future the full penalty would be imposed.

John Grimble, baker, Cator Street, Camberwell, was the third defendant. A half-quartern loaf purchased at the defendant's shop was found to contain 28 grains of alum. The defendant denied having any alum, and his foreman said he had never seen any on the premises. Perhaps the miller put it into the flour. Mr. Ellison said bakers should have the flour tested. He fined the defendant £1 and costs.

Poisoning by Prussic Acid.
Mistake in Dispensing.

An inquest was held in the male convalescent ward of the Royal Berks Hospital at Reading, on Monday, June 16th, before the Borough Coroner (W. Weedon, Esq.), on the body of Mary Corps, 32, spinster. The body having been viewed, the Coroner in drawing the attention of the jury to this inquiry, said they must inquire whether the person who administered the draught which caused the death of the deceased was guilty of manslaughter; if the poisoning was caused by gross carelessness or negligence, that person was guilty of manslaughter.

Mr. Rising watched the inquiry for the relatives of the deceased.

William Robinson Hadwin (having been cautioned by the coroner) said: I am dispenser here; I have been here four years and two months. I had been busy on Saturday, but not more busy than usual on Saturdays, as that is a very busy day. I had to make a draught for the deceased similar to those I had before made for her. I do not remember what time this particular draught was made up. I have seen a part of the draught since; there were two draughts in the bottle. It appeared to contain hydrocyanic, or prussic acid. I had not been using the acid in any former draughts, but had been using it frequently during the day. It was in the place in which it is usually kept, and was within a few inches of the bottles which I required for this draught. I cannot account for taking the wrong bottle, except by supposing my attention was called off for the moment, and that I took the bottle during that time. There was a boy in the dispensary with me, but he was not helping me make up draughts. I do not know the deceased, and have never seen her; I knew nothing about her. I was in my usual health on that morning, and not more flurried than usual. The bottles of chemicals were all labelled; there was a small poison label on the prussic acid bottle, quite large enough to be distinct. There was a similarity between the labels of the two bottles; that on the bottle I should have used was printed by myself in large letters, and that on the other was printed from type. I have been a dispenser for many years, and never had a misfortune of this kind before. I had more than 100 in-patients and about 80 out-patients to dispense for on Saturday; the out-patients were dispensed for first, and then the in-patients. I suppose I began dispensing for the latter about one o'clock, but might possibly have made up this draught previously, while waiting for prescriptions for the out-patients. I have seen the bottle with the draught in it, and have no doubt it is the bottle in which I put up the draught on Saturday. The deceased and her relatives are all strangers to me, and I have therefore no ill-will towards her. I heard of her death on Sunday morning; she was to take half of the draught at bed-time.

The bottles were then produced and identified.

Cross-examined by Mr. Rising: The bottles are kept on the same shelf. [The one from which the draught was taken was labelled poison, with an orange coloured label, and was larger than the other.] The small bottle also contained poison (chloral hydrate), but is not labelled as such. Twenty grains were prescribed. I suppose four drachms of prussic acid were given; the chloral hydrate and acid are always used in solution. About 40 grains were used in the mixture. The bottle is labelled "half to be taken at bed time," and it was the duty of the nurse to give it. The prussic acid bottle was in its usual place, and I am sorry I had not moved it, as I have at other places.

Mary Ann Cox, nurse at the hospital, said the deceased was not in my charge. I had charge of the ward in which she was on Saturday evening. I took the draught from the window and gave it to the nurse who I saw give it to the deceased. The bottle was labelled with the name of the deceased, and with directions for giving the draught. I saw the nurse pour half the contents into a glass and give it to the deceased. She was immediately taken with a burning heat, and said it tasted very different from what she had had before. She asked for some water, and as I rinsed the cup she became stiff. I laid her down and sent for the matron, who came directly and sent for the house-surgeon. He was there in less than five minutes after she had taken the draught; the bottle produced was that which contained the draught—it was left half full. Deceased died about half-an-hour after she had taken the draught.

In answer to questions from Mr. Rising and the jury, witness said she believed the writing was in the dispenser's handwriting; deceased had been a patient about a fortnight, and had a draught every night but one. The draught was given about ten minutes to ten, and deceased died at 10.20; she complained of the draught burning her, and asked for some water, and was then unconscious till she died. She had suffered a great deal of pain.

Mr. Hadwin, re-called, said: The bottle produced is that which has been used for deceased's draughts ever since her admission; the label is in my writing, and was put on when the bottle was first used.

Mr. Richard Galpin, house-surgeon, said: The deceased was admitted about a fortnight ago, suffering from disease of the bronchial tubes. I was called to her two or three minutes after ten on Saturday night; the matron said she had suddenly been taken faint. I saw she was in a dying state, and on questioning the nurse I found she had been better all the evening. Deceased became insensible, and I then took up the bottle and immediately perceived by the smell that it contained prussic acid; the symptoms were those of poisoning by prussic acid, and I have no doubt that was the cause of her death. I believe that is the general opinion of the medical gentlemen who have seen deceased. I have been here three years, and Mr. Hadwin was here before me; I have always found him very careful indeed in his dispensing, and never heard any complaint against him.

Cross-examined: The dispenser *might* have smelt the prussic acid, which emits a strong effluvium, but, unless he smelt it specially, he most likely would not have done so, as there were so many other chemicals in the room. There is a great difference between the smell of the prussic acid and the chloral hydrate, but in the dispensary they would be neutralized.

Re-examined: A *post-mortem* examination would enable us to say certainly what was the cause of death. The quantity of prussic acid was sufficient to account for it. I did not apply the stomach pump, as she would have died while I was using it. The time deceased lived was not very unusual.

Edward Wells, Esq., M.D., said: Deceased was a patient here: I saw her every alternate day and have seen the body since her death. We cannot detect the presence of prussic acid by the smell of the body, and I can only say what was the cause of death from what I have heard. I have known the dispenser ever since he has been here—four years—I have always found him an extremely careful and punctual man; he has had the management of the dispensary. Several members of the committee have sanctioned my saying that Mr. Hadwin has always been a very careful man. I think a *post-mortem* would not throw much light on the subject, as there is no question as to the administration of the dose, or as to the quantity. The dose given was a necessarily fatal one; therefore deceased's life could not possibly have been saved.

This being the whole of the evidence, the Coroner said the jury must first decide what was the cause of death. Mr. Hadwin had made up the draught and the nurse had administered it, so there could not be much doubt on that point. They must then decide whether the dispenser was guilty of gross carelessness; if so, they would be justified in bringing in a verdict of manslaughter.

The jury consulted for about ten minutes and then returned a verdict that "The deceased met her death by poisoning by prussic acid, administered by misadventure." The jury suggested that the dispenser should have more assistance on the busy days.

Mr. J. H. Wilson said, the recommendation of the jury would be conveyed to the Board at their meeting on Tuesday, and on the behalf of the committee who investigated the case that morning he begged to assure the relatives of the deep sympathy they felt at the loss they had sustained, especially as it was the first death of the kind which had occurred since the hospital had been opened. He also wished to express the sympathy of the committee with Mr. Hadwin.—*Berks Telegraph.*

Death from an Overdose of Paregoric.

On Tuesday, June 24th, Mr. F. Price, coroner, held an inquest at Salford respecting the death of a child named Newton, aged seven weeks. It appeared from the evidence that, the child being very cross, the grandmother put two tablespoonfuls of warm water into a bottle which had contained paregoric, and in which a few drops were left, and after shaking the bottle, poured the liquid upon some sugar, and told the mother to give half of it to the child. The mother, however, gave the whole, and the child became ill, and died the same morning. The jury returned a verdict that the deceased died from an overdose of paregoric, and the coroner cautioned the mother and grandmother to be more careful in future.—*Manchester Courier.*

Review.

Pharmacopœia of the University College Hospital. Published by Authority of the Medical Committee, 1873. Edited by William Martindale, Pharmaceutical Chemist, etc. London. 1873.

The practice now generally adopted by the London hospitals of publishing the forms for the administration of medicines used by their respective medical staffs, has its advantages, although something might perhaps be said against it. The principal object, we presume, of compiling these hospital Pharmacopœias is that of economizing time in prescribing as well as dispensing the medicines ordered for the hospital patients. There may also be another object, namely, that of limiting the number or variety of the medicines used, a selection being made of such as are considered most suitable for the purpose intended. The medical men attached to the hospitals are all eminent in their respective departments of the profession, and it is to be inferred, therefore, that the forms used by them in prescribing represent sound and advanced views in therapeutics and the treatment of disease. Beyond this it would be unreasonable to look for much that is new or instructive in these formularies. Simplicity, consistency, and efficacy we may expect, and we find in the little work before us, as well as in others of a similar sort, that complications and refinements are generally avoided, and the more simple and efficacious medicines principally ordered. It appears, however, that even in hospital prescribing an appeal is sometimes made to the imagination, for we presume it is for such purpose only the mixture of burnt sugar and water, under the name of *mistura flava*, is required, or that cochineal colouring or tincture of lavender is added to a lotion. We have wondered, too what the object is of ordering both calamine and oxide of zinc in a lotion. Surely calamine is never better than oxide of zinc, although sometimes it may be something very different from it, in which case we presume the oxide of zinc is intended to supply the absence of zinc from the so-called calamine. These, however, are small matters which are amply compensated for by the prevalence of a system of prescribing that appears to be more consistent with the special objects in view. In addition to diet scale, and instructions for reporting cases, the book contains 97 prescriptions, 39 of which are for mixtures, and the rest for various other forms for the administration of medicines. The principal peculiarities in this hospital formulary as compared with others are that the quantities of ingredients ordered for mixtures (the most numerous class of preparations prescribed) always represent one dose of a fluid ounce, and that weights and measures are expressed according to the British, and also according to the metric system. We think, however, that the method adopted of giving the equivalents of the British weights and measures, not in exact, but only in approximate, quantities according to the metric system, is by no means a commendable one. We object to the practice of representing the French gramme as 15 grains, and the fluid ounce as 30 cubic centimetres, as calculated to establish incorrect ideas.

BOOKS RECEIVED.

Jahresbericht über die Fortschritte der Chemie und verwandter Theile anderer Wissenschaften. Herausgegeben von Alexander Naumann. Für 1870. Drittes Heft. Giessen: J. Ricker, 1873.

Manual of Chemical Analysis as applied to the Examination of Medicinal Chemicals. A Guide for the Determination of their Identity and Quality, and for the Detection of Impurities and Adulterations. By Frederick Hoffmann, Ph.D., Pharmaceutist. New York: Appleton and Co. 1873. From the Publishers.

The Mineral Springs of the United States and Canada, with Analyses and Notes of the Prominent Spas of Europe, and a list of Sea-side Resorts. By George E. Walton, M.D., etc., New York: Appleton and Co. 1873. From the Publishers.

The following journals have been received:—The 'British Medical Journal,' June 21; the 'Medical Times and Gazette,' June 21; the 'Lancet,' June 21; the 'London Medical Record,' June 21; 'Medical Press and Circular,' June 21; 'Nature,' June 21; 'Chemical News,' June 21; 'Gardeners' Chronicle,' June 21; the 'Grocer,' June 21; 'Journal of the Society of Arts,' June 21; 'Grocery News,' June 21; 'Produce Markets Review,' June 21; 'Practioner,' for June 21.

Correspondence.

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

"Professional Patronage"—A Caution.

Sir,—A few nights ago I was aroused from my slumbers by a loud knocking at the door and a violent ringing of the night bell. On my hastily throwing up the bedroom window, a gentleman called out that he was a medical man, and requested that I would come down directly and supply him with some medicine that he required. On his entering the shop he asked for $1\frac{1}{2}$ oz. of chloroform, made from pure, not methylated spirit, and at the same time wished for a glass of water. After drinking about a pint of cold water he seated himself on a chair, and, taking a piece of lint from his pocket, saturated it with the chloroform and commenced rapid inhalation. Very quickly he was fully under its influence and snoring. Not liking the appearance of things, I rang for one of my assistants, and requested him to look out for a policeman. After a lapse of about twenty minutes, and during the absence of my assistant, my nocturnal visitor roused himself. I thought it probable he would now make a move, but no such luck; he vigorously plied himself with another "go" of chloroform, and again became insensible. I hesitated to "tackle" him alone, for in addition to a determined look, he carried a formidable stick in his hand, and I felt that I could not afford to have my head broken. At last my assistant returned with a policeman, to whom I explained the circumstances, at the same time requesting that he would at once remove him. With a little vigorous shaking, but still in a semi-stupid state, we got him into the street, and finally into a cab. I retained the bottle of chloroform, from which about half an ounce had been used, and even that he said he had no money to pay for. He was dressed in a suit of grey, and had a real or assumed contraction of one hand. From three to four o'clock in the morning this pseudo medical man kept me cooling my heels in attendance on him, and I have just been informed by my friend, Mr. Taylor, of Baker Street, that he has also been favoured with a similar visit. To prevent others parting with their chloroform and losing their night's rest in a similar manner is the object of this communication.

Thomas Greenish.

20, *New Street, Dorset Square.*

*** Since receiving the foregoing letter another chemist has written to the *Times* as follows, under the heading, "A Dishonest Dipsomaniac:"—

"On Sunday night last, or rather at 2.30 a.m. on Monday, I was aroused by the ringing of my night bell. As is my usual habit, I looked out from my bedroom window and saw a man waiting at my door. In answer to my inquiry as to what he wanted, he told me he was a medical man and required medicine. I dressed myself and came down into the pharmacy, and on opening the door was asked if I could supply some chloroform. I stated that it was not my practice to retail such a preparation to those I had not the pleasure of knowing, but if he were a medical man and would give me his name and address, I would let him have it. He told me he was Dr. ——, of —— Terrace. The address I purposely suppress, as I find there are respectable practitioners residing on the same terrace, and I have since discovered that the name and address were both false. He was evidently *au courant* with his subject, for he described the particular kind of chloroform he required, and which was to be that made by Messrs. Duncan and Flockhart, from pure alcohol. I told him that I supposed I ought to feel flattered (which I did not) at his selecting my pharmacy when he must have so many chymists nearer his own home than I was, but presumed that he required it for some accouchement in this neighbourhood. No, he wanted it for himself, as he suffered from epileptic fits, and felt that he then had one coming on, and that nothing relieved him but the inhalation of a few drops of chloroform. I expressed my surprise that he did not keep such a remedy by him, but was met by the ready excuse that on going to his bottle he found it had all evaporated, and that he had been to half a dozen different druggists before he came to me, and that not one of them would get out of bed. They were wiser than I was. However, it ended by my letting him have the chloroform. As soon as I handed it to him he sprinkled a drachm or so on his white cambric handkerchief, and seating himself comfortably began to inhale it. I suggested to him the expediency of his employing the remedy in the privacy of his own chamber, but it was in vain, he would not move. I told him I was anxious to get to my bed, and that I was getting tired of a reception that had been forced upon me at an unseasonable hour of the night. Affairs began to assume a disagreeable aspect. I opened the door wide, and looked up and down the street for a stray policeman or a passing cab, but in vain; not a soul could I see, and I could not readily summon any of my own household. He was a tall powerful man, and I felt how unequally matched we should have been had it ended in a trial of physical force. He had not inhaled enough to thoroughly satisfy him, but sufficient to make him an exceedingly disagreeable visitor. At last, by dint of threats and persuasion, I induced him to leave, but he flatly refused me the slightest remuneration, and reeled off with my bottle in his pocket.

"Now, this man is evidently a confirmed dipsomaniac; he has not the means of indulging in the usual stimulants resorted to by that class, neither does he care to pay for his chloroform. He has cunning enough to know, as a rule, that at the dead of the night only one would attend the summons of a chymist's night-bell, and that he would have a favourable field for his plans.

"For the information of my professional brethren, I would mention that he is a well-built, broad-shouldered man, about six feet high, dressed in a light tourist suit, and with large flowing whiskers—such, I think, as are technically termed "Piccadilly weepers." Should such an individual present himself at night to any of my fellow chymists, I hope they will not allow themselves to be swindled of their goods and robbed of their night's rest as I was. "John Taylor, Chymist.

"13, *Baker Street, Portman Square, W., June 24th.*"

We have also been informed that a person answering the above description, between the hours of nine and ten p.m. on the 14th June, went to a West End house and wrote a prescription, ordering 1 oz. of chloroform, of which he inhaled two drachms and became insensible. The same person has also practised this trick at other places.

J. Abraham (Liverpool).—Your communication has been received with thanks.

M. Doughty.—Your communication shall receive attention next week.

Messrs. T. H. Smith and Co. will find, on referring to our report of this case, and the editorial remarks upon it, that the particulars they mention respecting themselves were fully pointed out.

C. Kidd, M.D.—The opinion expressed as to the comparative safety of the two substances would find a more appropriate place in the pages of one of our medical contemporaries.

"*Lamium.*"—(1) Lamium purpureum. (2) Nepeta glechoma. (3) Veronica anagallis. (4) Senecio Jacobæa. (5) Fumaria officinalis.

"*Botanist.*"—(1) Juncus Gerardi. (2) Scirpus maritimus. (3) Nepeta glechoma.

T. A. Wedge.—Your letter has been handed to the publishers, who will communicate with you upon the subject.

"*Calyx.*"—We do not think that there is any deficiency in the supply of works similar to that described by you.

X. Z. Y. is referred to the rule respecting anonymous communications.

"*Theta.*"—(1) Section xii. of the Pharmacy Act, 1852, provides that it shall not be lawful for any person, not duly registered as a Pharmaceutical Chemist, "to exhibit any name, title, or sign implying that he is" a member of the Pharmaceutical Society. (2) Yes. (3) Yes; by virtue of having been in business before August 1, 1868.

Communications, Letters, etc., have been received from W. Wilkinson (Manchester), Gallois (Paris), H. C. Pollard, J. Hallawell, P. L. Simmonds, Symes, J. Bayner, Mudge, J.

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(THIRD SERIES.)

All Letters to the Editor will be found arranged under the head of "Correspondence;" Leading Articles, etc., under the head of "Editorial Articles and Notes."

THE END.

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